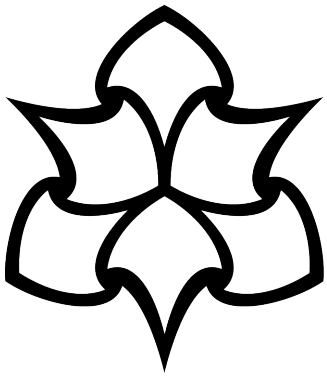

Student Perceptions on Skills and Learning Challenges in the Use of Educational Technology in a Low-Contact, Blended and Professional Learning Context: A Grounded Theory of 'Improvised Learning'

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Student Perceptions on Skills and Learning Challenges in the Use of Educational Technology in a Low-Contact, Blended and Professional Learning Context: A Grounded Theory of 'Improvised Learning'

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Abstract

This research project provides an original contribution to knowledge, comprising a grounded and unified theory of improvisational behaviours via Blended Learning and suggests a new paradigm of self-regulated, improvisational learning for potential application beyond the field of study. The study comprises an original Grounded Theory of 'Improvised Learning' demonstrating the most prevalent challenges, strategies and behaviours of students undertaking Higher Education programmes in a campus-based, low-contact teaching environment. The participant group were typically undertaking accredited professional programmes (usually related to a profession such as nursing or accounting). The students engaged in 'Blended Learning' i.e. study on-campus alongside use of learning technologies such as a Virtual Learning Environment (VLE). The research project used Grounded Theory as an holistic methodology to investigate the experience of students in this study context. The main data collection phase consisted of informal individual or group discussions held in classes, open plan Library areas or IT Labs.

Grounded Theory is a sociological methodology designed to formulate a new (Grounded) theory from a 'substantive area', i.e. a participant group typically comprising a shared vocational role or activity. Key elements of Grounded Theory include an emphasis on induction-based conceptualisation of theory from descriptive participant indicators and the continuous comparison of data for the emergence of 'theoretical categories' or codes. The ultimate aim of Grounded Theory is to demonstrate how conceptual categories inter-relate within a common theoretical explanation for the behaviour of participants (the 'core category').

This grounded study of professional learners identified a number of theoretical models of behaviour for engaging with Blended Learning, including innovative self-led use of Information Technology and collaborative learning. The emergent 'core category' - reflecting all dependant codes or variables was defined as 'Improvised Learning', explaining conceptually how students employ self-led strategies and skills to engage with disparate systems, environments and resources.

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Gyda gyflwyniad arbennig i fy rhieni, fyn ngwraig Sharon Catherall, fy mrawd Gareth Catherall ac i Arthur a Mair Jones ar gyfer pob eu gymorth a galondid yn y gorffennol.

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PREFACE

This PhD arose mainly from personal experiences working at Glyndŵr University based in Wrexham, North Wales (formerly the North East Wales Institute of Higher Education) in a technical and e-learning related development and support role from 2001-2009 and following earlier experiences during the late 1990s working at the same institution in a junior library related role.

The research project arose as a proposal to examine the field of 'E-Learning' – broadly representing the use of emergent World Wide Web (WWW or 'Web') based interfaces to information and learning applications, however it became evident a more defined focus would be required to define a suitable research question or activity within this broad field; a solution presented itself in the form of the Grounded Theory methodology, a sociological approach based around interrogation of participant responses for identifying participant group concerns.

The working research title eventually defined in the proposal 'Student perceptions on skills and learning challenges in the use of educational technology in a part-time, distributed and professional study context' reflected a desire to address the conditions, challenges and support needs of an increasingly prolific trend toward part time or low contact study facilitated by emergent learning technologies such as the VLE (Virtual Learning Environment) in a distributed i.e. multi-platform, multi-location and multi-context learning environment.

It is felt by the researcher (a professional working in E-Learning delivery for several years) that the wider field of E-Learning has remained relatively static in recent years, thus supporting the continuing relevance and currency of this research project; this factor is largely confirmed by re-appraised of the literature (also see

Chapter 5: Discussion In Relation To The Literature, Part 3: Findings in Context to Recent Trends). Indeed, many of the behaviours demonstrated in the practical research reflect the anecdotal student experience in 2014 (and for the period of the final thesis submission in 2017); many theoretical insights discovered provide evidence of ongoing challenges, concerns or behavioural strategies employed by students or learners regardless of context or place. Indeed, wider application of the emergent Theory also reflects what is perhaps the key aim of the Grounded Theory methodology, namely to discover and conceptualise transcendent behavioural patterns which apply beyond the immediate participant context, organisation, or field of study.

CHAPTER 1 (a): INTRODUCTORY CONTEXT

Part 1: Introductory Statement

A number of motivations can be identified regarding this study, in particular, trends in the provision of digital and online-based educational delivery since the early 2000s and associated wider aspects of information services supporting teaching and learning. These developments can be summarised in terms of an increasing prevalence for digital and computing behaviours and lifestyles, both within the managed environment of the Higher Education campus, and externally across society. These trends are also seen alongside increasing advocacy and innovation across the spheres of educational delivery and information technology, but also advocacy and intervention via government and official bodies to utilise, exploit and adapt the emerging dimension of digital and online technologies. In addition to these trends, other motivations for the study can be seen in the form of individual professional development and experience, including work in early Web based systems and wider experience in support and teaching roles within Higher Education. These trends and motivations will provide a detailed background to the study, illustrating emerging learning technologies and the student experience in context to sector, industrial and governmental developments.

Part 2: Structure of the Thesis

The first chapter of the thesis provides the background context, the student-learner environment and the developments in learning technologies that motivated the work in the first instance, this will consist of two sub-parts, Chapter 1 (a) discusses the historical, policy, societal and motivational factors in the study, Chapter 1 (b) explores the context of learning and teaching using Internet and Web based technologies. The second chapter will present the methodology of Grounded Theory, entering a high level discussion of the principles of Grounded Theory, including discussion surrounding positivist and constructivist approaches to the methodology used in the study. The third chapter will provide a detailed overview of the research design, including a description of coding practices used within the chosen methodology, Grounded Theory. The fourth chapter will provide two sub-parts, including Chapter 4 (a), providing a presentation of the component or dependent properties of the Grounded Theory resultant from the study ('Improvised Learning'), focused on how the theory was derived through inductive data analysis. Chapter 4 (b) will provide an explanation of the theory emergent from the research, focused on the Grounded Theory of 'Improvised Learning' that emerged via application of the Grounded Theory methodology to investigate students' perceptions on the use of learning technologies. The fifth chapter will provide an analytical discussion of the theory in relation to the literature, including a retrospective review of the literature on improvisation across educational and other sectors. The sixth chapter will provide a conclusion for the study, including a summary of the original research aims, an outline of the findings and summary of implications for future research which could be prompted by the resultant theory of 'Improvised Learning'.

This chapter will also outline approaches to potentially operationalise the research findings within the Higher Education sector and also for other sectors, such as Further Education.

i. Treatment of the Literature

It may be necessary to briefly consider the discussion chapter in context to the methodology used. It should be noted that the methodology selected, Grounded Theory is a qualitative research methodology based around the coding of participant responses following open discussion. The methodology requires the categorisation, comparison and verification of developed codes to define forms of behaviour which demonstrate interchangability in their properties. Through successive sorting, comparison and related techniques, increasingly refined or higher level codes are defined to explain behaviours as theoretical codes, indicating motivations and strategies continually engaged by participants to overcome their concerns. Due to this inductive approach in coding responses as data, it is considered necessary to approach the surrounding literature in a manner which avoids pre-empting or pre-conceiving participant responses or emergent theory explaining behaviours. Personal professional experiences, practice and prior professional writing of the candidate are acknowledged via discussions of research motivations (shown in the current chapter). Following chapters of the thesis will demonstrate how the research was approached in accordance with principles of the chosen methodology (Glaser's variant of Grounded Theory) comprising an objectivist, positivist, emic and empirical position when approaching the substantive area, the research context/environment and participant data. These principles are discussed in Chapter 2: The Methodology,

Part 3: Grounded Theory Principles. Further approaches/ techniques used to approach the research in the context of avoiding pre-conception and ‘a priori’ knowledge are also discussed in Chapter 2: The Methodology, Part 4: Branches of Grounded Theory and Rationale for the Chosen Methodology and Chapter 3: Research Design, Part 5: Approaches for Data Coding.

Research methods/ techniques or processes to mitigate and respond to personal preconception and experience are therefore outlined in early chapters of the thesis. Chapter 5: Discussion in Relation to the Literature will demonstrate contextual reference and comparison with the literature in accordance with principles of Grounded Theory such as ‘Theoretical Sensitivity’, where comparisons with prior literature and theory have supported or verified emergent coding.

The discussion chapter can be seen to provide a largely retrospective process occurring substantially following the practical research phase and development of theoretical perspectives via the chosen methodology. Consultation of some literature sources, applied in the context of the methodology to assist or complement data collection during the practical research phase is explained in Chapter 2: The Methodology, Part 3: Grounded Theory Principles and elsewhere in this thesis.

Part 3: Historical Background to the Study

Prior to the years represented by the practical phase of the research project (approx. 2007-2008) the UK Higher Education Sector had experienced considerable change following the adoption of networked information systems and development of Information and Communications Technology (ICT) literacy amongst educators, academic related staff and the student population (Haywood et al., 2004).

During the mid to late 1990s, the emergence of widely accessible networked computing facilities within HEIs (Higher Education Institutions), driven to a large extent by the Higher Education network operator JANET (Joint Academic Network) had opened new frontiers in institutional operations, supporting a diverse range of networked systems, such as Library Management Systems and their associated OPACs (Online Public Access Catalogue), Email and early bibliographic Library systems such as Dialog. The trend toward Increasing prevalence of ICT in HEIs during the late 1990s is outlined by Michael Yohe (1996, p.14), outlining emerging trends for user expectations of networked services and barriers to these demands, limited by network infrastructure, resources and platforms, commenting that "...We measure in minutes the time from delight that the library catalog is online to anger that the full text of all listed books is not instantly available on the screen."

The rapid adoption of home computing during the late 1990s ensured a medium for popular access to networked University systems and applications for learning and teaching. The Higher Education sector (and particularly younger or emerging HEI providers) would also be heavily influenced by government drivers for widening participation and advocacy for an industry-led University sector, with ICT providing a catalyst for innovative approaches to the delivery of teaching and user support.

i. The Shift from Networked Learning Resources to the Virtual University

Naughton (1999, p.238) illustrates the transition toward more usable networked systems, commenting that "…the Net before Berners-Lee was akin to using MS-DOS or UNIX - you could do almost anything provided you knew the lingo." Graphical User Interface (GUI) based Operating Systems such as the Apple Macintosh and

early Web browsers such as ‘Mosaic’ offered a more usable interface to networked applications (Policinski, 2012). Web-based networks were supported by technologies such as ‘Perl’, relational databases such as Oracle/SQL, standards for reliable infrastructure such as Open Systems Interconnection and TCP/IP (Paris, 2004, p.455; Qiu, 2006, p.92), security applications such as SSL and LDAP (Akram and El-Seoud, 2007, p.74) and development of JANET, the Higher Education network (Greenhalgh, 2001, p.13). The early 2000s were characterised by HEI adoption of Content Management Systems (CMS), allowing for management of Web content without requiring specialist skills (Williamson and McKay, 2002, p.505) and the Virtual Learning Environment (VLE), providing tools for debate, assessment and interactive learning (Heaton-Shrestha et al., 2005, p.371). The term Managed Learning Environment (MLE) described wider integration of student-facing systems and administrative functions (Carter, 2005 p.484; JISC, 2000; McKimm, Jollie and Cantillon, 2003, p.870). Toward the late 1990s terms such as Virtual University (Chellappa, Barua and Whinston, 1997, p.56), Virtual Library (Van Drie and Lajiness, 1998 p.274) or Virtual Campus (Maher, 1999, p.376) were used to define a unified, remotely accessible network, described by Chellappa, Barua and Whinston (1997, p.56) as “…electronic workspaces and global libraries that provide richer functionality and features than their physical analogs.”

ii. The Expansion of Computing and Internet Lifestyles

The period before the 2000s saw a dramatic rise in home computing, widely extending access to the Internet and related behaviours (Wyatt and Farrar,1994, p.204). There were 16 million Internet users worldwide by 1995 and 1,173 million by

2007 (Internetworldstats, 2013). By 2008 162 million domain names had been registered (Verisign, 2014). By the early 2000s, emergence of the Web as an accessible, interactive interface to the Internet was described as “Web 2.0” - typified by Social Networks such as MySpace (O’Reilly, 2005); this period saw an expansion in Internet behaviours such as use of e-mail, social networking for informal communications, content-sharing, use of Web blogs and engagement in commercial online services (O’Reilly, 2005, p.1). Search Engines also provided an accessible interface for the Internet (Cho and Sourashis, 2004, p.20). These developments implied societal changes and impact on the HEI sector (Barnatt, 2008, p.49).

Tim Berners-Lee’s conceptual ‘Semantic Web’ (Berners-Lee, 2001) proposed integration and personalisation across a range of networked devices, prompting World Wide Web Consortium (W3C) standards such as XML (Extensible Markup Language) allowing for more sophisticated integration of Web-based systems, this syndicated approach was termed “Web 3.0” (Hendler and Berners-Lee, 2010, p.28). Social Networks such as MySpace acted as a driver for Internet engagement and set new expectations for networked services. Selwyn (2011, p.2) describes the trend for self-led access to networked services as the “networked self”. The rise of mobile computing from the 2000s via PDAs (Personal Digital Assistants), smartphones and tablet computers accompanied the expansion of wireless connectivity such as 2G and mobile applications or ‘apps’. Urban and Sultan (2015, p.31-32) comment on the ubiquity of mobile technologies, describing the struggle of HEIs to meet demands for mobile, ubiquitous computing behaviours commenting that “…many higher education institutions (and educators) now find themselves expected to catch up with this world of social media…”

Part 4: Recent Developments in the Student-Learner Environment

i. Adoption of the VLE

By the early 2000s the VLE (Virtual Learning Environment) had become the de-facto model for learning platforms, including commercial VLE systems such as Blackboard and Open Source VLEs such as Moodle (Moodle Partners, 2016). A 2005 study for implementation of a VLE at Kingston University, Surry comments on the increasing prevalence of the VLE model and its flexibility for delivering learning at a distance, offering "...the management of teaching materials, synchronous and asynchronous communication..." (Heaton-Shrestha et al., 2005, p.370). A UCISA 2005 VLE survey in 2005, reflected the prevalence of commercial VLEs such as Blackboard (42%) and WebCT (40%) with lower adoption of Open Source platforms such as Moodle (13%), reflecting a trend away from experimentation and hosting multiple VLE platforms (UCISA, 2003) toward more focused institutional adoption of platforms (UCISA, 2005, p.8). In 2006 WebCT was acquired by the Blackboard Corporation (Casey, 2008, p.45), resulting in reduced usage of the (Blackboard owned) WebCT VLE and a shift toward the Moodle VLE as an Open Source solution (UCISA, 2010, p.2).
A UCISA survey (2014) found all institutions have surveyed continued to rely on a traditional VLE model for delivering e-learning needs, with the most prevalent VLE being Moodle (62%) reflecting increasing uptake of this Open Source platform, the report also reflected adoption of commercial solutions such as Pearson eCollege and Coursera. The VLE platform therefore remains a significant model for ICT facilitated education, with many of the original software providers and platforms remaining important stakeholders for UK HEIs into the current decade (UCISA, 2014).

ii. The emergence of TEL (Technology Enhanced Learning)

'TEL' or 'Technology Enhanced Learning' is cited as a term for delivery of learning via digital systems, originating via learning applications dating from the 1960s (Duval, Sharples and Sutherland, 2017, p.4). TEL has been defined by Bayne (2014, p.5) as "...the interface between digital technology and higher education teaching...", indicating that TEL is a prevalent term for UK policy-makers in a "social, economic and political context" (Duval, Sharples and Sutherland, 2017, p.6), although globally, terms such as "'educational technology' and 'E-Learning' still dominate." (Bayne, 2014, pp.5-6). Duval, Sharples and Sutherland (2017, p.5) indicate the significance of learning design in defining TEL, reflecting "accumulated research into how we learn" and comprising a "single system" approach across a rage of theory and practice. Kirkwood and Price (2013, p.6) emphasise an institutional context, however Duval, Sharples and Sutherland (2017, p.6) contrast the role of informal, mobile and personalised behaviours which inform "design for effective learning". Kirkwood and Price (2013, p.6) offer critical perspectives on TEL's 'enhancement' qualifier, also suggesting "...it is rare to find explicit statements about what TEL actually means...". Kirkwood and Price (2013) further query TEL advocacy focused on applications rather than pedagogy, similarly Bayne (2014, p.7) suggests TEL comprises "essentialism" - an obligatory context, limiting "...capacity to be critical about education and its relation to technology". Duval, Sharples and Sutherland (2017, p.9) also query barriers for students having English language or accessibility needs, suggesting that TEL cannot represent a "determinist approach" for all students, also emphasising the need for further research into TEL implications for teaching and learning.

iii. Drivers for Flexible Learning and Vocationalisation of Higher Education

During the mid to late 2000s, UK HEIs experienced a sustained growth in part time study; Universities UK (2012) indicate "...students studying part time for their first degree increased by over 90% over this period." The Higher Education Statistics Agency (HESA) indicates a similar increase in part time entry to HEIs by school entrants and rising participation levels from lower socio-economic groups (HESA, 2011); in 2003/4 UK-wide participation in HE by these groups was 28.6%, rising to 29.5% in 2007/08. These trends reflect HESA statistical returns for young entrants from POLAR 2 'Low participation neighbourhoods', rising for UK-wide coverage from 8.6% in 2005/06 to 10.1% in 2008/09, similar trends can be seen for disabled student entry, with UK wide coverage at 3.6% in 2004/05 rising to 4.7% in 2008/09 (Higher Education Statistics Agency, 2014).

Trends in the non-traditional entry would prompt advocacy within the HE sector and UK government to develop a more accessible model for educational delivery. The government white paper 'Widening Participation in Higher Education' (2003) outlined widening access targets for non-traditional entrants as a driver for raising academic achievement (UK Government - Department for Education and Skills, 2003, p.7). Government advocacy during the early 2000s could be seen to promote Higher Education delivery of vocational training as a facilitator for economic growth and to facilitate widening access for socio-economic backgrounds atypical of traditional University entrants. From the early 2000s many of these concerns would be expressed in UK government policy via white papers and would be adopted by HEI providers seeking to expand their market and engage in new relationships with communities and industry.

iv. The University for Industry

The 1996 government's 'National Committee of Inquiry into Higher Education' report, known as the 'Dearing Report' outlined recommendations for sustainability of the HE sector, for expansion, widening access and implementation of a new framework for qualifications (Dearing, 1997, Ch.1.4). A number of initiatives were launched to improve relationships between the UK HEI sector and industry, to create national schemes for widening entry across post-statutory education and for skills development. These programmes reflected government aims for an increased HEI role in industry via white papers such as 'The Learning Age' (1998) and 'The Future of Higher Education' (2003). This approach was often expressed as 'Market-led' or 'Demand-side education', an attempt to facilitate skills and expertise preferred by industry rather than sourced by educational providers (the 'Supply side'). This 'Demand side' approach is described in the paper '21st Century Skills: Realising Our Potential' (2003) outlining an approach "led by the needs of employers and learners." (UK Government - Home Office, 2003a, p.87). Schemes which sought to integrate post-statutory education in industry included the UfI (University for Industry), a virtual University launched by the UK government in 2001 and the UK 'LearnDirect' programme, allowing typically adult learners to access short technology and business programmes via 2000 nationwide facilities. Other schemes included the UK e-university (UKeU), providing online programmes for adult returners. The introduction of Foundation Degrees in 2001 also allowed HEI entry from the workplace (UK Government - Home Office, 2003a, p.82).

v. Lifelong Learning, Flexible Learning and the Information Society

Alongside widening access to Higher Education during the early 2000s, UK governments would reflect on the emerging uptake of ICT across the general population. The use of learning technologies would be presented as a facilitator for 'Flexible Learning' and 'Lifelong Learning' to facilitate trends toward part time study and flexible working characterised by short term contracts and expectancy for multiple job roles over an individual's lifetime (Dearing, 1997, Ch.4). The imperative to facilitate 'lifelong learning' is emphasised in the government paper 'The Future of Higher Education' (2003), commenting that 'lifelong learning' represents "...educational progression linked to a process of continuous personal and professional development." (UK Government - Department for Education and Skills, 2003b, p.16). The 1997 'Dearing Report' reflected on a contemporary UK transition from traditional industries toward retail and services characterised by expertise rather than labour; the report advocated the expansion of Higher Education to facilitate these trends, also advocating emerging Information and Communications Technologies to facilitate training needs (Dearing, 1997, Ch.4.9-14). During the late 1990s, these developments were accompanied by a reduction in HEI funding, expansion of tuition fees and loans and policy transition from the government-funded, post-16 HEI model, resulting in a more diverse student demographic and part time student market (Blandin and Machin, 2004, p.5). These trends would be reflected in an expansion of post-92 and polytechnic HEIs, often embracing the widening access and 'demand-side' agenda. Jones and Thomas (2006, p.618) comment "...there is a tendency towards the utilitarian approach, particularly amongst the new universities..."

vi. Widening Access and Web Usability

At the time of embarking on the current research project, the issue of widening access for Higher Education support comprised a significant motivation for study. Contemporary levels of declared disability stand at approximately 44,000 within the UK, an increase of over 50% since the 2010-11 academic year (HEFCE, 2017); the most common disabilities declared include learning disabilities such as “dyslexia, dyspraxia or Attention Deficit Hyperactivity Disorder” and half of students “had a specific learning difference." The Disability Rights Commission (2004) had outlined challenges faced by users with impaired vision or other access issues, pointing out the need for a universal approach to access as defined by the US 501 Web Accessibility legislation and by the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (The Disability Rights Commission, 2004, p.1).

Persson et al. (2014, p.507), reflects on the concept of “design for all”, commenting how unified concepts of usability and accessibility can ensure wider usability across a range of devices, technologies and applications, similarly, Catherall (2007, p.99) comments on difficulties for HEIs in ensuring Web accessibly in a context of increasing prevalence of commercial, enterprise level systems which can often be difficult to modify in contrast to locally developed platforms.

Varonis (Varonis, 2015. p.125) lists key design elements for Web accessibility, including contrast, personalisation and compatibility for platforms such as ‘screen readers’, to “...make content accessible to students with visual needs, including students outputting the screen to a tactile Braille display...”, also commenting on Web design for motor impaired students.

It should perhaps be noted that accessibility for Web based, online or digital content has been subject to critical perspectives, such as Liasidou (2014, p.169), suggesting that it can be difficult for policy makers and those advocating accessibility to decide or determine what characteristics constitute equalities or social justice in an educational context, suggesting that whilst "...there is agreement on the centrality of a social justice discourse in bringing about inclusive education reforms, the notion of social justice is ambiguous and contested...", this view is echoed by Persson et al. (2014, p.505), suggesting that formal technical standards still lack coverage in areas such as the ISO (International Standards Organisation) regime, indicating "...there is no consensus on formulating the concept of accessibility in different areas, not even within the ISO standardization community." Varonis (2015, p.120) also points out wide discrepancies in the implementation of Web standards amongst software developers and organisations.

vii. Emergence of Information and Communications Technology-related Literacies

A number of information technology related 'literacies' are cited in the present thesis, it can be seen that a growing narrative or advocacy surrounding literacies or competencies has developed over recent years (Jones and Flannigan, 2006, p.6). It may be useful to outline a comparison of some key 'literacies' which have emerged, such as 'Digital Literacy' - which seeks to define a pluralistic or broad range of learning strategies in relation to learning technologies (Knobel, 2008, p.1), 'ICT (Information and Communications Technology) literacy' - which typically defines "generic skills" related to the use of computers and related technologies (Oliver and

Towers, 2000, p.381) and ‘Information literacy’ – which typically defines wider learning approaches for the management, processing and critical use of information derived from a range of media sources (Bent and Stubbings, 2011, p.2).

Digital Literacy has been defined as a “plurality” of skills and competences (Knobel, 2008, p.1) and an “assortment of cognitive-thinking strategies” relating to “digital information”(Jones and Flannigan, 2006, p.6), also including “...cognitive, motor, sociological, and emotional skills... ...in digital environments.” (Eshet-Alkalai, 2004, p.93). Further definitions outlined by Jones and Flannigan (2006, p.6) include skills for interpretation of graphical interfaces (“photo-visual literacy”) , skills for re-using digital content (“reproduction literacy”), skills to “construct knowledge” from non-linear online sources (“lateral literacy”), skills to evaluate and assess digital content (“information literacy”) and literacy for use of diverse media formats (“New Media literacy”). Digital literacy is also defined in terms of collaboration for student peers “...to coordinate with others to create something truly original.” (Alexander et al., 2017, p.2). These definitions often cite reflective and interpretive processes (Jones and Flannigan, 2006), stressing higher level, critical behaviours contrasting with "standadized operational" literacies (Knobel, 2008, p.2). Critical perspectives on digital literacy also query “neutral” or “functional” emphases on acquisition of digital content and “technical know-how“ potentially lacking “cultural awareness” (Buckingham, 2006, p.263-266), also querying wider “symbolic or persuasive aspects of digital media” (Fabos, 2004, p.95) and critical awareness for “high-end design”, potentially lending “credibility” to digital media (Buckingham, 2006, p.267). Alexander et al. (2017, p.20-21) queries societal inequalities for development of ‘digital literacy’, reflecting barriers of “race and class”, for “older people or women in

some cultural contents" and Internet censorship in some world regions which "makes it difficult for them to actually apply this expertise without substantial personal risk..." In contrast to digital literacy, ICT literacy often refers to generic technologies such as wordprocessors or Web browsers (Harskamp et al., 2004, p.72) citing students' capacity "to make appropriate use of ICT" via a "range of communication tools" (Oliver and Towers, 2000, p.381). Vlieghe (2017, p.401), suggests that "policy-makers... ...regard it as a practical skill." Katz and Macklin (2007, p.50) however emphasise wider "researching and communicating" skills. O'Connor et al. (2002, p.16) suggests that ICT literacy allows students to "access, manage, integrate, evaluate and create information..." ICT literacy is also discussed as a requirement in terms of economic and employment skills for the 'knowledge society' (Sianou-Kyrgiou, and Tsiplakides, 2012, p.56).

Critical perspectives however query the impact of ICT literacy, suggesting this perspective can lack wider reflective and critical skills (Vlieghe, 2017, pp.401-403) and querying ICT literacy as a potentially limited solution to educational challenges (Sianou-Kyrgiou, and Tsiplakides, 2012, p.56). Katz and Macklin (2007, p.50) query ICT as "an end-in-itself", failing to consider learner "complacency" for ICT literacy due to familiarity with social media and mobile devices and "distraction" in class use of ICT. Riis (2015, p.385-386) comments on the "entanglement of ethics and technology" and need for critical awareness across formal and informal contexts. The "socioeconomic" impact of ICT literacy is queried by Sianou-Kyrgiou, and Tsiplakides (2012), suggesting "grammatical" forms for ICT literacy allowing for "a critical attitude vis- à-vis ICT." Vlieghe (2017, pp.403) queries ICT literacy as "...a profound shift in what it means to become an educated person."

Further perspectives for ICT literacy refer to economic, social and other disparities

for equalities inherent in societies, suggesting that “...ICT may exacerbate existing social inequalities…” (Sianou-Kyrgiou, and Tsiplakides, 2012, p.57).

Information literacy is typically defined as a specific range of skills for critical reflection, evaluation, effective use and management of information sources. Writing in a SCONUL (UK Society of College, National and University Libraries) paper outlining "The SCONUL Seven Pillars of Information Literacy”, Bent and Stubbings, (2011, p.2) suggest that information literacy comprises “...the ways in which information and data is created and handled, learning skills in its management and use and modifying learning attitudes..." These ‘Seven Pillars of Information Literacy’ comprise distinct competencies which can be selected for “different contexts and for different ages and levels of learner” , these include the “identify” pillar, describing skills to “identify a personal need for information...” and evaluating “information currency “, the “Scope” pillar outlining skills to assess bias inherent in media and to address “current knowledge” and “gaps” whilst the “Plan” pillar defines skills to “construct strategies for locating information and data “ and identification of “new tools” to explore unfamiliar sources (Bent and Stubbings, 2011, p.2-9).

Bruce (2004, p.1) comments on the role of information literacy in terms critically negotiating diverse information sources, similarly, Parker (2003, p.223) emphasises “...the ability to recognise when information is needed, then to be able to locate and evaluate...”, similarly, Johnston and Webber (2003, p.337) discuss critical and strategic research behaviours in contrast to information retrieval. Critical perspectives also query a prevalent narrative of digital literacy framed in context to libraries and librarians, suggesting omission of consideration for learning processes and a focus on electronic databases in contrast to wider, non-digital sources (Johnston and Webber, 2003, p.339-340).

Part 5: Personal Factors that Motivated the Work

i. Personal Influences during the late 1990s/ early 2000s

Experiences during the late 1990s/ early 2000s working at the North East Wales Institute of Higher Education (NEWI, later re-named Glyndŵr University) and sessional lecturing, contributed to a sense of change in trends for learning and teaching, these trends included the expansion of off-campus networked services, increasing reliance on ICT and an increasingly Part Time, vocational demographic. Glyndŵr University was felt to offer conditions suitable for the research project, reflecting sector-wide trends such as widening access for non-traditional entrants and implementation of learning technologies to facilitate Part Time and reduced contact programmes. VLE implementation is illustrated in the growth to 411 registered 'instructor' accounts and 373 online 'course sites' within the Blackboard VLE by October 2008. The 'NEWI IT Services Strategic Plan 2007-2010' reflected the growing importance of learning technologies "...as an enabler and performance improvement service." (Stockton/ NEWI IT Services, 2007, p.1). Additional trends noted included an increasing reliance on educational technologies for HEIs and potential disparity for ICT competencies within contemporary society (Byrne, 2003). Further trends at this time reflected challenges of ICT for non-traditional or older entrants and inequalities for Internet connectivity (Cullen, 2001; Friesen, 2003).

ii. The development of networked infrastructure in the UK Higher Education Sector

During the early 2000s, the HEI sector experienced considerable infrastructure-based advocacy and support via the JISC and JANET agencies for adoption of VLE systems, deployment for associated E-Learning technologies and improvement of core network infrastructure (Mayes and de Freitas, 2004; JISC - the Joint Information Systems Committee, 2004b); however, there remained many unanswered questions surrounding the viability of expanded ICT deployment and in particular, for remote study and distance learning. These questions included the matter of academic and operational staff ICT literacy for managing online learning (McPherson and Nunest, 2008, p.439; Rockwell, et al. 1998) and feasibility for deployment of virtual libraries and resources for study - an expensive and somewhat limited facility in terms of digitisation capacity prior to the late 2000s (Byrne, 2003, p.415).

iii. Note on ‘Service Level Agreements’ (SLAs)

By the early 2000s, ‘Service Level Agreements’ (SLAs) had begun to emerge within HEI operational planning and management, establishing formal agreements between university departments, external stakeholders and commercial partners to outline mutual expectations between stakeholders, to ensure quality assurance, define workflows and to allocate resources such as spending or expertise (LTSN, 2003). Helo, Gunasekaran and Rymaszewska (2017. p.19) define Service Level Agreements in terms of a contractual arrangement between stakeholders to ensure delivery of organisational services, particularly in terms of expectations for a

commercial partnership or licensed service, commenting that “Service level agreements (SLA) can specify the offered service at each stage and condition.” Service Level Agreements can be seen to have played a role for HEI infrastructure, in terms of external partnerships to deliver services such as 24/7 student enquiry support and capacity to deliver virtual learning in a potentially remote, overseas and non UK time zone. These overheads and challenges are emphasised in an LTSN (Learning and Technology Support Network) report, commenting on the increased demands for 24/7 networked learning and potential role of Service Level Agreements to define services and respond to student expectations:

> “...How will they get library support? How will academic staff deal with their questions? Will they be able to access student services? ...Service level agreements may be necessary to manage the expectations of students who are learning online.”
>
> (LTSN, 2003, p.15).

iv. The role of Private Equity

One question for deployment of educational technology posed often in the late 1990s, but still largely unresolved by the mid 2000s concerned the potential and growing role of non-traditional educational providers, technology-focused corporations such as Microsoft and other sources of private equity or external stakeholders for the delivery of Higher Education via technology (Noble, 1997; Cullen, 2001; Friesen, 2003). This debate was closely aligned with questions or potential concerns for the systemisation of learning and loss of traditional pedagogic, social and cultural experiences inherent in class based learning. These concerns were queried by David Noble (1997), questioning the uptake of systemised learning -

to the detriment of traditional class based collegiate and experiential learning as a “headlong rush to implement new technology with so little regard for deliberation of the pedagogical and economic costs and at the risk of student and faculty". For Noble, this trend is linked directly to issues of automation, including the displacement of educators and potential for rapid commercialisation of learning, commenting that “...beneath that change, and camouflaged by it, lies another: the commercialization of higher education. For here as elsewhere technology is but a vehicle and a disarming disguise.” (Noble, 1997, p.107). For a wider discussion on the role of commercial providers for learning technologies and related issues, see the sub-section shown in Chapter 5, the Discussion chapter, entitled ‘Significance of ‘Improvised Learning’ for the Globalisation Context’.

v. HEI Landscape and Vocational Learning Trends at Glyndŵr University

Glyndŵr University, based in Wrexham, North Wales came into existence in July 2008 when the North East Wales Institute of Higher Education (NEWI) was awarded TDAPs (Taught Degree Awarding Powers), after previously awarding autonomously awarded degrees validated by the University of Wales consortia.

The HEI landscape in Wales is currently characterised by eight Higher Education providers funded via HEFCW/ Higher Education Funding Council for Wales; in 2010 there were over 140,000 enrolments in HEI courses in Wales, of which 34% were part time, with around 1 in 6 students undertaking studies in the medium of the Welsh language - however, this figure is much lower for HEI providers in border regions such as Wrexham (HEFCW, 2011). In 2010, the HEI sector in Wales contributed more than £2 billion annually to the Welsh economy (HEFCW, 2010).

Glyndŵr University rapidly adopted many of the recommendations arising from government advocacy in the early 2000s, establishing community satellite centres, working with post-statutory providers to facilitate Foundation Degrees (such as Coleg Cambria) and becoming a partner of the all-Wales, HEFCW funded 'Reaching Wider' scheme, providing bursaries and support networks for student entry from low participation localities (HEFCW, 2011). According to the Glyndŵr University Web site in 2013, a quarter of graduates originate from low participation regions, this student group is identified as a demographic benefiting from access to Higher Education via Further Education colleges - a scheme termed "Communities First" (The North East Wales Institute of Higher Education, 2006); the organisation also outlines an aspiration for widening access to support disabled students unable to visit the campus regularly:

> "We ensure that the services available on Glyndŵr campuses are available at the partner colleges to enable students to access disability support, Funding advice, study support and access to library services. We want very student to have the opportunity to succeed."
>
> (Glyndŵr University, 2013)

The North East Wales Institute annual report from 2005/06 illustrated the particularly professional or vocational nature of Higher Education for this provider, with a significant number of adult returning graduates and significant enrolment from 'Communities First' (widening access) areas of the surrounding region: "The older student profile of the Institute meant that 35% of all graduates were over 25. ...Low participation and Communities First areas were well represented within the graduate

population accounting for 25% of all NEWI graduates in this year." (The North East Wales Institute of Higher Education, 2006, p.8).

With its origins in the local industrial and educational training sectors, Glyndŵr University already had an historic legacy of vocational Higher Education provision; by 2007 the organisation had diversified across a wide range of professional and vocational areas, including programmes of study for the built environment, management, computing, health, social care and leadership - across undergraduate and postgraduate levels, part or full-time modes of study and short Continuing Professional Development (CPD) programmes such as CIPD (Chartered Institute of Personnel and Development) and CIM (Chartered Institute of Management) accreditation.

The advent of the 'University for Industry' and related government advocacy for 'Demand' or 'Market–led' Higher Education provision saw Glyndŵr University (at that time NEWI) engage with UK government and the newly established Welsh Assembly administration to facilitate flexible and lifelong learning for the 'Knowledge Economy' and position itself as a market-led HEI provider ahead of TDAPs accreditation by the QAA (Quality Assurance Agency for Higher Education). This vision for becoming a 'widening access university', in contrast to a research-focused provider is illustrated in institutional annual reports during this period: "NEWI defines being market led as having the ability to understand, anticipate and respond to the needs of students, business, public bodies, governments, sector skills councils, further education partners and the wider community." (The North East Wales Institute of Higher Education, 2006, p.15).

Prevailing national trends toward part time, mature and non-traditional entrants, including those untypically represented by HEI entry can therefore be evidenced at

Glyndŵr University (previously the former North East Wales Institute) during the mid 2000s; this location provided a useful case study to explore an increasingly diverse student demographic, but also offered the chance to query the delivery of learning and teaching in the context of a HEI committed to implementation of widening access via associated infrastructure and support mechanisms to operationalise the delivery of Higher Education in an educational environment characterised by flexible, lifelong and part time study.

vi. Expansion of Remote and Overseas Online Learning

The expansion of overseas online learning remained an ongoing trend since the early 2000s. Aung and Khaing (2015) point out the “huge potential“ of economic and social impact for online learning in developing nations, however “...poorly equipped classrooms and lack of electricity have hindered the deployment and subsequent adoption of e-learning especially in rural areas." Torres (2017, p.8-9) comments that "in African countries only 20% of its inhabitants have access to the internet." Bagchi et al. (2015) contrasts differing connectivity across world regions, commenting that "use per 100 residents in the Netherlands was 93.96 in 2013 compared to 36.9 in Paraguay and 3.5 in Central African Republic in the same year..." (Bagchi et al., 2015). Internet Control is indicated as problematic for some regions, impacting search engines and social media, obstruction of Web security/privacy and criminalisation, resulting in barriers for regions such as China, with “more than 721 million Internet users “ (Torres, 2017, p.8). Aung and Khaing (2015, p.409) comment on difficulties for some students accessing English medium provision, suggesting their review “...found that most of the respondents felt language was a barrier to e-

learning." Torres (2017, p.8) similarly comments that “the Indian electronic market operates in different languages and multiple infrastructure problems generate a high internal digital divide." Poushter (2016, p.6) comments on gender equality issues, stating that in developing nations "...men are more likely than women to use the internet..." Developing regions do however experience high use of social media and connectivity of mobile devices such as smartphones, “climbing from a median of 21% in 2013 to 37% in 2015." (Poushter, 2016, p.5).

vii. Early Writing Projects in E-Learning and Associated Technologies

Additional motivations for this research project arose from a number of book and chapter publications mainly commissioned with Chandos Publishing during the mid 2000s; these publications allowed for a broad awareness of the context for educational technologies prevalent in the Higher Education sector, including issues such as technical, operational and academic approaches for delivery of E-Learning, Web standards and Web Accessibility, prevalent Virtual Learning Environment platforms, technical infrastructure, data security, authentication implications and issues for the practical management of E-Learning.

The textbook written prior to this thesis, ‘Delivering E-Learning for Information Services in Higher Education’ (Catherall, 2005) provided a broad introduction to the field of Web based learning systems, principally describing the VLE as a paradigm for Web based blended learning (in a low-contact, class-based setting) and online learning (in a remote or overseas context).

The above publication was followed by a book chapter dealing with the Web accessibility for Web based information services and platforms, ‘Accessibility issues for web-based information systems’ (2007).

The above publications were followed by another book chapter discussing the broad context of learning technologies for Higher Education and entitled ‘Learning Systems in Post-Statutory Education’ (2007). The chapter discussed issues such as the expansion of digital literacy within HEI and the wider population, evolution of the MLE (Managed Learning Environment) and VLE (Virtual Learning Environment).

A number of shorter publications and commentary contributed to motivations for the current study. Articles or monographs authored since the mid 2000s included discussion on commercial E-Books and related usability issues, critical perspectives on E-Learning – including ethical and pedagogic challenges for the systemisation of learning, articles on public Library use and funding trends, articles on the impact of globalisation and communications technologies.

Part 6: Concluding Statement

This chapter has attempted to set in context the historical and contemporary context for the student experience in the Higher Education landscape, in relation to emerging education technologies and in relation to wider sector trends influencing patterns of study. The chapter has discussed historical trends toward the prevalence of ICT-driven services and emergence of domestic computing and Internet behaviours. The chapter also addressed the personal impact of career experiences at the former North East Wales Institute of Higher Education (NEWI) – for student support and facilitating Web based platforms, illustrating the increasing prevalence of Web based

systems for delivering HEI services and educational delivery, in particular via remotely-accessible networked services.

The chapter also outlined historical trends toward increasing reliance on technical infrastructure to support educational and related service delivery, including the provision of scholarly materials and services via the Managed Learning Environment (MLE). The chapter also introduced the role of the Virtual Learning Environment (VLE) model for delivery of educational content via the Web for student access to course materials, discussions and other forms of academic engagement.

The chapter also raised the historical importance of advocacy, via professional, governmental and other stakeholders, including the impact of recent legislation on educational provision and response of educational providers in the context of inclusion and widening access to Higher Education.

An overview has been provided of the student context when examining the study area of low contact, professional and non-traditional student groups engaged in Higher Education, illustrating emergent conditions of the sector and role of learning technologies in influencing and supporting this environment.

The chapter also outlined further personal motivations for the study, including preliminary writing projects focused on areas such as accessibility and the delivery of E-Learning in an information service context.

CHAPTER 1 (b): THE CONTEXT OF LEARNING AND TEACHING USING INTERNET AND WEB BASED TECHNOLOGIES

Part 1: Introductory Statement

Whilst the term E-Learning has become prevalent in recent years, we have also seen a number of related terms and jargon used to describe computer or technology-facilitated learning and teaching; these sometimes appear synonymous with E-Learning in other cases this jargon has a more specific context, technological focus, pedagogic focus or refers to a specialist medium. This area of the thesis presents prevalent and emergent terms, theory and practice in the context of learning technologies as applied across post-statutory and Higher Education sectors, encompassing key concepts and approaches for learning and teaching – including collaborative, synchronous and asynchronous modes of learning.

Part 2: The Context of Learning Technologies and Theory

i. Note on Contextual Theory and Technologies for the Study, Defining Theory

In examining theories of learning or teaching prevalent in the literature of Technology Enhanced Learning, it may be useful to consider some definitions of theory itself. Dorin, Demmin and Gabel (as cited in Mergel, 1998) provided a definition of theory based on inductive principles of observation and adaptation based on empirical information, with key features being “a general explanation for observations made

over time", to create theory that "predicts behaviour", to allow for flexibility so theory "may be modified" (Dorin, Demmin and Gabel, 1990, as cited in Mergel, 1998, p.2). Wacker (1998) presents "definitions of terms or variables" which inform an extant theory, these include the "domain where the theory applies" i.e. the context or setting for the theory, "relationships of variables" which can occur between variables of the theory and "specific predictions" for outcomes possible via the theory (Wacker, 1998, p.363). Wacker further defines theory according to a continuum of abstraction, summarised as "High abstraction level theories", having "an almost unlimited scope", followed by "middle abstraction level theories" which serve as the raw materials for the construction of more general theories" and "lower level theories" which can be used to explain "empirical" or observable processes (Wacker, 1998, p.366). However, van de Ven (1989, p.486) questions the subjectivity and value of individual theory, suggesting any theory informing practice across a broad spectrum of activity must also illustrate its characteristics and impact in processes or applications.

ii. Definitions of Learning via Educational Technology

The founder of the Internet Time Group, Jay Cross may have used the term 'E-Learning' to signify electronic learning for the first time in 1998, defining this as "a vision of what corporate training can become. …eLearning is to traditional training as eBusiness is to business as usual.'" (Cross, 2004, p.104). The use of 'E-Learning' to broadly define computer facilitated learning (Clark and Mayer, 2016; Allen, 2016) is outlined by Henry (2001, p.249) as a term which superseded older related terminologies, commenting that "people talked of 'online learning', 'computer based training' and even 'Web' or 'Internet' based training…."

The JISC (Joint Information Systems Committee, 2004b, p.10) defines ‘E-Learning’ (in context to a wide range of computer systems, mobile, wireless and Web-based applications) as a concatenated form of “enhanced Learning”. JISC definitions of “e-Learning” (2004b, pp.7-10) also comprise a pedagogic focus, including the facilitation of “blended learning (the combination of traditional and e-learning practices)”, or alternatively “learning that is delivered entirely online”, to facilitate learning across “a spectrum of activities”; this JISC definition extends to wider experiential outcomes for learning, comprising features such as “connectivity”, i.e. accessing networked learning resources or platforms, “interactivity” within the context of assessment and autonomous access to study materials.

JISC (2017) has more recently defined learning and teaching within a broader, holistic context for digital technologies, reflecting mobile computing, learning in a remote, online context and across a range of learner spaces or contexts, suggesting “….it’s about the flexibility of learning, which means being able to alter the place, the pace and the mode of learning… …offering choices for learners about how to integrate their education with other aspects of their lives.”

For commentators writing from a critical pedagogic perspective, questioning issues such as pedagogic effectiveness (Munro, 2016) or equalities across social demographics (Suraweera, Liew, and Cranefield, 2016), the question can be raised if E-Learning is no more than jargon describing technology without reference to educational processes (Preston and Cuthell, 2012, p.19).

iii. Web Based Learning and Web 2.0

Web Based Learning is defined generally as a means of delivering an educational experience via the World Wide Web (McKimm, Jollie and Cantillon, 2003; Pedaste, 2013;). Whilst the provision of Web based learning began with hand-coded HTML pages, the development of Web content would shift toward Web editing applications, Content Management Systems (CMS) for authoring of Web content and the Virtual Learning Environment (VLE), combining features such as discussions alongside collaborative tools such as Wikis (for shared editing), Blogs (Web Logs) for rapid publishing of commentary and real-time (synchronous) tools for communications, delivery of teaching or collaboration.

The term ‘Web 2.0’, describing a more interactive and personalised Web experience (Allen, 2017; Belk, 2014) prompted similar jargon, such as ‘Library 2.0’ (Maness, 2006) to describe interactive Web content. O’Reilley (2005) proposed this term in contrast to static Web and print media, citing Web image sharing services such as Flickr.com, syndicated news content via RSS and social ‘tagging’ services or ‘folksonomies’ to share ratings, recommendation or commentary (Schatten, Seva and Đuric, 2015, p.40). The following figure compares older ‘Web 1.0’ applications and ‘Web 2.0’ platforms includng the commercial ‘Ofoto’ photography sales platform and ‘Flickr’, with the latter providing a broad range of photo syndication and sharing with major Social Networks and collaborative functions such as discussions and tagging:

Web 1.0		Web 2.0
DoubleClick	-->	Google AdSense
Ofoto	-->	Flickr
Akamai	-->	BitTorrent
mp3.com	-->	Napster
Britannica Online	-->	Wikipedia
personal websites	-->	blogging
evite	-->	upcoming.org and EVDB
domain name speculation	-->	search engine optimization
page views	-->	cost per click
screen scraping	-->	web services
publishing	-->	participation
content management systems	-->	wikis
directories (taxonomy)	-->	tagging ("folksonomy")
stickiness	-->	syndication

Figure 1: Comparing Web 1.0 and Web 2.0 Platforms (O'Reilly, 2005, p.2)

Craig (2007, p.154) comments on challenges presented for E-Learning 2.0, considering these developments "...profound change through a tsunami-like flood of innovative tools and services..."

iv. The VLE (Virtual Learning Environment) and MLE (Managed Learning Environment)

The VLE (Virtual Learning Environment) model for delivery of E-Learning, also sometimes called LMS - Learning Management System (Conde et al., 2014, p.188) has become increasingly prolific since the early 2000s. Similarly, the MLE or Managed Learning Environment model for an integrated, holistic learning environment (Babić, 2012) has also become synonymous with wider institutional learning systems, comprising content management, front-facing institutional Web functionality and integration with a wide range of institutional systems such as

student records, personal portfolios or other personalisation via technologies such as LDAP (Goyal and Vohra, 2012).

Theoretical perspectives on the VLE include the role of the VLE within the Managed Learning Environment as a medium or gateway to institutional curricula support, peer interaction and tracking of individual achievement (Wong, 2013, 319); in this sense the VLE is a window to institutional information, curricula and a range of student/tutor interactions and integration between disparate “in-house” platforms and systems (Roberts, 2004, p.1). Keller (2007) suggests adoption of the learning platform should be approached on a conceptual level, addressing the development and deployment of systems in a series of implementation stages “within a process describing new technologies as organizational innovations...” (Keller, 2007, p.300).

v. Blended, Online, Virtual and Distributed Learning

Blended learning is most commonly defined as a combination of class-based and virtual or online facilitated learning (Alammary, Sheard and Carbone, 2014, p.440). Bonk and Graham (2006) define ‘Blended Learning’, suggesting this refers to a combination of distributed learning via technology with traditional class-based teaching methods, reflecting “the idea that BL is the combination of instruction from two historically separate methods of teaching and learning: traditional face-to-face learning systems and distributed learning systems.” (Bonk and Graham, 2006, p.25-26). Littlejohn and Pegler (2013, p.9) define Blended Learning as an holistic approach for on-campus and off-campus participation via a variety of multimedia and interactive learning experiences. Langley (2007, p.159) comments on the potential for blended learning or “social learning” practices for sharing ‘tacit’ or cultural

knowledge within “communities of practice”, allowing for “an extension of the learning that occurs in the classroom...”

‘Online Learning’ can be seen to refer to the deployment of Web-based platforms for teaching and learning (Musa and Wood, 2003; Daniel, 2016); this term is often used to define remote or distance-based learning (Nguyen, 2015, p.309). Allen and Seaman (2009) use this term in comparison to “blended” modes, referring to programmes “in which at least 80 percent of the course content is delivered online...” (Allen and Seaman, 2009, p.4).

‘Virtual Learning’ refers to concepts of virtualisation or systemised learning, where class-based interactions are replicated by online interactions (Fowler, 2015, p.412); Stonebreaker and Hazeltine (2004, p.210) outline the greater flexibility offered by a virtual and synchronous class-based model, whilst also pointing out negative factors such as feelings of personal isolation, commenting on “the inherent difficulties of developing cohesiveness and true connectedness among students”.

Distributed Learning typically defines a learning context characterised by a spectrum of Web based learning tools, print-based and wider learning experiences (Lea and Nicoll, 2013). The paradigm of ‘distributed learning’ is illustrated by Kochtanek and Hein (2000, 282), indicating that this term “...is often used to describe a learning community with multiple sources of information, including the students themselves.” Distributed Learning often emphasises self-led behaviours, with participants accessing a range of systems and media to achieve outcomes (Kochtanek and Hein, 2000, p.282). Logan, Allan, Kurien, and Flint (2004, p.3) suggest Distributed Learning can challenge traditional structures of knowledge, commenting this "is very different from more traditional views that see knowledge as existing in isolation and

out of context...", suggesting a collaborative activity based around learner preferences in diverse ‘situated’ contexts.

vi. Synchronous and Asynchronous Learning

Synchronous Learning refers to the use of communications occurring whilst all participants are online/ mutually accessible. Wilson (2004, p.94) describes synchronous tools to allow virtual communities removing “barriers of time and place”. Synchronous learning can comprise text-based chat, digital/ satellite conferencing or Web based conferencing (Peacock, et al. 2012). However, barriers for synchronous technologies can include poor bandwidth and latency (e.g. over large distances), difficulties for proprietary video ‘codecs’ or applications such as the Java platform (Yamagata-Lynch, 2014). Hyder et al. (2007, p.1) also comments on commercial marketing tendencies around this term, characterised by greater emphasis for “delivery than about collaboration”.

Asynchronous Learning refers to communication between participants separated by time; asynchronous applications can include online discussion forums, email, Wikis (collaborative documentation systems), instructor feedback, or educational collaboration via blogging or online video blogs/vlogs (Northey, Bucic, Chylinski and Govind, 2015); asynchronous tools can be beneficial for participants separated by time zones or facing availability challenges. Kochtanek and Hein (2000, p.281) comment on the benefits of asynchronous learning, allowing student-led access to planned materials in an independent context which are typically “...digital (generally asynchronous and Internet- or Web based)...”

vii. Hybridisation of University Platforms

Hybrid learning can refer to a flexible, collaborative learning model focused around a range of institutional or informal Web platforms (Olapiriyakul and Scher, 2006; Bowen, et al. 2013; Tsai, 2011, p.151). The concept of hybrid learning environments, is outlined by Hall and Davidson (2007, pp.164-170), suggesting the integration of disparate approaches for learning via both online and traditional class-based methods, combining the use of the learning portal or VLE for delivery of academic content with use self-reflective blogs to facilitate group working. Gilly Salmon (2012) describes her conceptual model of 'E-Moderating', combining use of social networks, informal communication systems and institutional platforms such as the VLE, reflecting that "...online networking involves a hybrid of familiar forms of communication." (Salmon, 2012, p.16-17).

viii. Instructional Design - Reusable Learning Objects, Open Educational Resources (RLOs/OERs)

Instructional Design typically can refer to a the delivery of computer-based learning, associated with historic systems such as PLATO, but more recently associated with digital learning activities for system-neutral implementation across range of computer applications (Sharples and Sutherland, 2017, pp.3-4). Mayes and de Freitas (2004. p.10) define the broad, system-neutral concept for instructional design, comprising "...many forms of theory operating in tandem, rather than as opposing theories. Kolb's Experiential Learning Theory (ELT), comprising four inter-related learning approaches is cited as a framework for instructional design (Zajac, 2009, p.256), this

model includes elements such as “Concrete Experience”, “Reflective Observation” - i.e. personal reflection on the experience, “Abstract Conceptualization” – i.e. developing a framework to order the experience such as rules or codes, and “Active Experimentation” - concerning the individual’s experimentation with new insight for attempting the next concrete experience; these elements are expressed in a cycle - demonstrating the inter-relationship of these experiences, with new insight leading to modified behaviour:

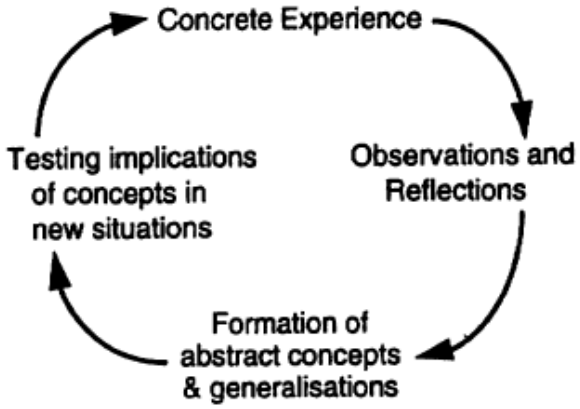


Figure 2: Kolb’s Learning Cycle (Vince, 1998. p.304)

Bloom (1913-1999) attempted to create a “taxonomy” (Atherton, 2013b) or classification for learning objectives; the “domains” defined by Bloom provide a continuum of development, including the “cognitive” domain – signifying synthesis of information and metacognitive processing, the “affective” domain – signifying the ability to determine value and the “psycho-motor” domain – signifying manual, verbal and other skills development:

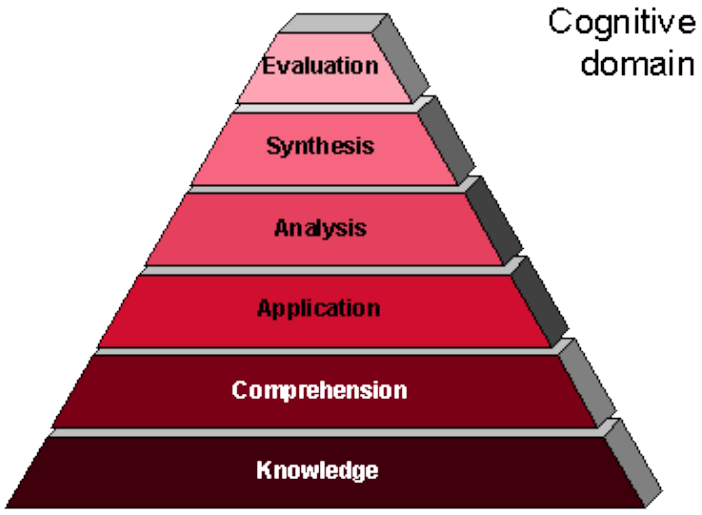


Figure 3: Bloom's Taxonomy - Cognitive Domain (Atherton, 2013b)

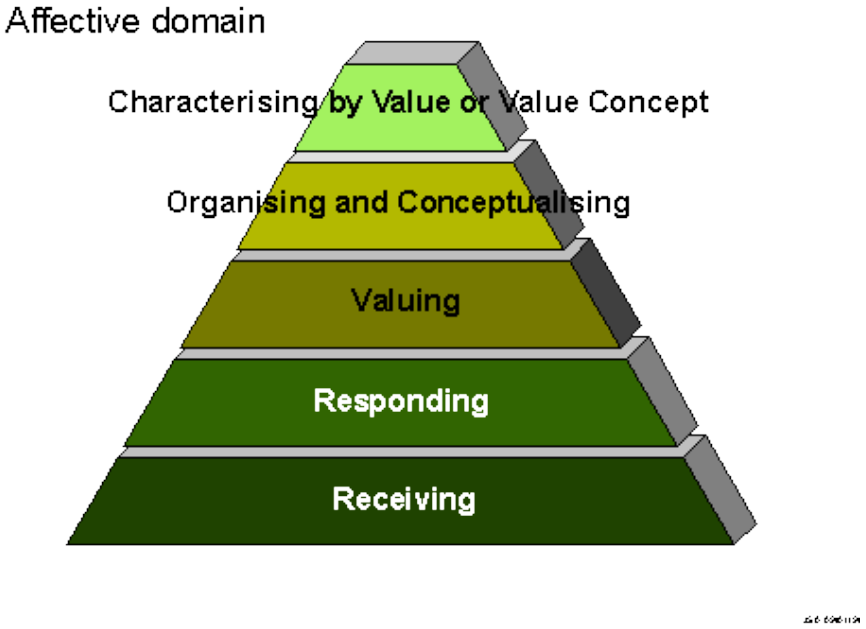


Figure 4: Bloom's Taxonomy – Affective Domain (Atherton, 2013b)

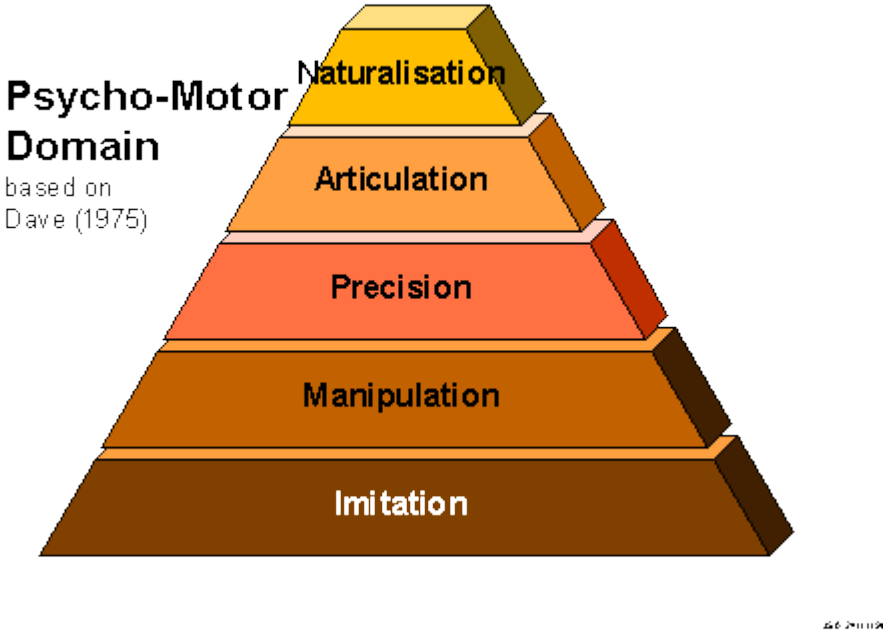


Figure 5: Bloom's Taxonomy – Psycho-Motor Domain (Atherton, 2013b)

The use of Bloom's taxonomy in the evaluation of E-learning is seen an evaluative model for E-Learning developed by Halawi, McCarthy and Pires (2009), an analysis of the development of Learning Objects by Muzio, Heins and Mundell (2001) and development of a framework for multiple choice questions by Govindasamy (2001).

The terms RLO (Reusable Learning Object), OER (Open Educational Resource) refer to sharable and re-usable interactive content, video, audio or other media to allow sharing, dissemination and re-purposing across practitioners (Etkind, Kenett, and Shafrir, 2016, p.310; Koh, 2017). McGreal (2004, p.1) comments that "they can be modular units that can be assembled together to form lessons and courses." Learning objects are typically sequential but may provide menus, multiple-choice or conditional choice options (Chiu and Churchill, 2016, p.1355).

This media is often shared via portals such as The JISC store (previously known as Jorum, http://www.jorum.ac.uk/) and may also refer to a wide range of media, including images, video, animations, interactive HTML 5.0 content or other digital resources (McGreal, 2004, p.1). RLO or OER typically refer to objects created according to formal standards such as SCORM or Sharable Content Object Reference Model (Zhu, Wu and Chen, 2017) – a US government derived ADL (Advanced Distributed Learning) project (http://www.adlnet.org/scorm) or the IMS standard (IMS Global corporation) provided via http://www.imsglobal.org/ (Hermans, Janssen and Koper, 2016, p.1265) .

Following significant investment via bodies such as JISC (Joint Information Systems Committee) for learning object proficiency and applications (Falconer, Littlejohn, McGill and Beetham, 2016), there remain long-standing questions on the impact of these resources and difficulties for authoring RLOs by non-technical staff (Lindert and Su, 2016, p.44). SCORM/IMS standards are also highly modular, reflecting differing configurations/support within VLEs, potentially representing difficulties for VLE implementation (Singh and Reed, 2002, p.62).

Applications such as Xerte (Ball and Tenney, 2009) and GloMaker (Singla, 2009) can provide an accessible interface to develop SCORM-compatible RLOs. Singla (p.163) comments on the “storyline” approach of the GLO Maker system, this platform “has two major parts: a Planner where the basic ‘storyline’ of the learning design is constructed, and a Designer where the screens are created based on flexible templates.”

Critical commentary on RLOs and similar technologies include technical barriers for their development, compatibility and reliability and debate on their pedagogical effectiveness (Day, and Erturk, 2017; Burgos, 2015).

Sandy Britain (2004, p.3) comments on a tendency for Open Educational Resources to focus "...on content delivery rather than looking more carefully at what learners do." Norm Friesen (2004, p.59) outlined some of the challenges for the OER/OER model, pointing out pedagogic limitations of learning objects due to their inherent technical nature; Friesen traces the systemised, linear nature of learning objects to instructional training used by the US military during World War 2, commenting that "Learning objects and e-learning standardization bear the imprint of the ideology and culture of the American military-industrial complex - of ways of thinking that are related either marginally or antithetically to the interests and values of education..." The OER or RLO model has also become associated with Open Access (OA) sharing via self-archiving within repository platforms (Butcher, 2015), allowing "any users to read, download, copy, distribute, print, search, or link..." (Chan et al., 2002). More recently, OA licensing via models under the Creative Commons framework (http://creativecommons.org), described as "an easy way to manage the copyright terms that attach automatically to all creative material under copyright..." (Creative Commons, 2016).

ix. Self-Regulated/ Managed Learning

Theories of self-led or self-managed learning focus on the student in a highly autonomous role, or where specific interactions are designed to develop critical or collaborative skills (Cowan and Peacock, 2017). Wilson (1997, p.1) defined the broad context for self-managed learning, grounded in constructivist principles of communities of practice, suggesting this perspective "...presumes that students who are active and take control of their own learning at any age level or in any learning

situation perform better and achieve better results." Linder and Harris (1993, p.641) outline a multi-faceted perspective comprising "Epistemological Beliefs" – concerning beliefs about truth and knowledge, "Motivation" - concerning personal goals and values, "Metacognition" - awareness of individual reflection, "Learning Strategies" - concerning individual approaches or "tactics" for learning, "Contextual Sensitivity" - concerning the facility to assess or "read" a "learning context" and "Environmental Utilization/ Control" - concerning the ability to manage resources. Otterwill (2002, , p.12) however suggested that autonomous learning is an economic imperative driven by the wider lifelong learning agenda, placing additional burden on part time, low contact entrants and academic support demands.

Cotton, Gavin and Yorke (2010, p.72) consider "...the ability of students to manage the combination of learning and non-learning activities online...", outlining the role of "distraction" in terms of "multi-tasking" and "boundary management" in context to use of multimedia and social media applications.

Use of externally sourced Web materials can provide learning resources beyond the institutional context (Winter, Cotton, Gavin and Yorke, 2010); in this context, there is an onus to develop the information literacy of students. These authors query Prensky's perspective on the 'digital native' (Prensky, 2001) and Berk's perspective of the 'Net Generation' (Berk, 2009) - perspectives presenting generations who have developed skills for use of digital technology from a younger age, i.e. "'native speakers' of the digital language of computers, video games and the Internet..." Winter, Cotton, Gavin and Yorke (2010, p.72) suggest this context presents challenges for educators and students, commenting that "Students who use technology less effectively for learning may lack technical skills or essential learning skills such as sustaining concentration or problem-solving." Following a study of

distraction management for post-graduate Higher Education students, Winter, Cotton, Gavin and Yorke (2010, p.78) outline students' perceptions of distraction management, suggesting disabling access to personal email and social media or limiting institutional computer systems to allow only 'formal' software or platforms.

x. Collaborative Learning, Social Learning and Informal Learning

Johnson's theory of collaboration (1975) entitled 'Learning together and alone' is based around cooperative, competitive and individualistic learning (Johnson, 1975, p.95); this work is also inspired by the seminal studies of Francis Parker and John Dewey on collaborative or group working (Johnson and Johnson, 2002, p.97). The theory focuses around factors for collaborative working, including "positive independence" – having a sense of inter-dependency on the group rather than the individual and "individual accountability" – emphasising sharing of assessment with peers. Fetherston (2001, p.29) similarly discusses the need to create communities for participation in a digital context, commenting that "Students need a sense of this world, a sense of the audience participating and an understanding of the mostly unwritten rules that govern its behaviour..." Graetz and Goliber (2002, p.18) describe the potential for virtual classroom interaction between tutors and students, suggesting that technologies can create a new paradigm for collaborative learning. Salmon's (2014) five stage model provides a formalised structure for 'E-Moderator' interaction with the student group, encompassing an initial stage composed of welcoming and encouraging, a second stage of familiarisation and building bridges between cultural, social and learning environments, a third stage of facilitating tasks

and supporting use of materials, a fourth stage of facilitating progress and a fifth stage of supporting and responding to students:

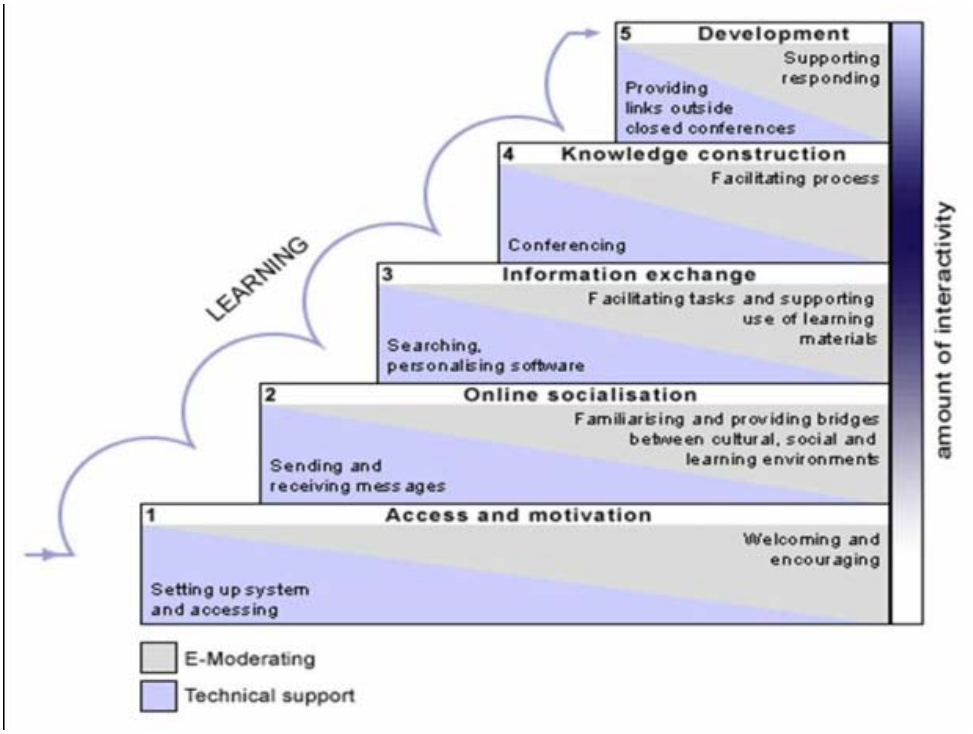


Figure 6: Salmon's E-Moderating Perspective (Salmon, 2014, para. 1)

Heinze and Procter (2004; 2012) further describe Salmon's model in terms of a participative and constructivist framework for learning, where the tutor's role is that of a guide rather than an instructor, to "make students interact with each other and the E-moderator, rather than only accessing information such as handouts and presentation material." (Heinze and Procter, 2004, p.2).

xi. M-Learning (Mobile Learning), Ubiquitous, On-Demand Learning

M-Learning can refer to the use of mobile devices such as the prevalent Apple iOS-style smartphone (Tracy, 2012) - providing diverse mobile applications (or apps) for

educational, factual and entertainment purposes (Gikas and Grant, 2013) and portable computing devices, such as laptop computers and tablet computers relying on touch-screen technology (Griffey, 2012). Tracy indicates the growth of the “app” software model for touchpad phones and tablet computers - platforms which are increasingly synergistic with each other. Tracy comments that “lightweight tablets (iPad, Samsung Galaxy Tab, Dell Streak) are becoming widespread as well and are (for the most part) larger versions of touch screen phones.” (Tracy, 2012, p.31).

M-Learning arguably represents a novel paradigm for technology based learning, e.g. provision of the institutional VLE via mobile devices (Giousmpasoglou and Marinakou, 2013); however, mobile device use may be dependent on issues such as the usability of mobile applications, considerably smaller screen dimensions, reliance on touch-screen interface controls, accessibility considerations for users with disability/ access issues. Tracy (2012, p.31) comments on these challenges for mobile devices, suggesting "... different devices have different sensors and abilities, with one of the most obvious being screen size.”

The effectiveness of Mobile devices can also be limited by infrastructure such as lack of widespread WiFi within the campus/institution or expense when using expensive ‘roaming’ tariffs overseas. Barriers may also be present in terms of design or “app” compatibility related to the diverse range of handsets/smartphones on the market. Traxler (2012) comments on the increasing ubiquity of mobile devices as a new paradigm of social and educational interaction occurring within the domain of learner’s daily lives:

> “Interacting with a desktop computer takes place in a bubble, in dedicated times and places where the learner has their back to the rest of the world for a substantial and

> probably planned episode. Interacting with a mobile is different and woven into all the times and places of learners' lives."
>
> (Traxler, 2012, p.2)

Keskin and Metcalf (2011, p.202) describe ubiquitous and mobile learning as learner-centred paradigm for learning, "when the learner is not at a fixed, predetermined location, or learning opportunities offered by mobile technologies..." Ubiquitous Learning typically refers to the use of mobile devices, laptops or 'notebook' computers carried conveniently with the student for use in libraries or when using public facilities such as the rail network (Tossell et al., 2015; Sevillano-García and Vázquez-Cano, 2015). The increasing ability of users to access ICT and networked applications in an ubiquitous context has prompted what has been described synonymously as 'anytime learning' (Bonarini, 1997, p.281), 'internet time' learning (Cross, J. 2004, p.103), 'on-demand learning' (Acharya and Sundararaj, 2011) or 'ubiquitous learning' (Boyinbode and Akintola, 2008, pp.401-402). Boyinbode and Akintola comment that ubiquitous learning or "U-Learning" is characterised by "all kinds of physical or abstract resources, such as human beings, physical devices or place, information space and so on", representing a form of learning which can be accessed in any context: "In other words, a U-learning environment is a learning environment that anyone can access anywhere, any time or any device."

Synonymous with 'ubiquitous learning', we also sometimes encounter the term 'on-demand learning' (Taminiau et al., 2015; Katz, 2016), stressing the increasingly challenging needs and expectations of students operating within the virtual or online sphere, facilitated by mobile devices and ubiquitous access to networked resources.

In their seminal paper, Trondsen and Vickery (writing in a corporate training context) defined ‘Learning On Demand’ (LOD) - comprising both opportunities and challenges for enabling self-led learning and support styles, with potential for cost savings, enhanced access to learning and improving the student experience. Trondsen and Vickery comment on efficiencies in a training and educational based context, suggesting that ‘LOD’ "reduces knowledge acquisition time, cuts travel costs for both students and teachers, lowers off-the-job related expenses, reduces classroom overheads and lowers materials expenses..." (Trondsen and Vickery, 1997, p.1).

xii. Personalised Learning, MOOCs and Mashups

Dabbagh and Kitsantas, (2012) describe how social media functionality provides an informal or contextual ‘Personal Learning Environment’ (PLE) for students alongside formal institutionally-led systems and platforms such as the VLE, providing an informal and situated learning environment facilitating self-led approaches for learning. Dabbagh and Kitsantas comment on the cloud-based, social-media format of PLEs, suggesting these applications provide an opportunity “...to help students aggregate and share resources, participate in collective knowledge generation, and manage their own meaning making...” (Dabbagh and Kitsantas, 2012, p.4).
The emergence of Personal Learning Environments (PLEs) potentially stands in contrast to the VLE and formalised, transmissive models for E-Learning; in the PLE context, learners participate in the creation of experiential learning via practical engagement (Rahimi, van den Berg and Veen, 2015), this could take the form of collaboration via social media or sharing and reuse of media obtained outside the formal VLE/ LMS (Learning Management System) setting (Humanante-Ramos,

García-Peñalvo and Conde-González, 2015, p.26). Practical examples of self-led or personalised learning approaches include blogging, allowing students to provide commentary on learning practice, use of E-Portfolios to record or critically reflect on personal development, micro-blogging activities such as use of Twitter or collaboration via creation of shared document development using Wikis (Dabbagh and Kitsntas, 2011, p.2).

The term MOOC (Massively Open Online Course) refers to E-Learning provision which has been made accessible to a wider audience beyond the local institution (Moe, 2015); the provision of a MOOC can occur by making Web content or learning systems accessible publicly via the World Wide Web or by allowing for public online registration or application processes. The 'FutureLearn' project, led by the Open University has developed a structured portal to MOOCs developed by individual HEI providers via https://www.futurelearn.com (Morris, Livesey and Elston, 2014, p.259). The MOOC approach for delivery of short or module-based courses is discussed in further detail within the following sections.

The use of social media, externally sourced multimedia and content syndicated from external sources (via technologies such as XML and RSS), compiled into a unified interface (via approaches such as API integration or AJAX) is sometimes referred to as a 'Mashup' (Ferreira et al, 2017; Wang et al, 2007), presenting the Web site visitor with page content drawn from a range of sources, this is described by (Craig, 2007) as the ability to "access data (e.g. on Google Maps), rework it through another application to collaboratively create new content referred to as mash-ups."

Craig comments on the increasing prevalence of mashup functionality accessible via popular social media, including the ability to embed, syndicate and re-purpose Web applications, effectively allowing users to display content from diverse sources within

their own Social Media presence, this process is also accessible for non-specialist users, typically without any requirement for programming or technical expertise, “a wave of recent developments are simplifying the process for the end-user.” (Craig, 2007, p.155).

xiii. Constructivist Theory and E-Learning

Constructivism was pioneered in educational research by Vygotsky (1896-1937) – suggesting a “zone of proximal development”, referring to the potential within individuals to achieve greater learning via self-led experimentation and exploration (Atherton, 2013e). This is seen in theories of classic constructivists such as Pask (1928-1996) - suggesting learning styles such as the “serialist” or sequential learner and “holist” or selective learner (Pask and Scott, 1972, p.217) and Laurillard (1993) – suggesting a “conversational” approach to collaborative construction of learning between student and tutor. Constructivism is also summarised by Atherton (2013e, para.1) suggesting “that the learner is much more actively involved in a joint enterprise with the teacher of creating (‘constructing’) new meanings.”

Fetherston (2001, p.30) stresses the importance of “technical features for learning”- emphasising collaboration and construction of knowledge via multimedia, sharing resources and Web based communications tools in a group or self-led context; however, these tools must be implemented effectively to ensure “meaningful learning”, being informed by “good pedagogical practices”.

Constructivist approaches to E-Learning are also evidenced by the “hypermedia” theory of Tolhurst (Park and Hannafin, 1998) and constructivist theory of multimedia use (Dede, 1996), stressing the role of multimedia for accommodating learner

preferences and individual learning styles: “Multimedia and hypermedia are learner-controlled interactive technologies; users can tailor presentations by selecting paths through the material customized to their interests” (Dede, 1996, p.3). For Dede, the use of multimedia can encourage an understanding of “interrelationships” between concepts, in contrast to “archival” approaches to learning, suggesting that “by displaying webs of interrelationships through concept maps or similar graphic devices, hypermedia systems enable learners to focus on the links among pieces of information, as well as the data itself.” (Dede, 1996, p.3).

Salmon (2014; 2004) comments on differing educational perspectives on transmissive vs. reflective learning, i.e. “...those who see online as based on instruction and transmission, and those who see the learner’s experience as central to knowledge construction...” (Salmon, 2004, p.5). Salmon outlines a flexible learning environment, mediated by the ‘E-Moderator’, comprising both formal and informal learning experiences - such as student led use of social media for participation, debate and engagement (Salmon, 2004, p.14).

Keller (2007, p.302) refers to a ‘Technology Acceptance model’ (TAM), focused on perceived usefulness to educators and students for adoption of systems, suggesting that “TAM posits that user acceptance is determined by perceived usefulness and perceived ease of use.” Keller also points out the need to consider learning environments as a flexible platform to accommodate a range of pedagogic needs, rather than simply as a systemised or received process (Keller, 2007, p.303).

Jonassen and Land (2000, pp.iii-iv) also outline the “transmissive” nature of instructional design, recommending the infusion of collaborative and active process, commenting that “...learning is neither a transmissive or a submissive process.

Rather learning is willful, intentional, active, conscious, constructive practice that includes reciprocal intention—action—reflection activities..."

xiv. Behavioural Theories and E-Learning

Behavioural theories of learning fundamentally concern reinforcement of associations between positive response and stimulus, with roots in ancient Greek philosophy, Mergel (1998, p.3) comments that "...Behaviorism, as a learning theory, can be traced back to Aristotle, whose essay 'Memory' focused on associations being made between events such as lightning and thunder." Atherton (Atherton, 2013c, para.4) describes scientific research carried out during the early 20th century by Pavlov and other behaviouralists to establish "classical conditioning" principles, pointing out the role of behaviourism in areas such as advertising. Skinner's (1904-1990) "operant conditioning mechanisms" (Good and Brophy 1990) extend Pavlov's theory of conditioning to a societal application, including perspectives such as 'negative reinforcement' – where a negative experience is avoided to produce a stimulus, such as "Good grades reinforce careful study." (Good and Brophy, 1990). Leading on from behaviourist theories, we find practical applications of operant conditioning in an educational context, such as use of praise or feedback for reinforcement. Ertmer and Newby (1993, p.50) outlined an approach for instructional design, combining constructivist and cognitive approaches for learning, suggesting the importance of behaviourist theory in understanding memory-based learning processes, suggesting that "tasks requiring a low degree of processing (e.g., basic paired associations, discriminations, rote memorization) seem to be facilitated by strategies most frequently associated with a behavioral outlook".

Another framework or approach for learning incorporating behavioural theory includes Gagné's (1916-2002) theory of learning for instructional technology. This model describes different "types" and "levels" of learning, encompassing five categories of learning, including verbal, intellectual, cognitive, motor skills and attitudes. The conditions in which these kinds of learning occur must be understood for learning to take place, for example attitudal learning can only occur when suitable attitudes have been conveyed by a role model (Ashaario, 2009). Nine 'instructional events' are defined corresponding to cognitive processes including "gaining attentions", "stimulating recall", "eliciting performance", "providing feedback" and "enhancing retention" (Ashaario, 2009).

Mondi, Woods and Rafi (2007, p.436) outlined a theory of "gratification" for deployment of learning technologies, suggesting the need for systems to "...possess attributes that are likely to satisfy students' learning needs, learning styles, values, motivations, interests, intentions and epistemological curiosity." In this model, the needs of students are defined within domains such as the 'cognitive' – providing metacognition stimulus and self-reflection for experiential learning, suggesting that "students may be motivated to use e-learning resources to gratify their Cognitive, Affective, Personal Integrative, Social Integrative and Entertainment needs..."

xv. Adaptive Learning

Burgos, Tattersall and Koper (2007, p.161) described an 'adaptivity' theory for facilitating student preferences in a context for learning technologies, commenting that: "...in adaptability, the user makes changes and takes decisions." The aim of this theory is to reduce the "cognitive load" (p. 2.) i.e. to ensure the user experience

is characterised by reduced stress in engaging with systems. Three forms of adaptation are proposed, these include “Interface-based” adaptation, additionally described as “adaptive navigation ...related to usability and adaptability”, “ Learning flow-based” adaptation - defining real-time, personalised adaptation of systems and interfaces to the user as they engage or interact with systems and “Content-based” adaptation – characterised by differentiation or modification of content based on the needs or preferences of the individual user “For instance, the information inside a learning activity can be classified in three levels of depth, and every level is shown based on a number of factors...”

Similarly, Fiaidhi (2011, p.10) describes a ‘Calm Computing’ model for use of technology facilitated learning where the role of technology is continually de-emphasised or reduced to focus learning around experiential factors for the student. This theory comprises a requirement for “peripheral” awareness of technologies or delivery mechanisms used to deliver learning, summarised as “the ability to move easily from a service at the periphery of our attention”. Rogers (2006, p.408) outlines a range of criteria for calm computing, suggesting that “Context-aware” computing can address end-user preferences for learning, syndicating content to preferred applications or Web platforms and allowing personalization for the end user.

Another form of adaptive learning is seen in Component Display Theory (CDT), this approach for instructional design was introduced by Merrill (1980, p.77) as a learning approach used for the 1971 “Time-shared, Interactive, Computer-Controlled Information Television” (TICCIT) learning platform, designed to provide a highly visual series of tasks based around stages such as “Rule” (a statement explaining the concept being taught), “Example” (a practical illustration of the theory) and “Practice” (an interactive opportunity for the learner to engage with the theory via

selection or manipulation of options on-screen).

xvi. The Role of Industry, Corporatisation and Globalisation in E-Learning

The Norwegian NKI University (http://www.nki.no) has delivered Internet technology based programmes since 1985 (Rekkedal et al, 2015; Arneberg et al., 2007), reaching15,000 active online students by 2001, by 2001 the NKI constituted "approximately 100 programmes and more than 400 courses at secondary and undergraduate levels, as well as specialised courses for competence development in business and industry... Each year it has around 15,000 active students (about 20 percent of them are now online students out of a population of 4 million Norwegians." (Paulsen and Torstein, 2001). The NKI model influenced the development of distance learning within UK Higher Education sectors, with implementation of computer-based distance education by the Open University in 1988 and adoption of Web-based online learning by the UK 'Learn Direct' scheme in 1999 (Arneberg et al., 2007).

In recent years, the UK university sector has expanded online learning programmes for study in a remote context, invariably facilitated by the VLE and associated E-Learning materials and systems (Moore, Dicksen-Dean and Galyen, 2010; Hazelkorn, 2015); in this context, the university sector have exploited the global potential for new markets in developing countries and growing economies in regions such as the Middle East and Africa (Altbach and Knight, 2007, p.294).

Nixon and Helms (2002) comment on the uptake of alternative corporate providers for education during the early 2000s: "Corporate universities exist in government

settings and include the Internal Revenue Service, the City of Tempe's Learning Center and NASA's Marshall Space Flight Center."

Whilst universities have recently attempted to exploit the global potential for E-Learning and remote learning, corporate providers operating within the UK have also begun to explore this market (Marginson, 2016), these include providers such as Pearson Education (http://www.pearsoned.com) and Laureate International Universities (http://www.laureate.net); whilst established and chartered universities have the advantage of degree awarding powers, corporate providers usually lack access to this facility. This basic premise for the delivery of online education is discussed by Laurillard (2002, p.137), including the observation that the changing role of corporate providers will largely be led by government policy and regulation: "the degree-awarding powers of universities protect the uniqueness of their institutions. At present, this is perhaps true, but governments have the ability to change that power."

Whilst there appear to be many online degrees available via UK universities at the time of writing, with over 1800 such degrees provided by UK HEIs (Distancelearningportal, 2016), many UK Higher Education providers appear to prefer commercial partnerships rather than direct delivery, with private providers typically operating programmes whilst universities act as arbiters of standards, and as awarding institutions. Altbach and Knight (2007, p.300) comment that "...conventional higher education institutions and new commercial providers promote, exchange, link, and predominantly sell higher education across borders..."

Rovai and Downey (2010) suggest that the traditional Higher Education sector has lacked required infrastructure or assets to enable wider delivery of programmes via learning technologies, commenting that "...alliances and partnerships focus on the

specific needs of both the institution and the target population...“ (Rovai and Downey, 2010, p.141).

McGettigan (2013) argues that greater involvement by private equity in the HEI sector is very possible in years to come,” Non-traditional HE providers are envisaged to expand in future years, this is reflected in recent and planned UK government legislation; current companies operating in this sector include Pearson, its subsidiary EdExel and Montagu” (Catherall, 2014b, p.47).

xvii. Critical Perspectives on E-Learning

The implementation of ‘E-Learning’ as a strategic imperative can also be observed in the context of UK government advocacy for digital literacy, reflecting a demand-led role for Higher Education and emergent lifelong or flexible learning for an increasingly dynamic employment market (Kruss and Petersen, 2016). Advocacy within the UK to implement technology-enhanced learning to facilitate lifelong learning and support industrial, technical and economic development has been a key characteristic of recent UK governments (Tomlinson, 2015).

Catherall (2006) commented on the impact of government policy prior to the early 2000s, indicating that “post-statutory UK education sectors have seen dramatic change in policy and focus… …a combination of widening access to post-statutory education and training and use of emerging technologies to achieve these aims.”

Key government reports were a characteristic of post 1997 government advocacy, defining national policy for the expansion of Further and Higher Education to facilitate training and professional development across society: “Reports such as the Dearing Report (1997), The Learning Age (1998) and 21st Century Skills Realising

Our Potential (2003) presented both industry and the education sectors with a number of goals focused on improving educational standards as a vehicle to strengthen the UK economy." (Catherall, 2006, p.153).

Cullen (2001, p.314) however questioned government emphases on the use of ICT as a driver for post-statutory education, questioning the likely expansion of academic delivery via learning technologies for some demographic groups and some business sectors, commenting "Where people in business or professional occupations acquire skills as part of their employment, manual workers and the unemployed are less likely to be exposed to such opportunities..."

The universality of networked access may also be questioned when considering recent government advocacy for ICT uptake and ICT investment within Higher Education (Pucciarelli and Kaplan 2016). This situation remains particularly true for elderly students and school leavers where class-based education remains the primary mode of educational delivery. This is often described as the "digital divide" (Cullen, 2001, p.312).

In addition to questions on universal access, the deployment of educational technologies is also inherently reliant upon prevalence and compliance with a variety of standards, allowing for development of Web sites, data-driven applications and interactive content for use across a range of Web browsers and devices.

Challenges for the implementation of standards for learning technologies include disparities between Web site HTML/ XHTML scripting, programmatic Web content and Web browsers. Mesbah and Prasad (2011, p.2) comment on the ongoing challenges following the shift toward interactive and dynamic applications represented by Web 2.0 and differing levels of compatibility between Web content

and client-side Web browsers, commenting that "...the explosive growth in the number of browsers and client-side environments has only exacerbated this issue…" One emergent area of concern for standards development comprises the development of the SCORM specifications for learning objects, allowing for development, sharing and re-use of packaged learning materials for use in compatible platforms (Burgos, 2015; Day and Erturk 2017). Singh and Reed (2002) also questioned the emergent nature of learning object specifications and suggest educators should query the status of SCORM compliance when evaluating commercial learning platforms (Singh and Reed, 2002, p.65).

Friesen (2003, p.59) comments on the close relationship between technology-facilitated learning and a linear and passive instructional design model, suggesting an inevitable outcome focused on systemisation and the maximisation of efficiencies for labour and productivity: "The end result of this approach is to understand training and the technologies that support it as a means of 'engineering' and maximizing the performance of the human components of a larger system.." Similarly, Musa (2003, p1.), Dobbs (2000, p.84) and Fetherston (2001) commented on a lack of attention to educational processes or theories of learning and teaching when evaluating, designing or deploying learning facilitated technology. Fetherston (2001, p.25) summarised "pedagogical challenges" in the context of Web based learning, drawn from a substantive review of literature surrounding E-Learning; these summaries can be seen to encompass several key fields for practical implementation of technology facilitated learning, including experiential learning, critical reflection on learning and collaborative or participatory learning in contrast to transmissive approaches to courseware delivery.

xviii. Learning Approaches/Styles for Technology Enhanced Learning

A range of theoretical perspectives on learning and their relationship to Technology Enhanced Learning can be identified in the literature, the following section attempts to contextualise these perspectives and outline their significance for technology enhanced learning.

Deep and Surface Learning was introduced by Marton and Säljö (1976), following group work involving Swedish students, questioning individual approaches for learning. Results indicated two contrasting strategies for learning based on either "surface" (i.e. "remembered" or factual related learning) and "deep" (i.e. "adaptive" or conceptual learning). Marton and Säljö (1976, p.4) comment on these differing individual approaches for learning, commenting that "...a number of categories (levels of outcome) containing basically different conceptions of the content of the learning task could be identified. The corresponding differences in level of processing are described in terms of whether the learner is engaged in surface-level or deep-level processing." Säljö defines learning types into distinct forms, including "Learning as a quantitative increase in knowledge", "Learning as memorising", "Learning as making sense or abstracting meaning" and "Learning as interpreting and understanding reality" (Säljö, 1979, p.19). The attributes of "deep and surface learning" can be summarised as follows (the table below is reproduced here from Atherton's paper, 'Approaches to Study "Deep" and "Surface"' (2013f):

Deep	Surface
Focus is on “what is signified”	Focus is on the “signs” (or on the learning as a signifier of something else)
Relates previous knowledge to new knowledge	Focus on unrelated parts of the task
Relates knowledge from different courses	Information for assessment is simply memorised
Relates theoretical ideas to everyday experience	Facts and concepts are associated unreflectively
Relates and distinguishes evidence and argument	Principles are not distinguished from examples
Organises and structures content into coherent whole	Task is treated as an external imposition
Emphasis is internal, from within the student	Emphasis is external, from demands of assessment

Figure 7: Deep and Surface Learning Summary by Atherton (Atherton, 2013f)

Fransson (1977, p.244) similarly describes “deep and surface” approaches to learning following a study of eighty one students whilst being subjected to internal and external motivational factors. Fransson also demonstrates a correlation between stress related factors such as exam anxiety and the resort of students to “surface” type approaches for learning, commenting that “Lack of interest in the text, efforts to adapt to expected test demands, and high test anxiety, were all found to increase the tendency towards surface-processing.”

Prosser and Trigwell (1999) and Ramsden (2003) further outline “deep and surface” learning strategies employed by students and potential responses to these strategies by educators to ensure “deep” learning approaches are integrated into learning design, commenting that “...activities aimed at changing approaches to teaching in order to improve student learning need to take account of these fundamental relationships between approaches to teaching and conceptions of teaching.” (Prosser and Trigwell, 1999, p.283). Atherton (2013f) additionally explores the motivational and strategic nature of deep and surface learning, suggesting that these approaches may be employed by the same individual at various times, citing the motivational influence of internal or “intrinsic” and external or “extrinsic” factors on the learner. ‘Deep’ and ‘surface’ learning is described in context to instructional design for learning technologies by Garrison and Cleveland-Innes (2005) and in context to a multi-theory approach for online learning by Cuneo and Harnish (2002) and in a framework for addressing learner diversity in promoting flexible learning environments by Dimitrova, Sadler, Hatzipanagos and Murphy (2003). A study by Garrison and Cleveland-Innes (2005) examined learning styles at Middlesex University alongside pedagogical approaches used for existing learning technologies. A questionnaire was used to assess deep or surface learning attributes of students engaged in use of learning technologies, Garrison and Cleveland-Innes comment on “deep” strategies observed “to attain personal meaning and reconstruction of knowledge by critical interaction with knowledge content and relating ideas to their previous knowledge…” (Garrison and Cleveland-Innes, 2005, p.3). These authors found that learning behaviours of students could be grouped into those employing deep, surface or achieving strategies – the latter reflecting learning approaches based on the sole objective of “activities that will result in the

highest marks" (Garrison and Cleveland-Innes, 2005, p.137). The role of reflective practice on individual study and understanding (cited in terms of "metacognition" by the authors) is emphasised as a characteristic of "deep" learners, however, to achieve these outcomes, the learner must not be constrained by issues such as workload, issues of time management or other constraints: "Contextual factors such as workload and time constraints, type of learning evaluation, the opportunity for metacognition, the shift of learning management to the students themselves, and instructor explanation, enthusiasm, and empathy have all been indicated in the development of deep learning." (Garrison and Cleveland-Innes, 2005, p.4).

Closely related to deep and surface learning styles, the education sector has witnessed a large range of commentary on personal approaches to learning in recent years, more recently termed 'learning styles'. This paradigm, based around the concept of diverse personal approaches for learning which can be characterised or defined for individual types of learner, with some preferring or exhibiting specific learning styles is described by Pashler, McDaniel, Rohrer and Bjork (2008, p.105), suggesting that advocates of "learning-style assessment contend that optimal instruction requires diagnosing individuals' learning style and tailoring instruction accordingly..."

We can see the learning styles concept for understanding learning techniques and strategies in many older or established models such as Kolb's experiential learning cycle (Vince, 1998. P.304) and in Honey and Mumford's adoptions on Kolb, emphasising role-style definitions for learners, such as activist learning, reflective learning, theorist learning or pragmatic learning (Atherton, 2013g):

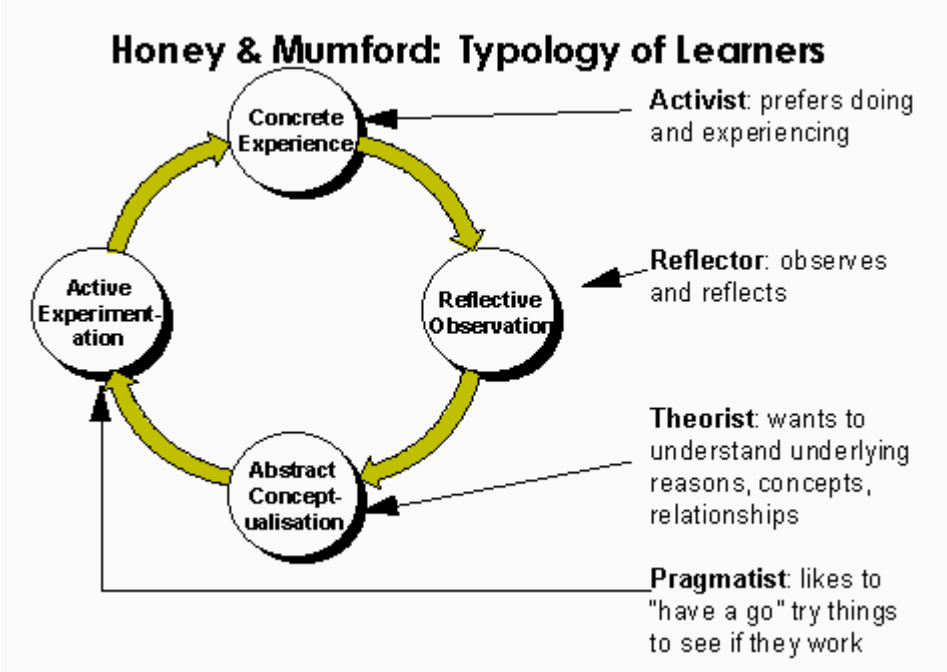


Figure 8: Honey and Mumford's Adapted Learning Cycle of Kolb (Atherton, 2013g)

Dimitrova, Sadler, Hatzipanagos and Murphy (2003) determine a definition of learning styles evidenced via their deep and surface learning-based assessment of learning strategies and attributes amongst sampled students, these include examples such as: "The Traditional Learner" – characterised by a focus on learning via hardcopy textbooks, "The Achiever" – characterised by a focus on assessment outcomes, "The Interactive Learner" – characterised by a focus on staff-student and peer/group interactions and collaboration and "The Social Learner" – characterised by a focus on group discussion/collaboration (Dimitrova, Sadler, Hatzipanagos and Murphy, 2003 p.4). The above example is typical and broadly congruent with learning style inventories suggested by Gregorc (1979), Dunn and Dunn (1993) and Vermunt (1996). For Atheton (2013g) many of these perspectives reflect subjective and interpretive "strategies" and can be applied in a multi-faceted manner as part of a narrative to explain individual approaches to learning, Atherton contrasts this

position with “hard” perspectives on learning styles which impose rigid models or arguments of learning as a formal paradigm .Atherton draws a distinction between “hard” and “softer” interpretation of learning styles; the “hard” definition of learning styles can represent an “extreme position it suggests that the style is neurologically determined. If this is accepted, then teachers are clearly obliged to present material tailored to that style. A softer ‘style’ argument suggests that students have clear preferences for learning in a certain way.” (Atherton, 2013g).

Part 3: Recent Trends in Learning Technologies/Student Centred Learning

i. Recent Developments for Collaborative Learning Technologies

It can be seen that the use of reflective and collaborative learning tools such as e-portfolios for study and wider continuing development, blogging for collaborative study and group work and use of Wikis for collaborative documentation projects have become increasingly prevalent in recent years (Dabbagh and Kitsntas, 2011, p.2). A study by Lane (2014, p.1) on the use of Wikis in a university class-based context reflected on the constructivist potential for collaborative platforms for encouraging active learning and participation, for constructing meaning and empowering students’ own learning and value of these applications in both the class and remote context for group study: “The positive orientation was predominantly being able to collaborate online without having to meet face-to-face. Integral to this were aspects such as being able to add and update content, seeing and editing what others in the wiki team have contributed, and associated version control.” (Lane, 2014, p.8).

Since the late 2000s, novel approaches have been explored for the delivery of class-based teaching via poll or quiz style technology, comprising use of mobile or traditional computing for delivering quizzes, polls and surveys via either Web based platforms or “app” type software installed on mobile platforms (Cheong, Bruno and Cheong, 2012, p. 94). These applications have been cited in an on-campus context, but sometimes also a remote context with students located externally from the educator (Herreid and Schiller, 2013, p.62). These applications, sometimes also called “clickers” (Martyn, 2007, p.71) can be Web based, offering flexible access to the poll or quiz functionality using a wide range of mobile devices, desktop or laptop computers or via mobile “apps” developed by the software provider, recent examples of polling, quiz or survey type applications have included Kahoot (Smith and Mader, 2015, p.10) and Poll Everywhere (Shon and Smith, 2011, p.235). A study at the University of Illinois by Stowell (2015, p.329) suggested that the use of clickers or polling applications could be beneficial in terms of students’ perceived usefulness and impact of the technology, however issues of connectivity to the Internet-connected application and other technical issues suggested this technology can present difficulties for some users, including issues of distraction when using mobile devices to access the polling application. Stowell comments that “students' attitudes toward using clickers and mobile devices were favorable, but 31% of those who reported using a mobile device could not connect to the Internet ‘sometimes’ or ‘most of the time.’” (Stowell, 2015, p.329).

A further emerging technology seen in recent years concerns the emergence of research gateways or academic social networking sites (ASNS) which allow for researchers (particularly postgraduate researchers studying for an MPhil or PhD) to engage with researchers worldwide, discuss research topics, publish papers and

engage in collaboration via a range of online discussion, and related tools. Vasquez and Bastidas (2015, p.1) comment that "...Each site offers its own combination of tools and capabilities to support research activities, communication, collaboration, and networking." These applications may be provided in the form of Web based platforms (e.g. ResearchGate, Academia, Social Science Space, Method Space) or may be provided within other academic platforms, including citation sharing systems such as Mendeley and Refworks (Zaugg, et al., 2011).

Recent years have also seen the proliferation of citation management applications, "apps" and Web based platforms, often integrating a wide range of scholarly or information retrieval functions within a single platform, providing automated generation of citations and bibliographies, integration/provision of research networking tools, scholarly searching platforms and integration of further Web based tools such as Google Docs (ProQuest, 2017).

Similarly, another recent development concerns the growth of social bookmarking and similar Web content sharing applications such as Diigo, Pinterest and Reddit, allowing for sharing, commentary, ratings/rankings and organisation of suggested Web resources, media, images, video and scholarly papers: "Diigo is a social book marking site. Diigo is a powerful tool that stores, captures, recall information. It saves important websites and we can access them from any computer connected with network." (Patel, 2017, p.6). Bienkowski and Klo (2014, p.92) comment that these systems facilitate the generation of "...useful information about resource usage and contexts of use... ...the classroom context the resource was used in; and for what kinds of students it was used..."

ii. Recent Developments for Mobile Technologies

The use of mobile platforms for blended and remote study models is explored by Viberg and Grönlund (2015, p.1), examining university second language students' perceptions on mobile devices, "apps" and learning resources in a distance learning context. Viberg & Grönlund comment how students' own mobile device behaviours must be considered when developing learning via technology, commenting that "...integration of mobile technology into learning practices depends on factors related to humans (students and instructors), design (content and technologies), and institutions (policies and strategies)..."

Nguyen, Barton and Nguyen (2014, p.2) studied the use of iPads across a range of systematic reviews in Higher Education, commenting that "...demographics of iPad users make it sensible to introduce and integrate iPads in higher education. Since then, many education service providers have started exploring how to use iPads for teaching and learning..." The iPad however, whilst empowering and enabling study across diverse locations with access to Web based systems and media was not found across the systematic review to enhance learning itself: "While students were positive with using iPad in their learning, no evidence was found to associate their iPad use with better learning outcomes." (Nguyen, Barton and Nguyen, 2014, p.6).

Similar perspectives on mobile device usage amongst students are also raised by Diemer et al. (2012), following a study of Higher Education students, suggesting that there is variation amongst students in terms of acceptance of tablet/iPad computer use within formal teaching and learning processes (Diemer, et al., 2012, p.20). The study considered a range of activities and processes via the tablet devices, including

use of the VLE, use of brainstorming applications and concept/ mind mapping, using apps to create graphs and online Library platforms.

iii. Recent Developments for Cloud Based technologies

Cloud computing approaches or technologies are characterised by storage of either generic documents/files or application-specific data in a form which is accessed, edited and saved or stored by a remotely based Internet service or server, comprising the client-server model for data management of Internet applications (Bora and Ahmed, 2013, p.9). Recent examples of cloud computing include the use of tools and features within the Virtual Learning Environment to store and collaboratively develop documentation (Hew and Kadir, 2016, p.64), use of freely accessible Internet tools such as Google Docs for personal or collaborative development and live (on-the-fly) editing of documents, spreadsheets, data or presentations (Madhavand Joseph, 2017, p.1). This kind of remote-based approach for study can allow students to work in an on-demand, just-in-time, and situated context, allowing for flexible working across a range of locations (Zurita, Baloian and Frez, 2014, p.124). A study by Chang et al. (2016, p.988) at National Taiwan University of 123 university students concluded that use of cloud-based applications demonstrated increased levels of innovation, creativity, increased student motivation and positive perceptions of the learning environment for students and faculty. Chang et al. comments that “Cloud-based m-learning has positive impacts on overall perceptions of innovative environments...” (Chang et al., 2016, p.993).

iv. Recent Developments for Distraction Management

The debate around mobile technologies has also included discussion on distraction and boundary management, considering potential issues which can arise due to mobile device access in an ubiquitous context, within and external to the institution (Fiaidhi, 2011, p.10; Winter, Cotton, Gavin and Yorke, 2010, p72). Lagan et al. (2016, p101) has undertaken a study of students' perceptions of personal learning technologies, considering both the application of these technologies for learning and wider application beyond the class or lecture context. Lagan comments on the ubiquitous nature of personal technologies and how these are now increasingly integrated into the students' learning, social and wider experience. Langan et al. comments that "...despite a technological revolution, university teaching practices have remained largely the same, resulting in 'cultural lag' within the classroom." Lagan et al. also considers an expectation by users that issues of distraction due to mobile use should be accepted by educators as a normal or expected condition for use of these technologies: "Students' repeated reference to the normalcy of their use of technology in 'today's society' signals the importance of considering the historical and cultural contexts of post-secondary teaching and learning." (Langan et al., 2016, p.109).

v. Video and Multimedia, the Flipped Classroom and Lecture Capture

Another development influencing blended and related models for learning via technology concerns the use of the 'Flipped Classroom', defined as a reversal of conventional teaching where students explore digital content such as video in a

remote or home setting, later returning to class to engage in discourse, analysis and related forms of discussion and group-based learning (Roach, 2014, p.74).

The function and process of the Flipped Classroom is further explained by Arnold-Garza (2014, p.8), indicating "...the flipped classroom has two defining components: moving the lecture outside of class, usually delivered through some electronic means, and moving the practical application assignments, formerly homework, into the classroom..." Roach suggests that this form of blended learning, combining class and remote study via use of learning technologies is a relatively new phenomenon and requires further research: "Although flipping the classroom has gained popular attention, very little research has focused on flipping the classroom at the collegiate level." (Roach, 2014, p.74). The “TED” or “Technology, Entertainment, Design” platform is described by Roach in terms of an application for providing a flipped classroom media which allows for uploading content to Youtube and can include quiz style functionality (Roach, 2014, p.78). Roach summarises benefits of the Flipped Classroom model in terms of facilitating a self-paced and just-in-time model for learning via technology, for encouraging student collaboration and tutor interaction within the classroom, providing empowerment for students to engage in study external to the class setting and to encourage reflective practice for students and educators (Roach, 2014, p.75).

At the time of writing, software applications have now become available such as Xerte or Articulate, providing HTML 5.0 functionality (allowing for complex interactions without the need for run-time environments such as Java or Flash). Bouki and Economou (2015, p.7) comment how the Articulate “Storyline” application can be published in multiple formats so students can use the output on i-Pads, Android devices and laptop computers and accessed via the VLE.

Similarly, the most recent version of the Microsoft Office suite of applications now also provide inherent tools and features to generate video from static content such as video, with narration, captions and interactive features.

A further significant development for blended learning concerns the emergence of lecture capture and lecture recording, allowing students to view lectures in a flexible manner, on-demand or in a structured format within their VLE. Williams, Aguilar-Roca and O'Dowd (2016, p.10) comment on the potential uses of lecture capture, providing "...opportunities for analytics, such as audience retention metrics that indicate sections of the video most often watched..."

vi. Developments for Learning Technologies and Information Literacy

In a study exploring the information seeking behaviours of Higher Education students, Erfanmanesh, Abriza and Karim (2014, p.70) considered the impact of "anxiety" related problems for students at both undergraduate and postgraduate level whilst engaging in information literacy activities such as use of Library databases and Web based search engines, commenting that "Information seeking anxiety can be interpreted as the fear and/or apprehension of searching for information resources during the information seeking process." (Erfanmanesh, Abriza and Karim, 2014, p.70).

The Flipped model or Classroom is also discussed by Arnold-Garza (2014) in context to a research project examining the perceptions of Higher Education students at Miami University, suggesting that this model is of particular interest by Librarians as a means to encourage information literacy behaviours, for self-reflection on information retrieval approaches/strategies; the role of interactive media

is suggested as an important transition from traditional library skills toward developing digital information literacy skills. Arnold-Garza (2014, p.13) comments on technical challenges, for educators and students in the use of this new approach, suggesting the need for development of Information Technology skills and training and extensive planning to ensure the model can be effective.

Head (2013) further comments on information seeking behaviours across a study of 11,000 US based students within Higher Education institutions, evaluating these behaviours from the perspective of “Project Information Literacy”, reflecting the skills required by students when engaged in project work for research and the generation of a substantive academic text, but also examining how students undertake information literacy in their personal lives external to the education institution (Head, 2013, p.472).

One of the most significant issues facing the students is cited in terms of information quantity, i.e. the volume of information accessible to students across a range of online sources, educational sources, Web based resources reflecting the need to develop skills to accommodate an increasingly diverse and wide-ranging scope for information retrieval. Head comments that students use a range of strategies to manage large volumes of data, "...they consciously manage their research tasks and activities within the constraints of the research process (e.g., time, availability of resources, and expectations)." (Head, 2013, p.474). One of the most significant research findings concerned strategies to minimise access or results displayed in electronic or print form and to rely on print resources to some extent; students also consulted Web based search tools in some contexts rather than relying on institutional platforms: "For course-related research sources, a large majority of students PIL surveyed in our 2010 study reported turning to course readings (96%),

search engines (92%), scholarly research databases (e.g., JSTOR or ABI Inform) (88%), and instructors (83%)." (Head, 2013, p.475). Ultimately, the research concludes by stating that there is a need for greater information literacy teaching for students in Higher Education to enable skills such as developing relationships with Library and related support staff, for evaluating information and developing skills to deal with high quantities of information: "Many students have difficulty understanding what the search process entails; many default to using Google and a few other familiar sources." (Head, 2013, p.476).

vii. Recent Developments for Game/ Gamification Learning Technologies

Perhaps another developing trend for blended and related areas of E-Learning, concerns the growing impact of “game” theory or “gamification” theory on teaching methods, for instructional design and for development of Open Educational Resources (OERs) or Reusable Learning Objects (OERs); the integration of game-like processes for learning has been discussed elsewhere in the thesis and has been discussed recently by Langan et al. (2016) and Sullivan (2010, p.67).

Qian and Clark (2016) provide a review of recent research in this area, suggesting the increasing prevalence of game theory for educators and learning technologists: "Game-based learning and 21st century skills have been gaining an enormous amount of attention from researchers and practitioners. Given numerous studies support the positive effects of games on learning..." (Qian and Clark, 2016. p.50). Qian and Clark suggest that students’ personal skills and educational processes are becoming more closely integrated, with a need to address these skills for the development of educational technologies (Qian and Clark, 2016. p.56).

viii. Recent Developments for Peer Facilitated Learning via Learning Technologies

In a study of student perceptions of peer and instructor facilitated discussion, Hew (2015) raises another novel trend for learning via technology, considering the increasingly prevalent role of peers or students as facilitators or mentors within the Virtual Learning Environment. Hew outlined this trend in terms of a growing body of students who are experienced in the use of learning technologies and the apparent need for support in the context of newly enrolled students. Hew comments on this trend in content to research carried out by Yin (2003), the research involved "...three different student samples—undergraduate students, postgraduate diploma students, and working adults. Specifically, this study examined students' perceptions after initial engagement with peer and instructor facilitation..." (Hew, 2015, p.22).

ix. Trends toward Open Source Uptake by Institutional Systems

In a similar context to platforms for open sharing, dissemination of Web resources, news, media or video, a further development for blended learning and E-Learning concerns an increased implementation for Open Source and other models of freely accessible systems and platforms, often published under Creative Commons, GNU or other Open Source licensing. Rabah (2016, p.95) comments on open source LMS trends, commenting that "The open source Moodle LMS is continuing to reign as the major player in providing campus-wide LMS solution across the globe – which is expected in future to have a major impact on the overall LMS and educational technology market offering..." Open Source platforms can include Virtual Learning

Environments (VLEs) such as Moode (Moodle Partners, 2016), Content Management Systems (CMS) such as Drupal (Saeed, 2013, p.244) and authoring platforms for developing Reusable Learning Objects (RLOs) such as Xerte (Gordillo, Barra and Quemada, 2017, p.188). Benefits of Open Source applications can include no cost for the software, a development and support network of practitioners and similarly open technical architecture supporting the application (such as PHP), with more prolific systems such as Moodle providing a commercial element for dedicated support (Rabah, 2016, p.95).

x. Internet Control Trends in World Regions

Whilst global trends for E-Learning have been discussed elsewhere in this thesis, it is perhaps notable that an additional trend for global access to learning technologies is now characterised by increased Internet Control and surveillance for some world regions (Alexander et al., 2017; Torres, 2017). Internet Control can reflect the use of wide-scale proxies (controlling access via an intermediary service), local Internet Service Provider (ISP) practices or other measures to monitor, control or obstruct secure Internet technologies such as SSL (Secure Socket Layer) and related technologies. Catherall (2015, p.34) comments on difficulties for some users experiencing connectivity issues in an online or remote educational context via learning technologies, problems can include "...obstructions caused inadvertently, such as the use of common TCP/IP and other protocol related Port numbers assigned... ...or deliberate blocking factors such as configuration to prevent certain protocols, encryption or services running...", the author further comments on the impact of increased Internet Control in some world regions, in context to distance

and remote learning via the VLE and related technologies, suggesting the increasing issue this can present for learning technologies and remote access for students who may be residing partially or permanently in an affected location, further commenting that “Given international trends toward increasing WWW restrictions or limitations on personal freedoms experienced in many parts of the world, and corresponding reliance on the WWW and social media such as Twitter and blogging for popular expression, the above tools have become a lifeline for many users in affected regions.” The increasing prevalence of Internet control in many world regions over recent years is also a significant factor for the delivery of distance based education via technology for students residing/studying in affected regions, posing challenges for educational providers and technical teams for the delivery of systems which can function in a dynamic and uncertain climate for network systems compatibility and functional integrity, in an environment where regional Internet regulations can change rapidly, sometimes without warning or formal notice.

xi. Key Reports on Emerging Technologies and Educational Challenges

The NMC organisation (New Media Centres), an independent research body has produced a number of reports under its ‘Horizon Project’ in collaboration with EDUCAUSE Learning Initiative (ELI), researching “trends, challenges, and technology developments likely to have an impact on teaching, learning” across educational sectors, including the Higher Education and HEI Library sectors. The research comprises qualitative studies across educational institutions in 195 countries (NMC, 2018). The NMC Higher Education focused 'Horizon' report (2017) was composed of a "78 experts" sourced internationally within the Higher Education

sector, the report was focused around the question " Which trends and technology developments will drive educational change?" (NMC, 2017). The report outlines "six key trends, six significant challenges, and six developments in educational technology".

Key long-term impact trends are discussed seen as drivers for "Accelerating Technology Adoption". The key trend, "Redesigning Learning Spaces" is focused around physical and digital innovation to accommodate scope for learning via informal spaces, design for collaborative learning and integration of learning technologies to facilitate individual or collaborative learning, commenting that these can "incorporate features such as movable furniture, adjustable control of display screens, WiFi, and multiple outlets"; wider, off-campus and conferencing is also cited in terms of adaptive learning spaces and facilities for online, overseas and other off-campus users, suggesting that "telepresence technologies are allowing geographically dispersed students and professors to more flexibly meet and work together." (NMC, 2017, p.16).

The key trend of "Collaborative Learning" discusses student group-working as a "social construct" which places the student “at the center, emphasizing interaction, working in groups" and for “Deeper learning” approaches which allow for critical, reflective and other advanced learning processes (NMC, 2017, p.20).

The NMC report also outlined several "significant challenges" in context to technology adoption in the sector, these are potential impediments to development of skills or literacies but also present potential opportunities for Higher Education (NMC, 2017, p.20).

The challenge of "Blending Formal and Informal Learning" cites a range of skills challenges for effective of blended learning approaches, including issues for

integrating the formal and informal learning spaces and challenges for section of credible online learning materials. The emergence of informal learning via educational technologies and growing integration between commercial providers for online learning (such as Coursera) is presented, suggesting the need to understand students' experiences beyond the institutional setting, in an environment where blended learning technologies such as Learning Management Systems are increasingly ubiquitous and integrated with social media and professional networks such as LinkedIn (NMC, 2017, p.22).

The challenge of "Improving Digital Literacy" is also raised in the report, suggesting disparities between students' prior knowledge of digital media, mobile devices and social media in contrast to studying via use of educational technologies in a formal educational context. The JISC "digital capability framework" is cited as a means of developing digital literacies for self-reflection and critical skill, similarly, activities developed at Western Sydney University are outlined for developing "high-order thinking skills". (NMC, 2017, p.24).

Further "Important Developments in Educational Technology" are cited in relation to the Higher Education sector, including the emergence of "Adaptive Learning Technologies" - suggesting success of adaptive learning initiatives such as the "Adaptive Learning Market Acceleration (ALMAP)" initiative, a multi-institution project to promote adaptive learning behaviours within Learning Management systems and US Higher Education consortia APLU "(Accelerating Adoption of Adaptive Courseware initiative)", initiatives which identified improved student performance and outcomes when studying via adaptive learning technologies (NMC, 2017, p.38).

Further challenges described include the "The Internet of Things" – querying the potential for wider integration of online and domestic devices and equipment and

"Natural User Interfaces" (or NUIs) for integration of sensor-based “swiping” and “touching” technologies - also referred to as “haptic technology”, citing research at University of Sussex to develop learning technologies relying on “ultrasound waves through the back of the hand to a screen display on the palm…” (NMC, 2017, p.48). The report summarises key insight or perspectives on learning trends such as the requirement for "cultural transformation" and for the requirement of "Real-world skills” to facilitate employability and relevance to “workplace development". The use of collaboration is cited frequently in the report, suggesting the importance of collaborative approaches to ensure "Communities of practice, multidisciplinary leadership groups, and open social networks".

The disparity between students’ prior or informal competencies is contrasted with the requirement for improving digital literacies, suggesting that "…fluency in the digital realm is more than just understanding how to use technology”. The impact of new technologies is presented as “foregone conclusions”, suggesting that the development and survival of Higher Education organisations depends on engagement with “these now pervasive approaches”. The report also suggests the need for ongoing engagement in “Lifelong Learning” to facilitate formal and informal learning for wider societal careers development, an objective for development of “faculty, staff, and students." (NMC, 2017, pp.2-3)

The IET (Institute of Educational Technology) is a European-based research organisation focused around leadership in Higher Education, learner analytics and projections of future trends for learning technologies in the HE sector, IET operates as an institute within the Open University, The IET 'Innovating Pedagogy' report is a series of annual reports exploring "new forms of teaching, learning and assessment

for an interactive world, to guide teachers and policy makers in productive innovation" (IET, 2018). The IET 'Innovating Pedagogy' report (2017) explores ten innovations related to the Higher Education sector; the report was compiled by the IET in collaboration with researchers at the "Learning In a NetworKed Society (LINKS) Israeli Center of Research Excellence (I-CORE)".

The development of "Open textbooks" is also outlined, comprising open, "freely shareable and editable resources" which can be modified by students and educators, used within specific learning contexts or ‘remixed’ for use alongside other educational resources. This kind of resource is cited as a form of “OER” (Open Educational Resource) and is suggested as a teaching method for discussing open licenses (such as Creative Commons) and related democratic information sharing, news reporting and content development, suggesting that "Open textbooks can be used to challenge the relationship between students and knowledge." (IET, 2017, p.4).

Similarly, another development comprises "Navigating post-truth societies", suggesting the importance of critical and reflective skills for interpreting a range of media sources in a climate of proliferation of Web-based resources and potential difficulties for issues of authority and bias, suggesting that development of critical and evaluative skills can promote "…understanding of the nature of knowledge and justification as well as fostering abilities to assess the validity of claims and form sound arguments. " (IET, 2017, p.4)

Another development cited includes "Intergroup empathy”, suggesting the need for diverse student groups or demographics to engage in a shared online community to develop mutual understanding and overcome extant historic, cultural, stereotypical or prejudicial barriers, commenting that "...when groups are kept apart, they are likely to

develop negative stereotypes of each other." These skills are suggested as necessary for an increasingly connected, shared experience for students engaged in digital technologies and online or remote models of learning (IET, 2017, p.4).

In a further development or perspective, "Immersive learning" is cited as a potential trend, characterised by interaction beyond textual, in-person or digital forms of learning via senses such as “...vision, sound, movement, spatial awareness...", this development is cited in terms of integration between learning activities and Virtual Reality technologies such as "…3D screens or handheld devices” commenting that “learners can experience immersive learning in a classroom, at home, or outdoors..." (IET, 2017, p.4)

The development of "Student-led analytics" is also cited, suggesting that students will lead in defining goals and influencing their own metrics in contrast to traditional institutional student metrics derived from enterprise/institutional systems such as the Virtual Learning Environment. In this model, students generate data during learning experiences or tasks, allowing for shared analysis of data, suggesting that student metrics "…not only invite students to reflect on the feedback they receive but also start them on the path of setting their own learning goals." (IET, 2017, p.4)

Another development, "Big-data inquiry: thinking with data" is cited as an emerging trend in terms of open access to statistical data and student engagement with data via learning technologies and Web based sources, allowing for open, democratic forms of data use and analysis. The report further comments that a new skillset or competency will be required for interpretation of data and visualisations, also suggesting that students will need to demonstrate they are “data literate” (IET, 2017, p.5).

In another development, "Learning with internal values", the report suggests that

educational providers will be required to consider the innate or personal values of students in contrast to values presented by institutions and ‘curricula’, suggesting that the recognition of these values and integration of personal values within learning activities will benefit learning processes, commenting that this approach "… balances the learning based on students’ internal values with the learning that is required by the normative values of educational systems." (IET, 2017, p.5)

In a further development, "Humanistic knowledge-building communities" the report comments on the need to recognise the role of societal impact on learning and of personal experience, suggesting these factors can enhance learning by integrating practices which are "highly creative, and self-directed”, this perspective is also referred to as Humanistic Knowledge-building Communities (“HKBCs”), suggesting that students “who participate in HKBCs develop their knowledge and selves in integrated and transformative ways." (IET, 2017, p.5)

Part 4: Concluding Statement

The above narrative has provided an outline of key concepts and approaches for the delivery of technology facilitated education, including key definitions and terms related to this field, an overview of key extant models or architecture such as the VLE and MLE, key approaches or modes of learning via technology such as blended, distributed and online learning and conceptual approaches or paradigms such as self-regulated, personalised, adaptive and constructivist learning. The above outline has included critical discourse in the wider field of E-Learning, including emergent role of corporate and private equity and critical perspectives on the use of educational technologies. Recent trends have also been outlined, including

developments for cloud-based technologies, the use of ‘flipped’ approaches for teaching via technology, distraction management issues, game theory, peer-facilitated learning via technology and the impact of Internet Control. The above narrative has outlined background context to this field, setting the context for outline of the research design, methodology used, presentation of resulting theory and discussion in relation to the literature.

CHAPTER 2: THE METHODOLOGY

Part 1: Introductory Statement

The qualitative methodology selected for the study, Grounded Theory provided an holistic, unified approach to address the study context, comprising low-contact, professional and non-traditional student groups engaged in Higher Education programmes. The methodology can be seen to be inductive, i.e. based on direct interpretation of participant responses via principles of coding for generation and analysis of ontological data i.e. to establish taxonomic definitions of behaviours and their properties and iterative approach, i.e. applying a series of common terms for grouping or categorisation (Guba and Lincoln, 1994, p.163).

Though comparison and categorisation (or coding) of data, the methodology allowed for the coding of student responses, comprising descriptive narratives and theoretical perspectives, allowing for a conceptual explanation of behaviours - indicating concerns, anxieties, motivations and corresponding strategies or behaviours within the substantive area identified.

The methodology therefore provided a framework and series of principles to address participant groups and to generate original theoretical insight or concepts explaining behaviour. The following chapter will explain the methodology of Grounded Theory, including key principles, variants of the methodology and a rationale for the selection of the chosen variant, i.e. Grounded Theory as defined by the co-originator of the methodology, Barney Glaser.

Part 2: Summary of the Grounded Theory Methodology

This research project began around the year 2005, tentatively investigating broad topics within the field of E-Learning, focusing variously on areas as diverse as Web Accessibility and core skills for student use of ICT. Given the sweeping nature of the initial research topic and difficulty identifying a discreet hypothesis or research question in this area, the methodology of Grounded Theory was identified as a potential driver for the research, providing a sociology-based “iterative, inductive” approach – stressing the need to examine behaviours as presented, rather than aligned to a preconceived hypothesis, with use of repeated or ‘iterative’ terms or taxonomies for generation of categories to represent behaviours (Walker and Myrik 2006, p.549) and an “interpretative” approach – stressing the need to develop an understanding or interpretation of behaviours based on data presented (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.209). This methodology and related approaches were considered useful for interrogating (then subsequently coding and refining) a theoretical rationale for the experiences of student participants engaged in the increasingly prevalent mode of part time and low contact professional related study.

Grounded Theory was developed by Barney Glaser and the late Anselm Strauss during the mid 1960s, after using qualitative coding and sampling methods to address the issue of patients dying at American hospitals. The study revealed a number of theoretical explanations for the behaviour of participant groups, including doctors, nursing staff, patients and patient relatives in the context of terminal diagnosis; their 1965 publication ‘Awareness of Dying’ describes a process of data collection via broad participant interaction, observation and coding to determine a

theoretical understanding of participant concerns or behaviours: “In such qualitative analysis, there tends to be blurring and intertwining of coding, data collection and data analysis, from the beginning of the investigation until near its end.” (Glaser and Strauss, 1965, p.288).

These techniques would be defined further in the 1967 text ‘The Discovery of Grounded Theory’ (Glaser and Strauss, 1967), ‘Doing Grounded Theory’ (Glaser, 1998) and ‘The Grounded Theory Perspective: Conceptualisation Contrasted with Description’ (Glaser, 2001).

The Grounded Theory method, based around use of direct participant interviews, memo recording and refinement of ‘data’ to provide conceptual understanding of participant concerns via constant comparison and verification is outlined by Walker and Myrick (2006), defining coding as “conceptualizing data by constant comparison of incident with incident, and incident with concept”, using the “constant comparative method” to ensure the development of “categories and their properties” (Walker and Myrick, 2006, p.551):

> “ ...These two procedures, together with the use of memos that document the analyst’s ideas as coding proceeds, and theoretical sorting, which organizes the data and the memos, are the essence of Glaser’s method. “
>
> (Walker and Myrick, 2006, p.551)

i. Note on Grounded Theory Terms

Grounded Theory uses many proprietary terms to describe its ontological approach to data and research methods (it should be observed that Grounded Theory terms are often conceptual in scope, as such they can overlap, or closely reflect related or synonymous terms). Whilst the researcher will define, explain and illustrate the

terminology throughout this thesis, a few issues related to terminology should perhaps be noted before reading further:

- Codes and Categories – the terms ‘Code’, ‘Category’, ‘Variable’ and sometimes ‘Indices’ are used fairly interchangeably in Grounded Theory literature; a Code usually refers to a new and unique way of explaining a process, concern or other aspect of participant behaviour. Whilst a Code may comprise the same data and properties as a Category, the Category refers more specifically to an emergent or original Code as an aggregated or refined entity in context to dependant codes or categories, or in context to its location within the wider structure or hierarchy of codes. Whilst the terms ‘Code’ and ‘Category’ are both evident in earlier phases of this research project (e.g. Appendix 3: Revised Proposal), the thesis will attempt to maintain use of the term ‘Code’ for purposes of consistency.

- The ‘Substantive’ phase of Grounded Theory refers to coding and category development during an ‘Open’ coding phase for a narrative account of participant concerns, i.e. allocation or grouping of early stage Codes (or ‘indicators’) to source data. These ‘Open’ codes can then be compared, refined and developed further to present more developed ‘Substantive Codes’; however, it is possible for codes at this stage to be termed ‘Substantive Codes’ or ‘Descriptive Codes’. This phase refers to the early (largely descriptive and pre-conceptual) phase of coding and category generation. The term ‘Descriptive Code’ refers to a code which has been particularly determined to provide a narrative account of behaviours,

processes or concerns.

- ‘Theoretical Codes’ or ‘Theoretical Categories’ refer to codes which have been refined, via Grounded Theory methods such as comparison and sorting, providing a conceptual or theoretical understanding of behaviours. Theoretical codes stand largely in contrast to Descriptive Codes and to the Substantive coding process as outlined above.

Part 3: Grounded Theory Principles

Induction vs. Deduction

The use of an inductive rather than absolutist deductive approach for the generation of codes, categories and theory is emphasised throughout Glaser’s model of Grounded Theory. This approach emphasises the emergent nature of theory in an ontological framework reflecting empirical (evidence-based) and positivist (received physical perception of truth) approaches to knowledge. This position stands in contrast to absolutist deductive approaches to determining truth or knowledge. This inductive view of Grounded Theory is demonstrated by Duchscher and Morgan (2004): “Funamental to Glaser and Strauss’s original GT approach to research is an absolute adherence to the inductive nature of the analytic process.” (Duchscher and Morgan, 2004, p.607).

Professional Interests and Preconception

For Glaser, the researcher should refrain from embedding their personal research interests or professional background within Grounded Theory based research; an

example of this could involve repeatedly querying a prior professional interest within a participant group, since this would likely detract from original responses which could otherwise have resulted from participant discussions. This approach can also prevent meaningful comparison or validation of emergent data. For Glaser, preconception reflecting a research problem must be avoided for data to emerge. Instead Glaser advocates identification of a substantive area to begin the research; in this context, the researcher is open to encounter, memo and refine a descriptive narrative of the social environment encountered. This provides an inductive approach to research the chosen field, “not a professionally preconceived problem, but often an area containing a life cycle interest...” (Glaser, 1998, p.118).

All is Data

Grounded Theory considers both the interrogation of participants and literature encountered as data. These contributions should be constantly compared with other data or used to validate coding and emergent categories. In this sense, any external or literature sources encountered should be considered as data and handled according to the same practical process used for comparison, sampling and validation of emergent theory. Glaser comments on the nature of data, suggesting data “expands constant comparison and theoretical sampling.”, comprising a range of information, communications and media: “The briefest of comment to the lengthiest interview, written words in magazines, books and newspapers, documents, observations, biases of self and others, spurious variables or whatever else may come the researcher’s way...” (Glaser, 1998, p.8).

Theoretical Sensitivity and Approach to the Literature Review as Data

Grounded Theory emphasises a particular approach to the role of the academic literature review, considering this elemental to data collection. Glaser advocates avoiding review of the literature entirely before practical research commences, thus avoiding preconception of the research problem, but instead suggests adapting the traditional literature review to the Grounded Theory process, e.g. via ongoing review of literature in response to development of codes and theory. This point is closely related to Glaser's definition of 'Theoretical Sensitivity', i.e. allowing wider influences such as the literature review to provide theoretical data for comparison and validation against practical research data. For Glaser, the literature should be regarded as data, commenting: "If the grounded theory researcher does a literature review first, he/she does not really know which literature will fit the substantive area. The researcher does not know what he is going to discover." (Glaser, 1998, p.69).

The Substantive Area and Emergence Vs. Forcing

In Grounded Theory, the "substantive area" represents a participant group, within which the researcher is attempting to "understand the action in a substantive area from the point of view of the actors involved. This understanding revolves around the main concern of the participants whose behaviour continually resolves their concern" (Glaser, 1998, p.115). Glaser particularly emphasises the need for emergence of data from within the participant group rather than imposition of a research hypothesis or question from the researcher or arising from a professional context, "Grounded theory is experiential in the nature of doing it. As a part of what he is producing, the grounded theorist shows the use of his own introspection to be careful of forcing." (Glaser, 1998, p.102).

Glaser outlines a number of opportunities where this could happen, most notably due to the academic research project proposal, influence of personal research interests or the literature review: “He can record his own experience in a memo. Or in the data, if necessary, in order to submit it systematically to his ongoing constant comparisons...” (Glaser, 1998, p.102).

Memoing for Open/ Selective Coding and Insight Recording

The use of memo-based recording of participant interaction, in the form of informal interviews, followed by a coding process to identify concerns and to aggregate or group these into ‘descriptive’ categories (a narrative style outline of behaviours or concerns) and ‘theoretical’ categories (a conceptual explanation for activity, behaviour or concern), provides a means for approaching a participant group (comprising the substantive area of study) and for identifying key concerns, processes and conceptualisations of student behaviour. The uses of memoing and related ‘coding’ approaches is fully outlined in the Research Design chapter (Chapter 3, Part 6: Explanation of Interview Memoing Technique vs. Recording).

Description vs. Conceptualisation

For Glaser, another major consideration is the difference between description of processes, interactions, concerns or relationships as a narrative discussion and the development of theory to explain these processes or behaviours. Glaser describes multiple levels of narrative type data ranging from the descriptive to the conceptual, indicating that the “goal of GT is to arrive at least the third level of conceptual analysis.” (Glaser, 2001, p.19).

Glaser outlined the data collection process for generation of ‘categories’ which can be developed, corresponding to participant concerns: “first is collecting the data, then generating categories, then discovering a core category which organizes the other categories by continually resolving the main concern.” (Glaser, 2001, p.19).

The development of categories toward higher level of conceptualisation is outlined as a process for development of theory to explain participant concerns and processes engaged by participants in responding to these concerns, this process can also indicate generalised theory which can be applied beyond the immediate participant content:

> “From substantive theory one can go on to a higher level, called formal theory. For example, becoming a nurse, a substantive theory, can be generalized to becoming a professional, a formal theory, and even raised to a higher formal level of becoming in general, a theory of socialization.”
>
> (Glaser, 2001, p.19)

Substantive, Open, Descriptive and Theoretical Coding

Glaser describes a process for coding participant data to identify inter-related and mutually inter-dependent variables for the creation of categories, i.e. codes which have been aggregated, refined or otherwise contribute to the development of a higher level code which explains or complements shared properties from earlier codes across the ‘Interchangability of Indices’ (Glaser, 1998, p.25).

When developing codes, Glaser outlines an early descriptive stage (which may however prompt early insight or ‘Theory Bits’) and a theoretical stage where codes are refined and developed into higher level conceptual categories. The practice of initially coding data derived from memos is referred to as ‘Substantive Coding’, “the

process of conceptualizing the empirical substance of the area under study: the data in which the theory is grounded. Incidents are the empirical data (the indicators of a category or concept)...” (Holton, 2010).

This process includes initial ‘Open Coding’ – translating the memos directly into largely ‘Descriptive Codes’ followed by selective sampling of existing codes via further interrogation of the participant group or comparison with other codes (‘Selective Sampling’) thus achieving code verification and further exploration of codes and emerging categories. This coding process “proceeds from the initial open coding of data to the emergence of a core category, followed by a delimiting of data collection and analysis for selective coding to theoretically saturate the core category and related categories.” (Holton, 2010, p.24).

The refinement of codes into categories eventually allows the data “to achieve an integrated theoretical framework for the overall grounded theory…“ (Holton, 2010, p.35). The coding process allows for conceptual understanding of processes and behaviours, resulting in categories which represent Theoretical Codes, these “conceptualize how the substantive codes may relate to each other as hypotheses to be integrated into the theory.” (Holton, 2010, p.35).

Theory Bits

Glaser supports the possibility of achieving insight early in the practical research process. These early theoretical observations or insight are termed “Theory Bits” (Glaser, 2001, p.19). These Theory Bits encapsulate conceptual insight which can feed into the creation of Theoretical Codes. Glaser comments on ‘Theory Bits’, “It is impossible to stop the ‘grab’ of theory bits. ...They can be applied ‘on the fly’, applied intuitively with no data with the feeling of knowing. ..They are exiting handles of explanations running fast ahead of the constraints of research” (Glaser, 2001, p.19).

Categorisation/ Sorting of Codes

Glaser describes a process of category generation, where codes and their properties are constantly compared with other codes and developing categories; categorisation is not simply aggregation of codes but a selective and theoretical interpretation of codes and their properties to establish inter-relationships between codes to identify higher level conceptual approaches for explaining processes and behaviours:

> "First he compares incident to incident, then as a category or its property emerges, he compares the concept to the next incident. This has four purposes. 1) It verifies the concept as a category denoting a pattern in the data. 2) It verifies the fit of the category nomenclature to the pattern. 3) It generates properties of the category. And 4) it saturates the category and its properties by the Interchangability of indicators."
>
> (Glaser, 1998, p.139)

During the process of categorisation and development of higher level theoretical codes, it is necessary to consider practical approaches for sorting; Glaser suggests the need to sort memos using a hardcopy or physical card index approach (Glaser, 1998, p.185); Glaser also comments on the usability of data analysis software for Grounded Theory coding, suggesting that most applications, including the qualitative data analysis package NUDIST can present challenges for theoretical sampling, sorting and constant comparison of data: "Computerization will likely catch up in the years to come, when accomplished grounded theory researchers turn their skills to generating software which helps not hinders the various stages of the grounded theory package" (Glaser, 1998, p.186).

The Constant Comparative Method and Interchangability of Indices

When data is compared, selectively sampled and emerging theory is contrasted and compared for validation or to explore new areas suggested in the data, this is referred to by Glaser as the 'Constant Comparative Method'; this method is closely related to another phrase seen in Glaser's works, 'Interchangability of indices', an outcome when variables, properties or dependent Codes within a Category exhibit interchangability across data, this is possible when "comparing incident to incident when coding his field notes, the researcher begins to see a pattern and a concept emerge that fits it. A category or its property has emerged." (Glaser, 1998, p.25).

Selective Coding (or Selective Sampling) and Theoretical Sampling

The process referred to as Selective Coding, Selective Sampling or Theoretical Sampling (Glaser, 1998, p.157), is described in Grounded Theory to explore or validate an existing code or category, "the conscious, grounded deductive aspect of the inductive coding, collecting and analyzing." (Glaser, 1998, p.157). This sampling process can involve returning to the participant group to query an emerging code and thereby refining categories further, this "constantly focuses and delimits the collection and analysis of data, so that the researcher is not collecting the same data over and over based on the same questions..." (Glaser, 1998, p.157). The use of Selective Coding contrasts with 'Open Coding' - describing the initial phase of coding directly following data collection (Glaser, 1998, p.138).

Emergent Fit

As theory is generated and categories are used to aggregate and compare emergent codes, the emergent high level theory should interrelate and 'fit' across the spectrum

of substantive and theoretical codes generated. This process requires the researcher to “compare the new data with the theory to check on fit, work and relevance of the grounded theory being used.” (Glaser, 1998, p.104). This process ultimately leads to the generation of a Core Category, encompassing all other categories.

Theoretical Saturation

The validation of codes and categories over repeated testing of the data is referred to by Glaser as ‘Saturation’, including validation of properties of categories; saturation confirms the emergence of higher level categories and conceptual models for explaining participant concerns or behaviour: “It focuses questions more and more on the direct emergence of the theory (thus showing again, how interview schedules constrain theoretical sampling.) ...Once saturation occurs new questions must be asked pertinent to the new emergent issues...” (Glaser, 1998, p.158).

Grab

The emergent high level conceptualisation of participant behaviour is described by Glaser as a Grounded Theory which has ‘grab’, i.e. demonstrates properties which powerfully convey an interdependent and transcendent explanation for behaviours or concerns of the participant group, “GT emphasizes the productive use of conceptual grab by generating relevant concepts that work and are integrated into a theory.” (Glaser, 2001, p.20).

Emergence of the Core Category

The aim of the Grounded Theory process is to achieve the development of a ‘Core Category’ aggregated from and paramount to all other dependent codes, categories

and theoretical perspectives, “to explain how the main concern is continually processed or resolved, the core becomes the focus of further selective data collection and coding efforts.” (Holton, 2010, p.29). The ‘Core Category’ emerges from the entire body of data and transcends all other codes and ideally, can be applied beyond the substantive area of research as a universal theoretical explanation for participant behaviour or concerns. The ‘Core Category’ represents behaviours or concerns which participants are continually attempting to resolve and can represent “any kind of theoretical code: a process, a typology, a continuum, a range, dimensions, conditions, consequences, and so forth.” (Holton, 2010, p.29).

The Wider Application of Grounded Theory

For Glaser, the Grounded Theory should transcend the substantive field (transcendence of theory), focusing on the abstract nature of interactions present within the participant group, “transcendence also, by consequence, makes GT abstract of any one substantive field, routine perceptions or perceptions of others…” (Glaser, 2001, p.11). From this argument arises the notion of the emergent Grounded Theory transcending the immediate study context and allowing application beyond the immediate context to other situations, participant groups and sectors: “Hence GT is a general method. Thus GT conceptualization transcends.” (Glaser, 2001, p.11).

Holton (2010) further confirms the imperative for the Grounded Theory as a wider, holistic theory which transcends the immediate participant group and has application beyond the field of study, thus achieving a theory which can be re-purposed or adapted for wider use: “The researcher who does not reach outside extant theory for theoretical coding possibilities runs the risk of producing adequate but rather

mundane conceptual theory. …The underlying imperative, however, is that the fit must be emergent and not imposed." (Holton, 2010, p.35).

i. Explanation for Literature Review Contribution in Grounded Theory

It should be noted that the Grounded Theory methodology advocates an alternative approach to the literature review, suggesting substantive appraisal of the literature following the practical research phase. It should be noted that the present researcher had already drafted a textbook on E-Learning before registering for the PhD programme, had worked professionally in this area, presented at conferences and had written professional publications in this field; however. It should be pointed out that the research proposal had attempted to address Grounded Theory principles for avoiding professional pre-conception (of outcomes/ theory). To this effect, the study attempts to reconcile uses of the literature (prior research, theory or commentary surrounding the broad field of E-Learning) within methodological approaches advocated by Grounded Theory. The use of a 'Theoretical Sensitivity' approach derived from Grounded Theory - assimilating wider reading within the practical phase of the study was accomplished via the input of selective readings as data; these contributions stand alongside early theoretical insights or 'Theory Bits' (Glaser, 2001. P.19) generated from 'Substantive', 'Open' and 'Selective' coding.

The unified assemblage of early 'Theory Bits' contributed from sources such as initial memos, early descriptive codes and Theoretical Sensitivity (literature influences prompted by practical research) can be illustrated in the samples shown in Appendix 10, Table 5 and in Appendix 10, Table 8.

A fuller, retrospective literature review was also undertaken to facilitate later discussion of findings following the practical phase and generation of theory (Chapter 5: Discussion in Relation to the Literature). Thus, treatment of the literature has been approached in accordance with Grounded Theory principles, avoiding a substantive literature review phase during data collection, but addressing some aspects of literature prompted via initial Open Coding and during the pilot phase of the practical research.

Further sections of this chapter will offer a more detailed explanation of Grounded Theory, its key concepts, the role of 'Theoretical Sensitivity' for the generation of early Theoretical Codes and practical application of the methodology.

Part 4: Branches of Grounded Theory and Rationale for the Chosen Methodology

i. Overview of Grounded Theory Types

It should be noted that several branches of Grounded Theory have emerged since the publication of 'Awareness of Dying'. The works of Anlsem Strauss and Juliet Corbin such as 'Basics of Qualitative Research: Grounded Theory Procedures and Techniques' (1990) promote a Grounded Theory method based upon inductive, deductive and verification approaches alongside a greater range of formal coding models or families, such as 'axial' coding which seeks to apply a deductive epistemological approach and use of formal contexts for coding such as conditional or situational factors "to put the fractured data back together in new ways... ...This connecting is accomplished through the use of a coding paradigm…" (Walker and Myrick, 2006, p.553). Three aspects are explored in axial coding, including "the

phenomenon: the conditions or situations in which phenomenon occurs; the actions or interactions of the people in response to what is happening in the situations; and, the consequences or results of the action taken or inaction."(Walker and Myrick, 2006, p.553). The use of axial coding in the Strauss and Corbin model emphasises the validation of data within existing or pre-defined categories, suggesting a more deductive approach for the generation of theory (testing against a theoretical perspective) and abductive approach (development of a hypothesis from initial observation which is then subject to further analysis). The deductive approach of the Strauss and Corbin model of Grounded Theory is outlined by commentators such as Cooney (2010), Bryant and Charmaz (2007) and Reichertz (2007):

> "(Abduction is) a type of reasoning that begins by examining data and after scrutiny of these data, entertains all possible explanation for the observed data, and then forms a hypothesis to confirm or disconfirm until the researcher arrives at the most plausible interpretation of the observed data."
>
> (Bryant and Charmaz 2007, p.31)

The above approach to Grounded Theory, via formalised coding families and contexts is at variance with the more open and inductive approach seen in works of Barney Glaser such as 'Doing Grounded Theory: Issues and Discussions' (1998); in this version of Grounded Theory, formalised or contextual approaches to the coding process are absent, instead the researcher is encouraged to address participant concerns in an open inductive framework, developing codes and refining them into categories based on a descriptive (or substantive) coding phase to identify participant behaviours, followed by ongoing refinement to identify theoretical indicators which are continually compared and validated via further data collection.

Walker and Myrick (2006) describe how Glaser's model of Grounded Theory can achieve a more realistic conceptual understanding for high level theoretical models for behaviour, outlining how Glaser "divided the coding process into two procedures: substantive and theoretical coding. Substantive coding… …is concerned with producing categories and their properties. Theoretical coding occurs at the conceptual level, weaving the substantive codes together into a hypothesis and theory." (Walker and Myrick, 2006, p.550).

On discussing the 'General Properties' of this methodology, Glaser describes the goal for the generation of a 'Grounded Theory', effectively supplanting the traditional hypothesis approach with a conceptual understanding of data which itself creates an hypothesis, ultimately allowing for generation of a 'Core Category', Glaser stresses the importance of development of theory in contrast to the hypothesis approach: "...Being honest about the data is paramount, because there is a great opportunity for misrepresenting what is grounded. That is, saying an hypothesis is grounded when it is not." (Glaser, 1998, p.3).

Additionally, a more recent constructivist-inspired Grounded Theory model has been developed largely by Kathy Charmaz, defined in texts such as 'The Sage Handbook of Grounded Theory' (2007) and 'Constructing grounded theory : a practical guide through qualitative analysis' (2006). In this model, a postmodernist approach is adopted, i.e. via deconstruction of the research context, data and professional background of the researcher, thus contributing wider experiential background or knowledge for the generation of theory: "The integration of methodological developments of the past 40 years distinguishes Constructivist Grounded Theory. This version emphasizes how data, analysis and methodological strategies become

constructed, and takes into account the researchers' positions, perspectives, priorities and interactions'." (Bryant and Charmaz, 2007, p.10).

Mills, Bonner and Francis (2006) further outline the contrasting epistemological nature of the Constructivist approach to Grounded Theory with established approaches described by Glaser, Strauss and Corbin. For Mills, Bonner and Francis, Grounded Theory can be applied in context to constructivist approaches, reflecting the cultural and historic background of the researcher, suggesting "we are all influenced by our history and cultural context, which, in turn, shape our view of the world, the forces of creation, and the meaning of truth." (Mills, Bonner and Francis, 2006, p.2).

This variant of Grounded Theory is defined as a constructivist informed approach which recognises that reality cannot be defined objectively but only via cultural and individualistic interpretation, "a research paradigm that denies the existence of an objective reality." (Mills, Bonner and Francis, 2006, p.2). The Constructivist ontological view - denying the possibility for creation of a unified or shared objective reality is further outlined by Guba and Lincoln, "realities are social constructions of the mind, and that there exist as many such constructions as there are individuals (although clearly many constructions will be shared)." (Guba and Lincoln, 1989, p.43).

Mills, Bonner and Francis discuss Grounded Theory in context to an ontological and relativistic context of a postmodern, humanistic and personally constructed reality, this provides a methodology "that would provide an ontological and epistemological fit with our position... ...our position, we were led to explore the concept of a constructivist grounded theory." (Mills, Bonner and Francis, 2006, p.2).

Glaser's model for Grounded Theory can be shown to take a 'positivist' position - reflecting the positivist theories of the philosopher Auguste Comte (1798-1857), stressing generation of knowledge from observable data to explain any social context:

> "The positivist paradigm of exploring social reality is based on the philosophical ideas of the French philosopher August Comte, who emphasized observation and reason as means of understanding human behaviour. According to him, true knowledge is based on experience of senses and can be obtained by observation and experiment. Positivistic thinkers adopt his scientific method as a means of knowledge generation."
>
> (Dash, 2005)

This perspective stands in contrast to the 'relativist' approach seen in Constructivism, where the importance of interactions between individuals, events and between social and cultural factors are emphasised in creating meaning. The Grounded Theory model provided by Chamaz (2006) is presented as compatible with this relativistic model, suggesting that narratives conveyed by participants within the field of study will invariably present a constructivist and relativist perspective, "(Strauss and Corbin)... ...underpinned by their relativist position and demonstrated in their belief that the researcher constructs theory as an outcome of their interpretation of the participants' stories. ...Charmaz (2000) is the first researcher to describe her work explicitly as constructivist grounded theory" (Mills, Bonner and Francis, 2006, p.7).

In assessing the various branches of Grounded Theory, it was considered most appropriate to apply the Glaser model for use in a Higher Education and class-based context, where the need for discovery of local participant behaviours, concerns or

challenges would seem most compatible with a positivist epistemological approach less influenced by personal professional background or beliefs.

Glaser's model for Grounded Theory particularly stresses an inductive and emergent approach for generation of data and development of theory without constraints imposed by formalised qualitative research methodologies or hypothesis based models; additionally, the Glaser model provides both an epistemological approach for research - to identify objective truth or knowledge (Mills, Bonner and Francis, 2006), alongside formal techniques for interrogating 'data' in the form of the participant group. The positivist nature of Grounded Theory and its variance from Constructivist or Postmodernist approaches is echoed by Glaser, suggesting that "GT is not an 'enquiry that makes sense of and is true to the understanding of ordinary actors in the everyday world,' as one QDA (qualitative data analysis) writer would have it." (Glaser, 2001, p.11). For Glaser, participants convey patterns of behaviour without awareness of wider conceptual insight, it is the role of the researcher to "uncover" these patterns: "GT in naming concepts does not try to take a 'concern to understand the world of the research participants as they construct it.'… …GT uncovers many patterns the participant does not understand or is not aware of, especially the social fictions that may be involved." (Glaser, 2001, p.11). The empirical approach of Glaser's Grounded Theory model emphasises the probable and objective nature of data. In this sense, the researcher is expected to develop a theoretical understanding of context and participants beyond an original external hypothesis. Glaser outlines an empirical approach for qualitative research, suggesting that "the world is totally empirical... …The data is not 'truth' it not 'reality'. It is exactly what is happening." (Glaser, 2001, p.146), this empirical context for

examining the research area “is more relevant than personal pre-conception or “vested fictions (that) run the world” (Glaser, 2001, p.146).

ii. Critiques of Glaser’s Methodology in Context to Traditions of Qualitative Enquiry

Grounded Theory in Context to Theoretical Perspectives for Qualitative Research

Following previous sections of the chapter exploring branches of Grounded Theory, it may be useful to assess critical perspectives on the chosen methodology - Glaser’s iterative, inductive perspective for Grounded Theory in comparison with related qualitative methods. It may also be useful to outline some of the key theoretical terms related to this area of qualitative research.

Key theoretical perspectives related to qualitative research include epistemology, reflecting the broad study of concepts and concerns, summarised by (Levers, 2013, p.2) as "the relationship between the knower and the knowledge, and asks... ...how I make meaningful sense of our world."

Objectivism is typically cited in terms of a belief system, whereby truth or meaning “reside within an object and is independent of human subjectivity” (Levers, 2013, p.2), in this perspective, the researcher attempts to distance themselves from environmental factors or bias.

Ontology similarly reflects the broad study of being and reality and the nature of the human being in the world..." and also refers to forms of categorisation for defining concepts and their properties (Levers, 2013, p.2).

Relativism ("Relativist ontology") reflects the nature of reality as an experienced phenomenon, in this view there is no definite reality, but only "multiple interpretations of experience..." (Levers, 2013, p.2).

Interpretive and Post-modernist approaches reflect on the role of personal experience, context, environment and historical factors, in this perspective the researcher "...seeks to explore actors' perception of and sentiments towards a particular concept, phenomenon, and/or happening." (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.208).

Positivist perspectives similarly emphasise processes of conceptualisation drawn from empirical (observable or experienced phenomenon), based on the classic empiricism of John Locke and David Hume (Charmaz and Begrave, 2012, p.349).

The terms 'emic' and 'etic' are also used to refer to differing emphases on the perspectives of the individual being researched - or 'emic' perspective, - in comparison with emphasis on the researcher and their own views/interpretations – or 'etic' perspective (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.210).

Common Theoretical Attributes of Grounded Theory

In considering contrasting perspectives on the chosen methodology, Glaser's variant of Grounded Theory, it may be worth considering common ontological aspects of the methodology. Mills, Bonner and Francis (2006, p.2) outline the common "methodological spiral" inherent in all branches of Grounded Theory, suggesting there are common "epistemological underpinnings", however, the principal difference between the various forms of the methodology relates to the "relationship between researcher and participant" – this is particularly relevant for post-modernist

approaches such as Constructivist Grounded Theory, however, the common epistemological aim, to conceptually define participant behaviours can be seen to reflect differing points on the “spiral”, with Constructivist approaches offering an extreme position “actively repositioning the researcher as the author of a reconstruction”.

Common “underpinnings” include pragmatist theoretical positioning, with truth derived from an empirical, evidence-based form of enquiry (Corbin and Strauss, 1990, p.418), inductive positioning – emphasising the role of enquiry established via evidence to arrive at theory (Charmaz and Begrave, 2012, p.347) and iterative positioning – reflecting the need to affirm and re-visit concepts or theory (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.211).

Whilst the discreet processes and methods for Grounded Theory have been outlined considerably in previous sections of this thesis, it can be shown that all variants of Grounded Theory share a common aim to define a high-level conceptual explanation for participant behaviours, von Alberti-Alhtaybat and Al-Htaybat (2010, p.211) comments that "...a grounded theoretical framework extends the scope of findings beyond the researched case, as it offers theoretical scope and insight."

Contrasting Theoretical Perspectives in Qualitative Research (and Grounded Theory Branches)

Charmaz and Begrave (2012, p.349) identify three forms of qualitative research approaches related to the methodology of Grounded Theory, these include “constructivist” perspectives, “objectivist” perspectives and “post-positivist” perspectives (Charmaz and Begrave, 2012, p.349).

In the positivist perspective, the role of empirical i.e. evidence-based, tested or observable phenomenon is emphasised as the process for achieving theoretical outcomes, typically obtained for qualitative studies via direct access to participant responses followed by testing and analysis, the aim of positivist research is for “conceptualising empirical findings” (Charmaz and Begrave, 2012, p.349).

For Grounded Theory, the Glaser variant is typically cited in terms of positivism, as a consequence of an emphasis on avoidance of pre-conception or prior theoretical influences and view of all participant or external sources as data for testing and analysis (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.210).

Similarly, variants of Grounded Theory can be referred to as “objectivist” in terms of a focus on the external environment or substantive area of study, precluding from theoretical, personal influences or leading questions influencing participant responses, in contrast with this perspective, the Constructivist and post-modern position indicates the role of experiential factors on the researcher and participant group, this is often defined in terms of a “reflexive” position when approaching research, integrating a range of individual experiences including “theoretical and research knowledge... constructivist grounded theory encourages researchers to be reflexive about the constructions..." (Charmaz and Begrave, 2012, p.355).

Glaser (2004, p.3) queries the role of constructivist and post-modern approaches for qualitative research, suggesting the “worrisome” nature of qualitative research based around “subjectivity” and difficulties in achieving truth (“accuracy”) via these approaches, commenting that "…the data focuses on its subjectivity, its interpretative nature, its plausibility, the data voice and its constructivism. Achieving accuracy is always worrisome with a QDA methodology."

In presenting contrasting Grounded Theory variants, their emphases and debate on corresponding strengths or challenges, it may be useful to initially consider the chosen methodology for the current study, comprising Glaser's inductive, iterative perspective for Grounded Theory. In this position, the researcher adopts an empirical, emic, positivist and objectivist position, approaching a substantive area of research as an empirical process for obtaining and testing evidence, comprising participant data, with an emic focus on participant data on contrast to external or experiential researcher or environmental factors and taking an objectivist/positivist approach in the analysis of data via iterative process – i.e. repetition and testing. von Alberti-Alhtaybat and Al-Htaybat (2010, p.211) further emphases Glaser's position on the participant voice, suggesting that the researcher adopts an interpretive approach by processing participant data in a conceptual form, rather than relying on the participant voice, commenting that "Glaser's approach to analysis is that the researcher takes a distant stance, lets data speak for itself, but the researcher seeks to determine what and why."

Whist some variants of Grounded Theory present highly formalised, pre-defined coding families (Walker and Myrick, 2006), Glaser presents – in contrast – a more simplified process-driven series of coding types, defined mainly in terms of two coding levels open (initially descriptive) coding and theoretical coding – arising from comparison and analysis of earlier open codes (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.211). The resulting code ontologies (category names) and terms referring to code properties remain in the domain of the researcher, rather than relying on pre-defined coding families or terms, thus allowing for coding based on participant data rather than pre-defined structures inherent in the method, this

“reflects a more flexible and possibly more interpretive approach to data analysis and interpretation..." (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.218).

In contrast to Glaser’s open coding method, a comparative variant of Grounded Theory can be found in the works of Anselm Strauss and Juliet Corbin, presenting an abductive position, partially based around use of pre-defined coding families – such as axial coding (Walker and Myrick, 2006, p.550) and verification via comparison and analysis; Stottok, Bergaus and Gorra, (2011) define this approach in terms of an abductive position based on predictions (hypotheses) arising from data collection, suggesting that Strauss and Corbin “...recommended a more pragmatic and systematic process as well as a focus on abduction… ….based on predictions (hypotheses), which then can be verified.”

Walker and Myrick (2006, p.553) define the ‘axial’ coding process focused around participant behaviours or processes such as "…the conditions or situations in which phenomenon occurs; the actions or interactions of the people in response to what is happening in the situations; and, the consequences or results of the action taken or inaction..." For Walker and Myrick (2006, p.554) the use of pre-defined coding families presents challenges for the ontological empirical position, suggesting that “…they would appear to have elevated their use of tools, paradigms, and matrices to a place above the constant comparative method." (Walker and Myrick, 2006, p.551).

In contrast to empirical, objectivist and emic approaches shown above, the Constructivist approach for Grounded Theory emphasises an etic, experiential and highly interpretive position, suggesting the need for reflexive acknowledgement and integration of wider phenomena and influences within the research process, these factors are "…considered an important part of positioning yourself as the researcher." (Hoare, Mills and Francis, 2012, p.242).

Perhaps the most evident difference between Constructivist and Positivist/Objectivist Grounded Theory approaches comprises their respective epistemological positions on the nature of truth arising from the research process, with Constructivist approaches emphasising an entirely interpretative, relativist outcome where "…neither data nor theories are discovered, but are constructed by the researcher as a result of his or her interactions with the field...", in contrast to a 'discovering' outcome, where theory is considered a latent or ever-present conceptual-level process extant in participant behaviours (Thornberg, 2012, p.248)

The relativist position for Constructivism, emphasising the emergence of truth and theory via a process arising from the constructed perspective of all participants is outlined by Charmaz and Begrave (2012, p.349), commenting that these approaches "…do not ensure knowing; they may only provide more or less useful tools for learning. Constructivists study how participants construct meanings..."

Grounded Theory as a contested Method?

Some critical perspectives on Grounded Theory (including Glaser's variant of the methodology) includes Thornberg's discussion (2012, p.246) querying the viability of qualitative research in the absence of prior professional context, insight or influence of related literature, commenting that "…a researcher who collects and analyses theory-free data without any prior theoretical knowledge and preconceptions, has been strongly criticized by scientist philosophers..." (Thornberg, 2012, p.246).

von Alberti-Alhtaybat and Al-Htaybat (2010, pp.212-223) also comment on general difficulties for Grounded Theory, related to a lack of clear process as a consequence of the method's highly ontological and theoretical format, potential difficulties for the

role of prior theory (preconception), difficulties ensuring the “rigour of the analysis” and difficulties conceptualising on a fully transcendent level to apply outcomes beyond the field of study.

It may be useful to consider Glaser’s claims surrounding his variant of Grounded Theory and related perspectives, one of these claims refers to the widespread adoption (across global regions and academic disciplines) and longitudinal scope of the theory since the initial publication of ‘Awareness of Dying’ (Glaser and Strauss, 1965). Glaser (Glaser, 2010, p.2).comments that "... grounded theory has gone global, seriously global among the disciplines of nursing, business, and education...", also commenting on the diverse adoption of the method across many disciplines, suggesting that "...disciplines that use and support grounded theory deal with important, highly relevant dependent variables… …involved in pain, cure, social-psychological fates, profit, management problems, learning..." (Glaser, 2010, p.5). Thornberg, (2012, p.243), whilst querying issues such as the role of preconception (“a-priori” knowledge) in Glaser’s Grounded Theory - agrees this variant of the methodology has been widely adopted for qualitative enquiry, suggesting this "…is a widely cited and frequently used approach in a wide range of disciplines..." Similarly, Mills, Bonner and Francis (2006, p.1) commenting on Glaser’s variant of the methodology suggests this approach has proven to have longitudinal impact over approximately 50 years, emphasising the role of Grounded Theory for the health sciences – evidenced via a wide range of peer reviewed journals, commenting that "Grounded theory has proved an enduringly popular choice of methodology… …since its development in the 1960s, with more than 3,650 journal articles published, both on the methodology itself and reporting research outcomes." (Mills, Bonner and Francis, 2006, p.1). Levers (2013, p.4) similarly comments that

"Grounded theory is one of the most utilized qualitative approaches in nursing research..."

Glaser also comments on the issue of relevance for his iteration of Grounded Theory, commenting that "the more preconceived methods do not give relevant answers", also suggesting that researchers can be shown to adopt the empirical, inductive and iterative approaches found in this methodology in contrast to approaches emphasising fixed, pre-defined or structured Qualitative Data Analysis methods, commenting that researchers "…come to grounded theory to escape the preconceived problems, concepts, and format methods of data collection... ...irrelevance that is based on approved formed methods." (Glaser, 2010, pp.2-4).

The issue of relevance for Glaser's variant of the methodology is supported by Cooney (2010, p.25), suggesting that whilst some aspects may be less relevant for a non-social participant context, Glaser's approach "…is particularly helpful when investigating social problems or situations to which people must adapt..."

A repeated emphasis of Glaser concerns the relevance to participant concerns, emphasising the role of Grounded Theory for differentiating these behaviours or concerns from 'social fictions' or , allowing for discovery of "…what is going on… …how to account for the participants' main concerns… …Grounded theory is what is, not what should, could, or ought to be." (Glaser, 2010, p.6).

Glaser's claims surrounding relevance are also supported by Duchscher and Morgan (2005, p.605), suggesting the application of this variant of the methodology for social sciences and statistical research "…as a general method, applying it to both quantitative and qualitative research approaches."

Glaser further claims his variant of Grounded Theory to reflect a superior form of truth, with an emphasis on the empirical, emic position, querying outcomes for Qualitative Data Analysis lacking a fully objectivist position, suggesting that qualitative research typically lacks “accuracy, truth, trustworthiness or objectivity of the data." (Glaser, 2004, pp.3-5). Glaser suggests that "formulated evidentiary methods” inherently rely on formal, institutional or “homogeneous environments of culture and structure", suggesting that truth is often superseded by professional or established paradigms. For Glaser, truth is more easily obtained via "culturally diverse environments” where participants are less influenced or institutionalised by these established paradigms (Glaser, 2010, p.5). Glaser also cited the original nature of truth derived from his ontological empirical and positivist approach, suggesting that researchers could not have "…dreamed [their Grounded Theory conceptual outcome] or deduced it from preconceived ideas and are turned off by the blind alleys of reformulated ideas…" (Glaser, 2010, p.8).

Closely related to Glaser’s ontological empirical position, the role of ‘Theory Bits’ and early memoing/ coding processes are a prominent aspect of his methodology. Theory Bits and open coding approaches advocated by Glaser, emphasising the role of early conceptualisation - in contrast to verbatim note-taking - reflects Glaser’s claim for conceptual relevance, commenting that "Theory bits allow us to escape the particularistic, experiential explanation of an incident… …theory bits are grounded, not biased, prejudiced, or conjectural. Multivariate thinking can continue these bits to fuller explanations." (Glaser, 2010, p.12)

Critical perspectives on Glaser’s claim for conceptual relevance include (Cooney, (2010, p.23), commenting on Glaser’s reliance on the assumed neutrality of the researcher, and Thornberg (2012, p.246), commenting that in contrast to Glaser’s

perspective on avoidance of preconception, that the derivation of truth is inherently related to prior knowledge, also commenting a potential contradiction in Glaser's advocacy of 'Theoretical Sensitivity' for integration of the literature, whilst advocating a purely inductive position in relation to external influences, commenting that "...This makes troubles for the position of pure induction." (Thornberg, 2012, p.246). However, Urquhart (2000, p.3) points out approaches for "subtle" influence of the literature as "data", suggesting that an overly simplistic presentation of Glaser's contradiction between induction and preconception is misleading, commenting that "…the researcher takes an inductive rather than deductive approach, and listens to the data rather than imposing preconceived ideas on the data."

Concluding Remarks - Ontological and Epistemological Validity for Glaser's Grounded Theory

In conclusion to this discussion on the ontological basis of Glaser's Grounded Theory in comparison with related qualitative research approaches and theory, several observations can be observed to support the use of the chosen methodology on the basis of empirical, positivist and emic characteristics in contrast to related methodologies or perspectives.

The Glaser variant of Grounded Theory provides a framework or perspective for discovery of existing concerns or behaviours rather than imposing a constructed or external perspective on participant concerns, this is outlined as a characteristic of Glaser's variant of the methodology by Charmaz and Begrave (2012, p.349), commenting that "…grounded theorists are neutral analysts of a knowable external world... .. Meaning [is] inhered in the data, and the grounded theorist discovers it."

Similarly, Cooney (2010, p.23) outlines the positivist position of Glaser's methodology, allowing for an objectivist approach, allowing for the "reductionist" discovery of data via iterative, repeated and comparative data collection and analysis processes, these characteristics allow for discovery of "…manageable research problems, and objectivist rendering of data'."

The complexity of pre-defined coding processes, coding families and related structured methodologies such as Strauss and Corbin's axial approach stands in contrast to Glaser's open coding position, allowing the researcher to define and conceptualise the coding process freely in response to the emic, participant context; (Walker and Myrick (2006, p.550) comment that "…Glaser's… …coding methods appear rather simple... ...Theoretical coding occurs at the conceptual level, weaving the substantive codes together into a hypothesis and theory." (Walker and Myrick, 2006, p.550). von Alberti-Alhtaybat and Al-Htaybat (2010, p.212) agree this aspect of Glaser's methodology, commenting that "Glaser's approach offers the researcher a flexibility in the research process that Strauss and Corbin (1998) have eliminated from their evolved approach..."

Glaser (2010, pp.9-10) further outlines the value of his methodology as an holistic "general method", providing a model for approaching qualitative enquiry in a timely, cost-efficient and effective format; Glaser comments that "…by default to ease, costs and growing use by many, grounded theory is being linked to qualitative data and is seen as a qualitative method…."

The emic position for Grounded Theory, offering flexible approaches for data collection and conceptual analysis is further outlined by von Alberti-Alhtaybat and Al-Htaybat (2010, p.212), commenting that "…flexibility in analysing data and developing findings reflects the emic perspective of the interpretive ontology, while

interpreting through the “objective mirror or reality” reflects the etic aspect."
Finally, Glaser (2010, pp.12-13) comments that whilst there may be challenges for his methodology and perspective, admitting this is not widely taught, there are many factors indicating support, implementation of and integration of the methodology within qualitative methods, commenting that “...The future will bring less need to legitimize grounded theory; hence, there will be less need to justify using it. Now, many researchers have to explain it and argue for its use. Its future portends that grounded theory will be as accepted as are other methods (e.g., surveys) and will require little or no explanation to justify its use in a research project."

iii. Rationale for Selection of the Methodology

The Grounded Theory methodology as outlined by Glaser provided a means to refine the large and unfocused topic outlined for the research and impose a more formalised and qualitative approach on the study; this allowed for a sociological and inductive approach to address participant concerns for the generation of theory, whilst also preserving the original goal of the project to interrogate the skills, learning needs and general condition of the selected participant group.
Walker and Myrick (2006) outline the basis of Grounded Theory as a means of developing an original theory directly from data via two primary techniques - namely coding data from memo interview notes, “the analyst codes all data and then systematically analyzes these codes to verify or prove a given proposition.”, followed by analysis of data via inspection of data attributes and comparison of these codes to create theoretical categories, i.e. the researcher “merely inspects the data for properties of categories, uses memos to track the analysis, and develops theoretical ideas...” (Walker and Myrick, 2006, p.548).

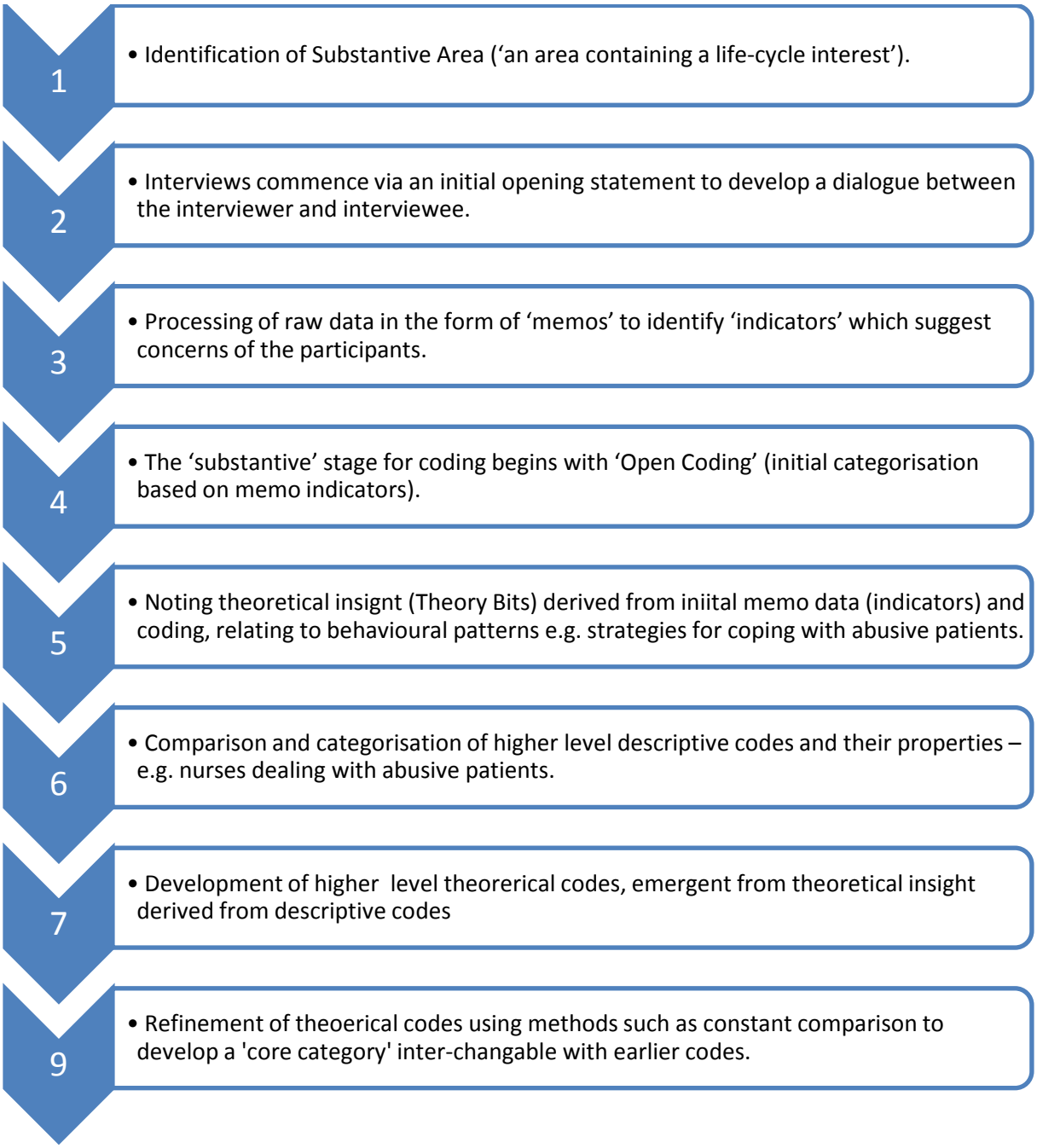
Key features of Grounded Theory which seemed to offer a sound basis for addressing this research project and for addressing the substantive area of study, i.e. low contact, professional related students studying via an environment of blended learning, included:

- Focus of the methodology on the premise of a 'substantive area' following the sociological-based qualitative research methods used for Grounded Theory.
- Potential for the generation of an original 'Grounded Theory' to explain participant concerns, i.e. "...their continual resolving is the core variable. It is the prime mover of most of the behaviour seen and talked about in a substantive area... It emerges as the overriding pattern." (Glaser, 1998, p.115).
- An approach combining practical research methods/ techniques with an holistic methodology derived from an empirical, inductive perspective; this would lean toward the use of experiential data for the understanding of participant concerns: "Grounded theory is a package. It is a revolving-step method that starts the researcher from being a 'know nothing' to becoming an expert who will later become a theorist..." (Glaser, 1998, p.3).
- Use of memos (see Appendix 7) – to quickly record output from participant interviews and also record theoretical insights or "theory bits" (Glaser, 2001. P.19).

Thus, the selection of Grounded Theory as the over-arching and holistic approach for the practical research project provided both a series of practical methods for interrogating the substantive area and a broad methodology and inductive framework

(also see Chapter 2, Part 4), for developing a conceptual understanding of participant behaviours. The following figure comprises a flowchart of Grounded Theory Processes derived from an unpublished paper distributed at NEWI (North East Wales Institute of Higher Education) during 2006 (Catherall, 2006b):

iv. Flowchart of Grounded Theory Process



Notes –

Theoretical Sensitivity - A broad awareness of the topic and surrounding topics will ensure 'Theoretical Sensitivity' to allow the researcher to develop theoretical categories of behaviour from the data. Theoretical categories could be tested or compared against substantive categories to determine if they relate, for example, a theoretical category derived by comparing similar substantive categories could reveal the concept of nurses employing avoidance strategies for abusive patients. Whilst this category may have been derived from other categories, it can also be tested against re-worked categories and existing literature to support the theory (this is essentially 'Theoretical Sensitivity').

Constant Comparative Method - Comparing and testing all data as necessary, e.g. comparing substantive categories to produce theoretical categories and eventually the 'Core Category', developing memos from the literature to identify concepts for comparison with theoretical and substantive categories.

Figure 9: Flowchart of Grounded Theory Processes

Part 5: Concluding Statement

This chapter has introduced the Grounded Theory methodology as an holistic, unified approach for the study, including the origins of the methodology and its sociology-based coding method for processing participant responses as data - particularly outlining the methodology of Barney Glaser, with its positivist, iterative and inductive approach for interrogating participant groups, emphasising observation and the confirmation of emergent theory via comparison and generation of codes or categories, illustrating participant behaviours and concerns.

The chapter also outlined the ontological based method of Grounded Theory, developing a series of increasingly inter-changeable indicators which summarise those behaviours and concerns in both a descriptive format and attempt to explain participant processes conceptually. The role of the literature has also been outlined within the methodology, drawing attention to the need for ongoing and retrospective review of literature in accordance with the principle of Theoretical Sensitivity, allowing for later comparison of emergent codes with theory, observations and insight derived from literature to confirm or add further insight into possible theoretical processes arising from the emergent theoretical codes.

The chapter also outlined Grounded Theory approaches and processes intended to avoid the pre-empting of theoretical outcomes and influence of professional opinion or prior knowledge, these include principles such as ‘all is data’, and ‘Emergence Vs. Forcing’, the chapter also outlined processes to confirm or validate emergent codes and theoretical insight, including ‘Emergent Fit’ and ‘Theoretical Saturation’.

Several variants or branches of Grounded Theory have been outlined and the rationale for selection of the chosen variant has been assessed and explained in context to study aims, suggesting the appropriate use of Glaser’s inductive focused methodology in contrast with the more prescribed, formulaic approach of Strauss and Corbin and in contrast with constructivist approaches emphasising the role of postmodernist or cultural factors for developing original Grounded Theory.

CHAPTER 3: RESEARCH DESIGN

Part 1: Introductory Statement

This chapter will outline the development of the research design, including an overview of the initial proposal and research aims and how the research design was received and commented upon during a 2006 Grounded Theory seminar with Barney Glaser in London. The chapter will provide a detailed outline for the early pilot research phase and explain how the pilot study and its processes was later adapted to design the full phase research stage, this will include a brief outline of ethical and related considerations for the practical research phase. Processes used in the practical phase will be discussed, such as the initial use of an Aide Memoire to suggest informal areas for discussion within the parameters of the methodology. The process of memoing and recording techniques will also be discussed, including early coding to develop a tentative Core Category during the pilot stage. The assimilation of the pilot and full phase studies and re-analysis of data will also be discussed.

The chapter will also consider tools/software used for the analysis of the data and processes for sorting and categorisation of codes, alongside practical methods employed for processes such as sorting, generation of higher level categories and generation of theoretical insight.

Part 2: Development of the Research Proposal

It should be noted that whilst the research project began with a proposal for a relatively simple mixed-methods approach via traditional survey-based research and staff interviews, it became increasingly apparent for the need to refine the scope of the research project; the field being addressed was considered at supervision meetings and seminar presentations to reflect a very wide range of potential interests and research topics, ranging from evaluation of core skills, student perceptions of E-Learning, evaluation of the Managed Learning Environment, Web accessibility, configuration and deployment of the VLE and staff perspectives on E-Learning.

To this extent, it is necessary to consider the formal research proposal (original and revised, see Appendixes 2 and 3) as an historical contribution to the development of the research project; the highly structured and group-delineated approaches described in the proposal were significantly modified following the selection of Grounded Theory as an holistic methodology for addressing this broad field via the student body. The resulting practical research project did however retain the aims described in the original proposal, addressing low contact students in a blended and highly distributed learning environment undertaking professional-related studies for career purposes.

What follows is a narrative to explain some of the anomalies between the research proposal and the practical research which followed, largely due to the shift away from the original mixed methods research approach toward use of Grounded Theory. Whilst the original proposal addressed a strictly defined “part time” context, signifying students enrolled on formally defined part time degrees or professional development

programmes, the revised proposal title was modified to reflect models of “low contact” study, including formally defined full time programmes, where class teaching was less than 15 hours per week. This was felt appropriate due to the relatively low class/tutor contact patterns evident in full time programmes of study and this issue became evident as a potential source of interviews following academic interest from programme fields such as BSc Engineering, BN Nursing and other full time programmes.

In the original proposal, undergraduate degree programmes were strictly defined as the target sample group. However, by the revised proposal this had been adapted to consider a broader range of programmes due to difficulties accessing student groups for the pilot during 2006-2007 and when significant support for the study became evident from 1-2 year professional related programmes such as CIPD (Chartered Institute of Personnel and Development) accreditation. It was felt that including these programmes would be appropriate given the professional/ vocational context of student groups, broadly reflecting the ethos of the study to interrogate low contact and professional students.

Furthermore, when the full practical research phase began in 2008, a number of opportunities were presented to approach programmes defined as ‘Postgraduate’; following supervision discussions, it was felt it could be permissible to approach these groups in areas which represented significant numbers of adult returning students more closely related to the aims of the research project. These included postgraduate programmes such as the CMIA (management accounting) postgraduate diploma and some postgraduate nursing qualifications. This allowed for

access to a broader range of interviews to expand interrogation of student concerns and explore or validate data.

It should also be noted that the factor of age was quickly rejected for selecting groups for interview. This was felt inappropriate and un-workable due to the highly diverse age demographic present within the student body. Furthermore, the factor of age was felt to be less relevant to the core aims of the project in addressing students undertaking low contact, professional related programmes. It was also felt that the current professional/ vocational status of students (i.e. working or in part time employment) would be difficult to define precisely in selection criteria when selecting groups. Furthermore, it could be assumed that the programmes selected for study would contain sufficient numbers of students in a vocational context, in full or part time employment given the demographic characteristics of NEWI (North East Wales Institute of Higher Education) at the time of the study; these characteristics, if relevant would also emerge from the data.

Additionally, the original research proposal limited access to only first year students, this was felt unworkable due to the more complex nature of some programmes, e.g. with HND graduates migrating to later years within some programmes/ use of academic credits to proceed to further years. Furthermore, since the VLE model for E-Learning had only recently become embedded at the institution for many programmes, it was evident that the use of learning technologies was occurring for many students in an original capacity at later programme years - for example with second year undergraduate students being exposed to the VLE for the first time. Moreover, as the pilot study commenced in 2007, it became apparent that the question of developmental progression and comparison was a secondary

consideration to broader contextual and behavioural issues being addressed in the study, which had shifted from a skills-based focus to a Grounded Theory approach, aligning the study more closely to participant concerns and representing a social and behavioural context. Given these considerations, as the practical research progressed, it was considered more useful to accept offers of access to second or third year student groups than reject these on the basis on a longitudinal developmental parameter.

Another modification to the original research proposal concerned the use of surveys rather than interviews. By the time the 'revised' proposal (See Appendix 3) was compiled in late 2005, the Grounded Theory methodology had been explored as an holistic approach to addressing a substantive participant group broadly defined in the proposal, namely low contact or part time students studying professional related programmes. The Grounded Theory methodology advocates use of unstructured interviews rather than surveys – thus allowing for dynamic and flexible interactions and data coding which can be easily expanded, verified and compared.

Furthermore, the ethical approval process at NEWI required the provision of an 'aide memoire' to guide the progress of the study undertaken (see Appendix 6). This document included considerations for opening debate with students in a planned class setting. Topics for discussion in the aide memoire included querying support or access challenges and how students studied across multiple locations. However, due to the later selection of Grounded Theory (a methodology prescribing the need to avoid preconceived research questions) this document was not used formally in any structured interviews, however some of the opening comments were used to begin discussions with students, e.g. asking the nature of academic studies, time

spent in class, extent of online platforms use and study carried out beyond institutional IT laboratories. Rather than dismiss the use of the aide memoir entirely, it was felt that some of these questions posed a helpful and neutral starting point to open interviews and query students on their blended learning experience and did not pose significant issues for use of Grounded Theory. This issue was also discussed at the Grounded Theory seminar in London (24-26th April 2006), where a discussion occurred with Barney Glaser and research peers on the use of an aide memoire as a means of opening the interview process. This discussion resulted in general consensus on the need to 'break the ice' in some way when approaching interview groups, but also for the need to avoid preconception by proposing positions or assertions which could detract from student concerns; a detailed overview of the Glaser event and discussion concerning this research project is provided in the following pages.

Additionally, the use of several key stages for distinct data collection (initially via surveys) shown in the original proposal was also later removed; the proposal had outlined deployment of practical research phases at key times throughout the academic year to enable contrast and analysis between these stages. Following the selection of Grounded Theory methodology and discussion of the proposal at Glaser's Grounded Theory seminar, it was felt this approach did not concur with the Grounded Theory model for a single research project – potentially obstructing the ability of the researcher to either pursue areas of interest, develop comparisons between emerging categories or verify data; it was suggested that additional phases could provide scope for later projects where results could be compared across all distinct research phases. Instead, a simpler approach was adopted to ensure student familiarity with the VLE/ blended study context – this was achieved by

addressing student groups who had been studying for at least two semesters, thus avoiding the first year intake period when students would have lacked opportunity to develop awareness of the VLE and related distributed learning experiences.

The first practical pilot phase was begun in 2007 and was envisioned to interrogate student groups in a planned class based context, however later stages of the pilot and the full phase research carried out in 2008 expanded to use of ad-hoc, unplanned interviews with student groups and individuals in Library/IT lab locations – this was partly due to later low responses from the academic community, the need to expand the interviews for data verification and to explore emerging codes further. Additionally, the use of an informal rather than class-based environment was felt to be more aligned to obtaining more honest and less contrived “baseline” data (Glaser, 1998, p.111).

An additional omission from the proposal during the resultant practical research phase concerned staff surveys. These had been proposed as a parallel practical research phase to query staff views on student skills development; however, it was later felt that this approach could pose potential issues for preconception and imposition of what Glaser calls “professional” or “personal predilections” (Glaser, 1998, p.118), since these views could exacerbate or reinforce the researcher’s own professional preconceptions, i.e. “...personal predilections distort descriptions. ...they are prejudices, value laden, ethics, ideology, psychological blocks, spinning distruths, preconceptions that are unchangeable, oversimplification, axes to grind in favour of a position... GT rescues us from this personal biasing whatever the source...” (Glaser, 2001, p.151).

Finally, another objective originally seen in the proposal concerned the development of a matrix to inform student skills development. This would pre-propose the

outcome of a skills-based theory emerging from the data. Instead, the emergent research outputs resulted in the conceptual or theoretical definition of processes undertaken by students, cumulating in an inter-related core category which reflected all other theoretical models for behaviour; this thesis provides a range of conclusions and recommendations for operationalising theoretical outcomes from the data.

Thus the strict framework for the project, initially limited to first year, part time undergraduate students undertaking degree programmes via structured surveys was modified to comprise any low contact programme related to a professional area, such as engineering, teaching, nursing, accountancy, management and architecture (discounting most humanities programmes for example), and expanded beyond undergraduate first time students to a broader range of professional programmes via both formal class-based and informally approached student groups.

It can be seen therefore that the practical research context for the study, eventually comprising over a hundred student interviews, was re-formed on a basis more appropriate to the Grounded Theory methodology.

A note should also be provided regarding the final title of the research project, since the final title of this thesis includes the term ‘blended’ rather than ‘distributed’ learning. The rationale for original use of the term ‘distributed’ was due to the context of the research proposal, focusing on the broad array of learning technologies, contexts and experiences within the substantive area of study, whilst the final thesis title, citing ‘blended’ learning, attempts to convey the institutional context as a frame for the research project, namely the delivery of learning via a mixed class and VLE facilitated mode of study (i.e. the institutionally-led ‘blended learning’ model for Technology Enhanced Learning). Whilst the final thesis title reflects the institutional

context of ‘blended learning’, this title does not detract from the inductive Grounded Theory method used, i.e. to explore the broad range of potential study experiences encountered by learners.

i. The Glaser Seminar and Appraisal of the Methodology/ Proposal

Between April 24-26th 2006, the researcher attended a small conference with Barney Glaser, the event constituted a ‘round-table’ based approach, with a small number of Grounded Theory researchers able to debate aspects of their research projects with peers and with Barney Glaser in person. Core features of Grounded Theory were described at the seminar, illustrated by examples of behavioural theory generated from the methodology such as ‘super-normalizing’: “Kathy came up with super-normalizing (which goes on a lot, where to deny a condition you act even more normal than the average person).” (Glaser, 2006b, p.1).

Glaser’s response to the research proposal (revised version, see Appendix 3) included commentary on the need to avoid preconception in relation to issues such as a defined research “question”. Glaser advised “moving on” from the proposal to focus instead on data and the substantive group:

> “Now that you have got accepted, you can move on from your proposal. You can leave it now until much later. You would have to discard all aims and objectives and then let the data emerge. Your next step is to go out and get data. No-one will look at the proposal again. Be careful not to preconceive. Wait for earned relevance. You may see these things in your data, but it may not have earned relevance.”
>
> (Glaser, 2006b, p.1)

Glaser also queried the use of multiple population groups (such as students and staff). In Glaser's view these were very different substantive areas which could present issues when trying to merge data, e.g. due to the differing perspectives of these groups, "Would it be appropriate to look at 2 different audiences, e.g. students and staff? I would stick with one population from the point of view of ease. Just jump in and look for a core variable. E.g. Odis and his colleague looked at alcoholism, but came up with 2 very different studies." (Glaser, 2006b, p.1).

It was suggested that the study should avoid imposition of professional interests, detracting from core concerns of the "substantive area", namely the student group being addressed, Glaser suggested the research should aim to be "abstract from time, place and people. Stick with one population, find a core variable. You don't need to go for full coverage – you go for conceptual coverage. Then you end up with a theory with general implications." (Glaser, 2006b, p.1).

Glaser concurred with the suggestion that use of unplanned or informal groups could enrich the study. Rather than relying purely on planned class based interviews, Glaser may have also alluded to the benefits of a relaxed, informal context in which students would be more receptive to the researcher, Glaser also pointed out the need to avoid preconception during the interviews and to approach these informally, suggesting "walk in and say 'how are you doing?' And then let them talk. You are talking about the unit vs. process discussion. But GT is abstract of place, people and time..." (Glaser, 2006b, p.1).

On the topic of the aide memoir, Glaser suggested this should be used with caution to avoid imposing pre-conceived knowledge, theory or practice, thus "framing" the discussions under the researcher's professional background (Glaser, 2006b, p.2), Glaser suggested "suspending" personal knowledge: "You will bring some

fundamental conceptual insights to the area…"; it was also suggested that the aide memoire provided a means of satisfying the ethical process (Glaser, 2006b, p.2). Glaser also pointed out the need to avoid jargon when opening interview discussions, thus further avoiding the imposition of professional framing, indicating the need to "work at asking open questions, without using jargon. If you use jargon, they will jargon you back." (Glaser, 2006b, p.2).

In relation to the literature review, Glaser pointed out the need to avoid imposing professional or theoretical frameworks, Glaser pointed out the need to avoid "socially structured vested fictions – they are a functional requirement of everyday life…" and to focus on "socially structured" data emerging directly from the interviews (Glaser, 2006b, p.2).

In conclusion, the seminar proved an important step in the adoption of the Grounded Theory method as an holistic approach to address the substantive area; the seminar also provided a means to modify approaches to the research and to avoid potential problems, such as reliance on the aide memoire. For further information about the seminar, see Appendix 1: Unpublished Paper following the Annual Grounded Theory Seminar.

Part 3: Outline of the Research Design

Final research Outline (Final working research context)

The original research project proposals (see Appendices 2 and 3) offered a tightly structured research context and schedule for addressing the student body over a series of separate research phases during the academic year. However, as has

been discussed previously, many of original parameters for the study were considered inappropriate or impractical in relation to the use of Grounded Theory, largely due to the need for focus on a single participant group, to avoid professional preconception and to ensure a data gathering process which could be expansible and broad enough to ensure sufficient access to student groups for constant comparison of data.

In contrast to the original and revised proposal, it may be worth summarising the resulting research programme which constituted the pilot and practical research phases:

Pilot Phase – Autumn-Winter 2007

- All of the groups interviewed were part-time, or in a low contact class setting.
- The interviewees were initially taken with first year students only, but were later drawn from all years, i.e. 1-3.
- Groups were initially studying professional related programmes excluding postgraduate level, however for the reasons mentioned in previous pages the scope was expanded to include postgraduate students studying highly vocational-related professional programmes – with significant numbers of adult returning students. Programmes included (For a list of programme acronyms see Appendix 20) FDSc Health and Safety, BSc Health and Safety, MSc Environmental Studies, MA in Public Sector Studies, CIMA Diploma, MSc Advanced Clinical Nursing, MBA (Business Administration).

- The pilot phase totalled over 30 interviews sessions, around half these ‘sessions’ were conducted in a planned class environment, however later sessions were also carried out ad hoc in IT labs and Library areas.
- Several interviews had a group discussion mode due to time and access constrains, i.e. class-based with opportunity to address groups of individuals at the end of a taught session.
- Interviews usually lasted from 10-20 minutes each.
- Interviews were loosely initiated by suggestions/ opening questions in the aide memoir.
- An information sheet was provided containing a broad description of the research with a URL for further details.
- Participation was voluntary in all cases (various communications were established with students to determine their willingness to participate).
- The interview data was anonymous and consent forms were provided.

The pilot phase for research resulted in a number of modifications undertaken for mostly practical reasons. A more detailed explanation of modifications resulting from the pilot is provided in previous pages; the main modifications from the proposal included:

- Expansion to a broader range of professional qualifications, including postgraduate study.
- Expansion to greater use of ad hoc interviews to expand data collection.
- Expansion to include all years of study, excluding new student intake (only addressing students in their third semester).

Full research Phase – carried out throughout 2008

- The data used in the pilot study contributed to the full phase, allowing for comparison of data, verification and exploration of categories developed in the initial practical phase.
- All of the groups interviewed were part-time, or in a low contact class setting.
- The interviewees were later drawn from all years, i.e. 1-3.
- Groups included both undergraduate degrees, professional programmes and vocational-related postgraduate programmes – with significant numbers of adult returning students, programmes across a wide range of professional subject areas such as education, nursing health, management and administration and architecture.
- The full phase totalled 62 interview sessions held in a mix of group and individual settings; most of these sessions were held informally in Library and IT labs.
- Several interviews were conducted via a group discussion mode due to time and access constrains, i.e. class-based with the opportunity to address groups of individuals at the end of a taught session.
- Interviews lasted from 10-20 minutes each.
- Interviews were loosely initiated by the aide memoir for purposes related to the NEWI ethics procedure (to ensure suitable parameters for the discussion), this was compiled as a general indicator for the kind of discussions that might ensue, but in practice this was not used heavily during the interviews.
- The same information sheets were provided as used in the pilot.

Part 4: Research Aims and Participant Group

i. Identification of Participant Groups

Shortly prior to the first pilot practical phase, largely occurring Autumn-Winter 2007, academic staff at NEWI (North East Wales Institute of Higher Education) were contacted by email on an all-staff mailing list, informing them about the pilot research project; this correspondence included a brief summary of the research project aims, i.e. to investigate the condition of low contact students studying in blended learning environment on professional related programmes via Grounded Theory methodology (and avoiding new entrants as described previously). The email asked for support in setting up formal class-based opportunities to interview students; supporting documents included a paper written by the researcher regarding attendance at the Grounded Theory seminar (Appendix 1), a copy of the revised proposal (Appendix 3), other supporting documentation such as the interview information sheet for student participants (Appendix 5) and the Aide Memoire (Appendix 6).

During Autumn/Winter 2007 the following programme areas participated in planned class-based interviews: Health and Safety, Environmental Studies, Public Sector Studies, CIMA Diploma, Advanced Clinical Nursing, Business Administration; most of these areas comprised bachelor's degrees or professional qualifications.
Later interviews carried out toward the end of the pilot in winter 2007 included expansion to use of informal interviews held with students on an ad hoc basis in the IT labs or institutional library. Formal class-based sessions held during the full phase of practical study included Nurse Prescribing, CIMA/CIM, Management and

business related programmes and Health and Safety. A wide range of additional professional related programme areas were encountered in the ad hoc interviews, including engineering and architecture accreditations, educational programmes and public planning and administration programmes.

ii. Ethical Approval Process

The practical research phase required completion of an ethical approval process at NEWI (North East Wales Institute of Higher Educating). This included components drawn from the revised proposal including the rationale for study of the low contact participant group, an overview of the data collection methods via interviews, description of the Aide Memoire, steps to anonymise student participation, such as taking names of students by consent only/ coding of data without reference to individuals and outline of benefits of the research for the institution. Research-related considerations requested for ethical approval included (for the resulting Ethical Approval Form, see Appendix 4):

- Understanding of student concerns for the prevalent context of part time study and use of learning technology.
- Use of coping strategies.
- Self-directed study issues.
- Student-tutor communication issues.

Part 5: Approaches for Data Coding

i. Aid Memoire Experiment and Discussions

The Aid Memoire (Appendix 6) was carried during the pilot and full phase practical research stages. This document has been discussed at some length in Chapter1, Part 3 and elsewhere. It should be noted that the use of this document, whilst required for Ethical Approval was considered potentially problematic for imposition of preconception when implementing a Grounded Theory study.
The Aide Memoire included questions on the general status of the student; these questions did prove useful starting points to open the interview:

1. Is the student an undergraduate or postgraduate student, Part time or Full Time, what is their subject and year of study?
2. Approximately how many hours a week do they spend at lectures?
3. Approximately how many hours a week do they spend studying? How much of this time is spent using computers? How much of this time is spent on the Internet/ World Wide Web? What system(s) or applications do they use most?

The Aide Memoire also included further questions on general study behaviour – these were used less than the primary questions shown above:

1. Does the student study mostly at NEWI, at home or at work? What are the reasons for this?

2. Does the student mostly use NEWI, home or other IT facilities? What if anything is different about using home or NEWI facilities; does the student have a preference and why?
3. How would the student assess their own general IT skills using required software/ systems? Do they think their IT skills have improved since coming to NEWI? Why have these skills improved?
4. What motivates/ de-motivates the student when using computing facilities for their study?
5. To what extent does the student use software applications, e.g. Office. CAD, SPSS. How comfortable is the student using applications?
6. Do they use the Internet? World Wide Web, Email, discussion boards or chat. To what extent are these activities study related? How comfortable are they using Internet for these purposes?

Further satisfaction or value-based questions in the Aide Memoire (querying support issues and study techniques) were not pursued in practice for the practical research; the full range of these questions is shown in Appendix 6.

ii. Interview Style and Approach

The researcher always introduced himself informally to the sample group before commencing either individual or group interviews, indicating the relationship of the research project to NEWI facilities and how their responses would provide feedback to NEWI academic and support departments.

The interview would begin informally with an open invitation by the interviewer to discuss the student's experiences of ICT use or general issues related to their study. This proved enough to steer the conversation around to issues of VLE use and related issues important to the student.

Whilst early interviews tended to be more open-ended, later interviews would be informed by comments from earlier interviews, allowing for 'selective coding' of responses in order to question subsequent students on particular issues, for example, early interviewees frequently mentioned a reliance on the VLE system (e.g. as their first point of contact for completing an assignment); this provided scope for a question which could be re-used in other interviews, leading to confirmation of this as a reoccurring variable.

Part 6: Explanation of Interview Memoing Technique vs. Recording

How the Methodology was applied

The chosen methodology, Grounded Theory required the use of a memoing process, this involved noting participant comments on an open coding form (see Appendix 7) and annotating early indicators or paraphrasing of concerns to allow memo comments to be sorted and refined into early descriptive codes. The interviews were not recorded, but as outlined previously in the thesis, compiled in an annotated form directly on memo sheets/forms and were later digitally recorded within an Excel workbook structure, this process allowed for immediate recording of sense for the comment and identification of early codes at the earliest opportunity, allowing for rapid transformation of memos into early indicators which could be refined for

generation of early descriptive codes. The memoing approach used reflects a conceptual-level, rather than a descriptive-level approach for annotation (Duchscher and Morgan, 2004; Montgomery and Bailey, 2007; Stern, 1980; Corbin and Strauss, 1990), focused around recording for ideas or early insight rather than detailed lists or verbatim narrative.

Memoing Approach

Grounded Theory methodology emphasises the requirement to internalise and annotate participant data rather than strict reliance on verbatim recording and data entry, allowing for greater opportunity to record the sense or descriptive outline of concerns or behaviours shared; Glaser and Holton (2004) outline the value of this memoing approach to allow coding to begin as soon as possible, including the possibility for immediate annotation of responses in the form of indicators (early descriptive codes) and for annotating early theoretical insight, commenting that "...writing memos in GT has to do with immediate recording of generated theoretical conceptual ideas grounded in data…"

During a meeting with Glaser in 2006 (Grounded Theory Conference, London), Glaser reviewed the current study in proposal form, commenting on approaches for interviewing students and the memoing process. Glaser commented that it was not necessary to "go for full coverage" but to aim for "conceptual coverage" (Glaser, 2006), Glaser emphasised the need to annotate directly the views of participants in a format allowing for rapid collection of ideas, concepts and early theoretical insight, suggesting, "walk in and say 'how are you doing? ... let them talk." (Glaser, 2006),

also recommending avoidance of formal recording methods, commenting “...jump in and see what happens... ...don’t tape..." (Glaser, 2006).

The direct use of memos, i.e. short annotations recording conceptual-level sense or insight of expressed as ideas, rather than in the form of detailed lists or lengthy narrative, as previously outlined in context to the current study - is further supported beyond Glaser’s model in the literature, (Birks and Mills, 2015) outline problematic aspects of verbatim recording, suggesting the need for more conceptual level annotation for development of theory derived from interviews, commenting that recording or transcribing lengthy verbatim narratives "... is inefficient, detracts from the focus of early category delimitation and generates mounds of superficial data."

Furthermore, the use of technology such as audio or video recording is similarly queried as an efficient approach for direct, rapid and effective annotation, suggesting the use of recording devices can be intrusive, obstructing the annotation of useful insight, commenting that "...the advantages do not necessarily provide justification for the adoption of additional technology that may prove intrusive and impact on your performance and the responses of your participants." (Birks and Mills, 2015).

Montgomery and Bailey (2007, p.68) query the effectiveness of verbatim ‘field notes’, contrasting this approach with memoing techniques, indicating the advantage of memoing in contrast to the ‘descriptive’ format of field notes, which comprise "...descriptions of social interactions and the context in which they occurred...”.

Montgomery and Bailey suggest that memos however reflect “the researcher’s thinking processes rather than a description...” - suggesting that memos offer a higher level format for annotation, comprising “theoretical accounts".

Stern (1980, p.23) suggests the advantages of memoing, allowing for the recording of brief, conceptual type observations of participant responses, suggesting that

memoing "...is a method of preserving emerging hypotheses, analytical schemes, hunches, and abstractions"; for Stern it is less relevant to record lengthy or detailed verbatim accounts of the interview, instead emphasising a requirement for the recording of ideas, concepts and early insights, suggesting these can be refined or sorted further, commenting that "...ideas are captured first on scraps of paper; later on typewritten pages or cards."

Thornberg (2012, p.254) also outlines memoing as a form of “self-conversation”, allowing for a processing or filtering activity at the point of the annotation, thereby resulting in higher level, conceptual data, suggesting that "by memo writing (memoing), the researcher develops ideas, conceptualizes data and makes analytical conversations with him- or herself..."

Grounded Theory and related qualitative approaches frequently cite conceptual memoing, as outlined by Corbin and Strauss (1990, p.422), commenting that “...theoretical memos” allow for the recording of conceptual insight and in relation to descriptive behaviours/narratives presented by the substantive area; memos allow for later sorting and refinement to discover “categories, properties, conceptual relationships, hypotheses, generative questions that evolve from the analytical process." (Corbin and Strauss, 1990, p.422). Corbin and Strauss emphasise the inter-relationship of memoing within the wider development of theoretical categories, suggesting that memos constitute the Grounded Theory “system”; in this approach memos are “not simply... ideas” but are “related to the formulation of theory”, furthermore, memoing “continues until the very end of the research” and “incorporates and elaborates on the coding sessions...” The use of memoing in a higher level, conceptual form - in contrast to descriptive annotation or field notes is described as “’code notes’ produced by these sessions" - emphasising the coding

role of memoing rather than a strictly annotative process (Corbin and Strauss, 1990, p.422).

In this model for memoing, the use of descriptive-level annotation implies the loss of potential data and at the earliest and arguably most relevant stage of the research, i.e. the point of interview or data collection, suggesting that "...a great deal of conceptual detail is lost..." (Corbin and Strauss, 1990, p.422), this view is shared by Duchscher and Morgan (2004, p.610), suggesting that "memos are aimed at conceptualizing that, which to this point may have been purely descriptive."

The prevalence of conceptual-level memoing in contrast to descriptive annotation is further outlined by Duchscher and Morgan (2004, p.609), suggesting that the exact template or form used for memoing "a sentence, a paragraph, or a few pages" is secondary to the discovery of conceptual data, suggesting that conceptual-level memoing "raises the data to a conceptual level; develops the properties of each category; presents hypotheses about connections between categories; and begins to locate the emerging theory..."

The inherent conceptual-level insight available via memoing is indicated by Holton (2010, p.33), suggesting that although traditional field notes or annotation is " based on description, memos raise that description to the theoretical level..." (Holton, 2010, p.33). For further detail regarding the data collection process used in the study, see Chapter 2 'Memoing for Open/ Selective Coding and Insight Recording'

Further Annotation/ Memoing Issues

Glaser and Holton (2004) comment on the use of memoing, allowing for rapid identification of conceptual processes, rather than recording discussions in a

verbatim format, suggesting that "GT does not require tape-recorded data... ...GT uses all types of interviews and, as the study proceeds, the best interview style emerges..." Holton (2010, p.32) further emphasises the theoretical basis of memoing, commenting that "memos are theoretical notes... ...parallel with the coding and analysis process..." (Holton, 2010, p.32), also suggesting the uses of initial memo data for sorting, comparison and development of original theory "... to develop ideas with complete conceptual freedom. Memos are 'banked' and later sorted to facilitate the integration of the overall theory." (Holton, 2010, p.33).

Hoare, Mills and Francis (2012, p.243) similarly outline the role of memoing for sorting and generation of theory, these are "...informal analytic notes."

Heath and Cowley (2004, p.147) also describe the role of memos during the sorting process, suggesting that "...the sorting of memos keeps the researcher in contact with the data…"

The 'interpretive' process inherent in memoing can also be shown to promote reflection and emergence of early theoretical insight, Holton (2010, p.33) comments that "memoing in conjunction with coding and analysis slows a researcher's pace, forcing a reasoning of the emerging theory..."

The memoing process is also closely related to the generation of 'Theory Bits', early insight for conceptual explanation of behaviours, expressed using a short phrase or expression which can be indicated during interview memoing (or during later interviewing, sorting or comparison), Glaser comments that these comprise "...bits of theory from a substantive theory that a person will use briefly in a sentence or so... ...It is too cumbersome to tell the whole theory..." (Glaser, 2010, p.11).

The ongoing context for memoing throughout the current research project is reflected in the use of initial memoing for the pilot study, followed by the longer main interview

phase, with continued use of memoing for participant interviews. The flexibility of memos, allowing for creative and visual sorting is indicted by von Alberti-Alhtaybat and Al-Htaybat (2010, p.216), allowing the use of a "diagram, rather than essay" type notes (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.216).

Holton similarly suggests the longitudinal context for memoing and relationship to processes such as sorting and the generation of theory, commenting that "...memoing of the emerging conceptual thoughts while actively engaged in coding and analysing enables the researcher to continuously build theoretical sensitivity." (Holton, 2010, p.27).

The concept of ‘in vivo’ coding is prevalent in qualitative research methods such as ethnographic studies, assigning a code-type phrase or ‘indicator’ to data. Lewis-Beck, Bryman and Liao (2003) outline the uses of ‘in vivo’ coding, suggesting these ‘codes’ use a "...term that is used expresses meaning in a way far better than any word that could be provided by the analyst..." (Lewis-Beck, Bryman and Liao, 2003). von Alberti-Alhtaybat and Al-Htaybat (2010, p.217) also comment on the importance of the ‘in vivo’ concept for the Grounded Theory method, suggesting that "...the names should provide an image and should reflect the substantive context as closely as possible... ...for instance through the in vivo codes..."

It can therefore be shown that the memoing processes used in the current study reflect established models for acquisition of data via a conceptual level memoing method, used broadly in qualitative research and specifically found inherent in the Grounded Theory methodology, allowing for early annotation of theoretical insight and for assisting in processes such as sorting and sorting for defining higher levels of theory.

For further details on the memoing process, also see Chapter 3, Part 5: Approaches for Data Coding and following sections.

Challenges in Using the Grounded Theory Processes

Challenges were observed in the use of processes such as memoing and wider theoretical approaches derived from the methodology, such as the placement or role of the literature review. One challenge for implementation of the methodology lay in the development of the entire study within one holistic methodology, this process required adjustment for the perceived role of methods in a mixed context and development of awareness for wider theoretical and epistemological stances or perspectives advocated for the methodology; Glaser (2010, p.2) reflects on the holistic model for Grounded Theory, describing this as a "specific general methodology"; the implementation of Grounded Theory as an holistic approach for the entire study was not achieved immediately but adopted gradually following early proposal drafts based around a traditional literature review, this development is shown via Chapter 3, Part 2: Development of the Research Proposal and related sections of that chapter.

Similarly, the issue of the literature posed challenges, since Grounded Theory (and in particular, Glaser's iteration of Grounded Theory) "...does not support a priori theoretical settings. Ideally the researcher should have a "clean slate" before commencing the investigation..." (von Alberti-Alhtaybat and Al-Htaybat, 2010, p.211). The issue of the literature review in Glaser's model for Grounded Theory is indicated as problematic by Hoare, Mills and Francis (2012, p.241), suggesting contradiction in avoidance of preconception whilst suggesting the role of literature via 'Theoretical

Sensitivity', commenting that "there may be a fine line between enhancing sensitivity to developing concepts in your own data and forcing your data into an existing theory". Similarly, Thornberg (2012, p.245) suggests wider omission of input from the literature as a barrier to developing theory and comprises "an extreme position that underestimates researchers' ability to reflect upon the links between extant theories..."

The current research project however does present the literature in context to the methodology, providing individual context to motivations for study within the early thesis chapters via a candid outline of pre-existing concerns or experiences whilst setting out approaches for conducting the research without reference to detailed structured or leading questions, as evidenced in the reduced role of an earlier aide memoire (see Chapter 3: Research Design, Part 5: Approaches for Data Coding, Aid Memoire Experiment and Discussions). Approaches for harmonising the use of the literature within the study were also achieved via a retrospective review of issues such as improvisation in a range of contexts following the practical research phase and later similar literature sampling of key topics or themes related to the substantive study context, Blended Learning - this is outlined in terms of the 'Theoretical Sensitivity' approach for Grounded Theory, for further information on these approaches see Chapter 1(a), Part 2, Treatment of the Literature and Chapter 2: The Methodology, Part 3: Grounded Theory Principles and see Explanation for Literature Review Contribution in Grounded Theory.

A further challenge for the implementation of the current project related to a general lack of discreet format or process for conducting research via the chosen methodology. von Alberti-Alhtaybat and Al-Htaybat (2010, p.223) comment on this issue, suggesting that the "...lack of more detailed prescription on how to do

grounded theory" can be difficult. This view is echoed by Urquhart (2000, p.1), commenting that "...there is a shortage of literature in the form of practical guidance on the 'how-to' of grounded theory technique... "

An approach to this problem comprised a detailed and systematic approach for defining research methods and processes based on theoretical and epistemological perspectives shown in the Grounded Theory literature (the explanation for these processes is outlined in Chapter 2: the Methodology, Part 2: Summary of the Grounded Theory Methodology and Chapter 3: Research Design, Part 7: Overview of the Practical Research Phases). An early attempt to define discreet processes for operationalising a Grounded Theory study is discussed in Chapter 2, Part 4 (Flow Chart of Grounded Theory Process) and in Appendix 1 (Unpublished Paper following the Annual Grounded Theory Seminar).

Advantages of Glaser's Grounded Theory Method

The advantages of Glaser's model for Grounded Theory are outlined in Glaser's publications on the methodology; Glaser (2002, p.3) indicates the methodology can potentially allow for development of an original theory which is "abstract of time, place, and people..."

The advantages of 'in vivo' coding are also emphasised for early generation of conceptual level data for emergence of original theory, Glaser (Glaser, 2002, p.4) suggests this kind of coding have greater relevance as "...they come from the words of the participants in the substantive area."

The "multivariate" approach of Glaser's method can also be shown to provide an 'iterative' and multi-layered theory, comprising numerous dependent conceptual

perspectives within a broader theoretical framework, "... producing a multivariate conceptual theory." (Glaser, 2010, p.1).

The descriptive format of field notes in comparison to memoing and ‘open coding’ is also cited by Glaser as a challenge to "standard QDA” (Qualitative Data Analysis), whilst traditional QDA “ emphasizes getting the “voice” of the participants” Glaser’s model for Grounded Theory suggests the need for a deeper analysis of participant concerns from the earliest stage of data collection, suggesting the process of memoing and open coding comprises “’in vivo’ concepts” which “...do fit, work, and are relevant." (Glaser, 2002, p.5). Similarly, Glaser often emphasises the underlying sense or conceptual-level processes within participant data in contrast to descriptive annotated data, suggesting that "GT uncovers many patterns the participant does not understand or is not aware of..." (Glaser, 2002, p.5).

A further cited advantage within Glaser’ model for Grounded Theory is presented in terms of “grab”, this is summarised as the outcome of open coding, early theoretical insight and ‘in vivo’ type coding, offering early conceptual ‘codes’ which allow for empathy and shared insight, these codes "can instantly sensitize people... ...to seeing a pattern in an event..." (Glaser, 2002, p.16).

Glaser also suggests the application of Grounded Theory as an “evidentiary” approach relevant for ‘real world’ situations and scenarios, offering insight beyond established hypotheses or established paradigms, suggesting that "...researchers and users of the more evidentiary, preconceived formulated research have become disaffected with their data collection, their findings, what they should find, and whatever hypotheses should be tested." (Glaser, 2010, p.6).

The contextual relevance of resulting theory, often having application beyond the immediate substantive study is also cited by Glaser, "for example, imposing

treatment paradigms on patients that do not fit their lifestyles..." (Glaser, 2010, pp.7-8).

Research Design for Verification/ Validity, Reliability

The current study utilised a range of approaches to ensure validity of findings, the use of over 100 interviews ensured a wide sampling coverage, other approaches supporting validity and verification included use of selective coding – consisting of the use of memo data and emergent theoretical insight noted within memos to raise extant concerns, behaviours or strategies in the presence of participants - allowing discussions to lead toward those issues and to confirm, modify or expand the established 'indicator' (also see Appendix 10, Table 1 for theoretical insight associated with memoing).

Sampling of early memo data – i.e. raising extant issues in the presence of participants was implemented using prolific early codes derived from the pilot study and later, also from the main phase of data collection. The use of comparison and sorting of memos, with iterative sorting stages of early descriptive data and theoretical insight (Theory Bits) is outlined in Chapter 3: Research Design, Part 7: Overview of the Practical Research Phases and is outlined more generally across Chapter 4 (a): presentation of the emergent theory. The process of sorting and refinement of initial memo data, then sorting of higher levels of descriptive and theoretical codes also comprised a form of verification, as codes were developed for higher levels of conceptual insight. This approach is reflected in Glaser's comment (2002, p.4) on the comparison of incidents "...which shows the pattern named by the

category and the subpatterns which are the properties of the category." (Glaser, 2002, p.4).

It should be noted that the sorting process has also been applied partly in a retrospective format, following absence from study following the main practical phase in around 2009 and resumption of the analysis in 2013; the use of selective sampling during the practical phases did however influence interviews, resulting in the generation of memoing data which was retrospectively sorted again in 2013, this process is explained in the previous section of this chapter, ‘Rationale for Re-Analysis of Data, Methodology Appraisal, Assimilation of Pilot’. The verification of data via selective sampling was achieved by posing leading suggestions/questions in accordance with the Grounded Theory principle of ‘selective sampling’. Early memoing outputs during the initial interviews in the pilot phase were sorted (using simple Microsoft Office based templates – also see Chapter 4(a), Part 2) resulting in a series of developed descriptive codes (shown in Worksheet 3a/ Appendix 10, Table 4); early version of these codes were refined and raised during further pilot interviews for verification. The pilot-generated ‘descriptive codes’ with associated early theoretical insight ‘Theory Bits’ provided an approximate and arguably, imperfect attempt for initial use of the methodology, the challenges and weaknesses of this phase are discussed further in Chapter 4(a).

The following examples of ‘selective’ codes were raised during and subsequent to the pilot stage. For a full list of selective sampling terms/indicators used, see Appendix 10, Table 3: Worksheet 3a:

Pilot derived Substantive Code	Justification/ Reason for Selective Sampling	Associated Tentative Theoretical Codes	Associated Tentative Developed Code
Low contact study (characteristics & strategies)	Whilst the sample groups/ individuals interviewed were mostly on formal part-time courses, some individuals were approached ad-hoc in open learning areas, in some cases these turned out to be full-time students but consistently indicated they were attending class less than 10 hours a week…	Lone studying via ICT; Self navigating Technologies; Inter-location studying; Remote peer-communicating; Study-Work Integrating; ICT self-supporting; ICT knowledge sharing; ICT facility discovery; ICT facility exploiting	Multi-tasking commitments
Work/ Study/ Life balance	Many of the students indicated issues with juggling home, study and work issues, many indicated how their work and study was well complemented, while others indicated little employer support (in terms of time, resources)…	Commitment (life, work, study) accommodating; Vocational study avoidance; Vocational study exploitation/ appropriation; VLE workload avoidance; VLE information exploitation; Career studying (voluntary / involuntary)	None
Using ICT	Characteristics of this code included - Using computers, printers, photocopiers, scanners, Using a range of computer software to process information,	ICT familiarising; Goal-based ICT appropriation; ICT problem navigating; Support network developing; ICT software/ systems/ equipment ownership	ICT self-reliance

	Dealing with ICT problems such as broken PCs, password problems, Learning to use systems, software and related facilities, Accessing ICT in order to undertake the coursework and project work….	(literal owner and stakeholder); Cross-system/ platform coping; ICT systems, software, Web resource, VLE navigation	
Using the Web	Using basic search engines such as Google (few other search engines were mentioned) and Google Scholar, Using institutional Web pages (in some cases, but reported difficult to find)…	Web credentialising/ evaluating; Institutional Web navigating/ awareness building; Google-based Web experiencing; Web sorting; Web resource storing/ retrieving; Cross-system Web navigating; VLE-based Web browsing/searching; ; Web-resource trusting	Web space integrating (Becoming familiar with a wide range of Web platforms as an integral component of their study routine and research)

Table 1: Example pilot phase selective sampling (codes raised during interviews)

The early pilot-derived descriptive codes (also comprising ‘selective codes’ for sampling/verification) were cited during the initial stage of the full research phase, allowing for leading questions on issues such as remote access to the VLE and study facilities, workplace and family commitments, strategies for use of institutional platforms and working in groups in a remote context (see previous table). The pilot-derived selective sampling codes were refined further following initial interviews

during the full interview phase (see table below); the resulting (further refined) substantive codes – reflecting both earlier pilot-derived substantive/selective codes and full phase interviews - were used for selective sampling to lead further interviews for verification.

The following examples of 'selective' codes were raised during the full interview phase. For a full list of selective sampling terms/indicators used, see Appendix 10, Table 3: Worksheet 3:

Memo Comments and <u>developing</u> Substantive Codes	**Justification/ Reason for Selective Sampling of this Indicator/ Code**
Role of Communication tools	To ascertain if online communication tools are used alongside static course content as suggested in early pilot interviews.
Use of the WWW	To verify usability issues using formal databases as suggested in early pilot and throughout many interviews in the full phase, also to ascertain user confidence and skills in using the WWW and diverse WWW sources.
Results issues via Databases	To further confirm problems reported using Library databases as part of the repertoire of WWW/e-resources.
Full text (e-resource) location	To confirm issues reported when using bibliographic databases, also confirming that students increasingly expect bibliographic databases to supply full text rather than traditionally displaying citation details for physical item sourcing

Table 2: Example full phase selective sampling (codes raised during interviews)

Weaknesses of the verification/selective sampling processes in the current study arguably mainly to the retrospective sorting process during 2013, when further verification was only possible in via retrospective (electronic) sorting processes, perhaps comprising a more limited iterative approach than perhaps advocated in Glaser's Grounded Theory methodology, applying the principle of 'constant comparison' and 'selective sampling' to early descriptive and early theoretical coding during and immediately following the practical phase, with high level theoretical sorting largely occurring later in 2013 due to the retrospective sorting process outlined in Chapter 3, Rationale for Re-Analysis of Data, Methodology Appraisal, Assimilation of Pilot. The use of 'constant comparative' method however is evident for early development of substantive descriptive codes and all associated early theoretical insight (Theory Bits), with additional later verification processes including five stages (or iterations) of theoretical sorting (comprising sorting for Theory Bits, Early Theoretical Codes, Developed Theoretical Codes, High Level Theoretical Codes and the resultant Core Category and its properties).

Some statistical frequency data was also used (in the retrospective stage) for verification of early memo-derived common indicators (commonly occurring memo properties expressed as 'Control Terms' in the electronic sorting process) to define prolific coding categories. Memo responses were grouped using common 'indicators' to define higher level, conceptual or reoccurring behaviours, the frequency of occurrences of common 'indicators' was also numerically scored in terms of a frequency (number of times occurring) and frequency distribution (as a percentage in comparison across all indicators), these frequency values allowed for a systematic evaluation indicators' prominence, with higher frequency scores associated with more regularly occurring indicators – as assigned across individual memo

responses. This process of assigning a common indicator value (expressed as a ‘Control Term’ in the Excel workbook used to input all data) and calculating frequencies allowed for a process of verification and reliability in defining prolific early codes derived from the common ‘indicators’ (Control Terms). This original approach has been shown in earlier sections of the thesis to derive from uses of statistical software for analysis of qualitative data. For further details, see Chapter 3, Part 10, Selection and Explanation of Tools and Methods.

Further verification approaches included use of Excel spreadsheet filters and formulae and verification via electronic sorting tables (undertaken during the later analysis stage) to structure and analyse the data, allowing for processes such as colour-coded categorisation of code families (i.e. sorting emergent conceptual codes under High Level categories). The use of visual and software-based sorting approaches to assist in verification of coding and categorisation is outlined in Chapter 3: Research Design, Part 10: Selection and Explanation of Tools and Methods, see sub-sections such as Sorting Templates via Microsoft Office Drag and Drop Functionality and Use of Office Relationships Hierarchies Tool for Visual Representations. The value of tabular and visual-based sorting is echoed in Glaser’s comment (2002, p.4), suggesting that "...pattern is named by constantly trying to fit words to it to best capture its imageric meaning." (Glaser, 2002, p.4).

The general approach adopted throughout the current study, reflecting use of sorting and comparison to define higher levels of conceptual insight or theory is reflected in Glaser’s perspective on the development of categories as a means of verification, suggesting that "...fitting leads to a best fit name of a pattern, to wit a category or a property of a category. Validity is achieved, after much fitting of words, when the chosen one best represents the pattern." (Glaser, 2002, p.4).

Note on Generalisability

The Grounded Theory of 'Improvised Learning' (engaging in learning via adaptive, innovative approaches which extend environmental limits) and it's multivariate properties related to adaption, extending, supplementing or similar behaviours can be shown to represent a high level, conceptual and therefore transcendent theory for student engagement in academic practice, potentially applicable beyond the immediate substantive area/ research context and for application in wider contexts such as the Further Education sector or other contexts for Higher Education such as Online Learning or engagement in MOOcs (Massive Open Online Courses).

The theory of 'Improvised Learning' can be shown in context to other, unrelated Grounded Theory-based outcomes and in terms of an holistic or transcending theory for conceptual explanation of participant behaviours, such as "supernormalizing" (portraying normal attributes in a non-normal situation) or "credentialising" (developing credentials within a given sphere of activity). Glaser (2002, p.7) suggests the transcending or generalising nature of his iteration of Grounded Theory in terms of "...a continually transcending perspective, a constantly larger and less bounded picture. ...The credentializing of nurses easily leads to the credentializing of all areas of work to ensure "expert" quality..." (Glaser, 2010, p.7).

Transcendent application of the resultant Grounded Theory of 'Improvised Learning' was achieved in the current study by defining early theoretical insight/Theory Bits during memoing, by assigning early theoretical insight during early memo analysis stages and via comparing data as the study progressed to discover higher levels of behaviour explained conceptually.

See the following sections for an explanation of processes inherent in the methodology for the generation of conceptual level, transcendent properties and insight/perspective on participant behaviours:

- Chapter 3: research Design, Part 10: Selection and Explanation of Tools and Methods
- Chapter 4(a): Presentation of the Emergent Theory, Part 3: Early Theoretical Codes and Part 6: Note on Derivation of Theory via Inductive Data Analysis, also see Chapter 4(b) Explanation of the Theory of Improvised Learning, Part 3: Early Theoretical Codes Contributing to the Theory.
- Chapter 4(b): Explanation of the theory of Improvised Learning, part 6: Further Insight Arising from the Core Category 'Improvised Learning', in particular see the subsections: Passive and Active Improvisational Behaviours, 'Transcendent Characteristics of 'Improvised Learning'.
- Chapter 5: Discussion in relation to the Literature, Part 4: Holistic and Transcendent Characteristics of 'Improvised Learning'.
- Chapter 6: Conclusion, Part 5: Summary of Further Potential Research Suggested by Research Outcomes and see Additional Implications for Research and Practice Beyond the Substantive Area.

Part 7: Overview of the Practical Research Phases

i. Overview of the Research Pilot Study (2007)

This section attempts to describe the original data collection, analysis and sorting process to create a tentative Grounded Theory from the pilot data. The data analysis

was carried out soon after the pilot and presented in early 2008 at several MMU seminars for postgraduate students and at a staff colloquium at the North East Wales Institute (see Appendix 8 for the accompanying presentation handout).

The implementation of Grounded Theory data collection was achieved using a basic memo recording table (see Appendix 7). The memo form attempted to provide a basic structure to record Substantive "indicators" (Holton, 2010, p.24) comprising an annotated narrative of respondent comments or a tentative initial "Open code" (usually a short descriptive label or phrase attempting to encapsulate the response). The memo also provided a column to record "properties" - sub-features of the indicator (Holton, 2010, p.27), and "theory bits" – early insight into conceptual understanding of the process or behaviour related (Glaser, 2001. P.19):

Substantive Indicator (narrative or tentative code)	Properties, with Theory Bit/ Insight

Figure 10: Memo form for Substantive Indicator and Properties with Theory Bit/ Insight

The formal, class based sessions proved to be motivating and insightful after having spent a considerable period developing the research proposal outline and engaging in academic activities such as conferences and seminars in the broad field of E-Learning.

ii. Overview of the Full Phase Study (2008)

The full research phase of the study was begun virtually immediately after the pilot phase and was carried out from early 2008 throughout that year, ending in autumn 2008. The full phase research comprised 297 comments across 62 sessions (some sessions included more than one student participant). The full phase study was carried out using the same general interview style as seen in the pilot, the main difference was the significant reduced use of formal class-based groups with the majority of interview sessions conducted informally in the institutional library or IT labs. Data collection used the same memo techniques seen in the pilot; data was later transferred to a basic Excel spreadsheet for annotating memo indicators, these would later be annotated further into a controlled taxonomy for more efficient category development. Data collection during the pilot study was broadly seen as contributory and useful for embedding with data derived from the full phase, however, the pilot data was assimilated with the full phase data at indictor level, and the initial ‘theory bits’ found in the pilot were subject to selective use, comparison and verification before being re-used within the main data sorting process, e.g. a common code for ‘part time’ study could be expressed as ‘low contact’ study. The methods used for assimilation of the pilot and full phase data are described in the following pages.

Part 8: The Pilot Study: A Theory of Self-Led Multi-Systems Traversing

It should be noted that the pilot study did not utilise all phases or methods of the Grounded Theory process, instead a rough approximation of the process was

achieved in an attempt to create ‘Theory Bits’ for the generation of a tentative Core Category; the pilot data can be seen to have promoted exploration and verification for later full phase interviews and all pilot data would later be inputted and combined with the full phase research data and exposed to sorting and comparison with that data.

Shortly following the pilot – ending Winter 2007, a report was created documenting the development of a tentative Grounded Theory; this report formed the basis for a series of presentations at MMU and NEWI during early 2008 (Catherall, 2007b); the report version of the presentation is shown in Appendix 9. These events included:

- TIRI *(The Information Research Institute)* - Presentation on current research. Venue: MMU, 15/01/07.
- NEWI Staff Research Colloquium / Discussion: Informal presentations on research by NEWI staff, 21/01/07.

The pilot research phase of the study comprised 215 comments across 39 sessions (some sessions included more than one student participant).

In the following table, we can see some example annotated memo indicators (annotated participant responses) derived from the pilot. Note the table below represents the codified version of pilot data after later input alongside full phase data. Later workbook and software approaches for data codification (including assimilation of pilot and full phase data within an Excel workbook structure) are described in further Chapters of the thesis such as Chapter 3, Part 9: Approaches for Full Data Coding/Analysis.

In the table below, the memo response is codified as an indicator comprising a "Control Term" (effectively comprising an Open Code); later sections of the thesis will explore how Control Terms were sorted for generation of Substantive codes.
In the assimilated, Excel workbook table shown below, the "Descriptive Code (Indicator)" corresponds to the early descriptive "Open Code" found in the original pilot. To this effect, the Descriptive Code below has been created from the pilot memo comment, but retrospectively re-annotated to assimilate within a new electronic workbook structure.

It may be helpful to provide a summary of memo components, illustrating the use of ID numbers to manage and anonymise the presentation of memo data:

- Comment ID – a unique ID number associated with a specific comment made within the group interviewed, the comment is displayed in the tables summarised, reflecting the memoing technique derived from the Grounded Theory methodology, allowing for descriptive coding as a refined term. The comment is anonymised via the comment ID within the table but can be traced in the memo record to specific respondents.
- Session ID – a unique ID number referring to the group/session where the researcher engaged with the student body. The session was typically composed of several student participants; on occasion this was composed of only one participant.
- Theory Bits/ Insights – some comments led to the immediate notation of theory bits (early theoretical insight). Where early theoretical insight was apparent in participant comments, this was noted in the memo record and is shown in the Excel workbook table. Theory bits derived from initial memoing

and other sources such as the literature (theoretical sensitivity) were later compared and refined to suggest early theoretical codes.

We can see examples of “Theory Bits” or insights – early indications of theoretical processes in the sample Memo Data worksheet overleaf (also see Appendix 10, Table 1 for further workbook examples):

Comment ID	Session ID	Group or Person Description	Comment (summarised)	Descriptive Code (Indicator) (refined as Control Term)	Descriptive Code Properties (comma separated list)	Theory Bits, Insights
1	1	FDSc Health & Safety (P)	Undergraduate foundation student studying part time, busy work-life balance with some home working around 7 hours personal study per week	Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities	Prioritising tasks and objectives to achieve wider aims
2	1	FDSc Health & Safety (P)	Around 6 hours classes per week considered fairly low contact with tutors/peers	Low Contact Study	Generally under ten hours contact with class per week, Sense of isolation from the institution including tutors and peer students, feeling of self-reliance and less scope for obtaining support, lack of social interaction and socialisation with peers or staff	

Table 3: Example Excel content - Derived from ‘Worksheet 1: Memo Data including Descriptive (Indicator) Codes

At the time of the pilot, the data was analysed using a basic table-sorting approach via Microsoft Word, this contrasts with later re-analysis and assimilation of the pilot with full phase data using more sophisticated software approaches described above and in later sections of this thesis. Once each pilot interview had been completed, the data contained in the Memos was typed up in a basic table format (using Microsoft Word) in order to sort all 215 comments into 49 early Open Codes. These Open Codes included the following:

- Commitment issues
- Low Contact Study
- Mixed physical-online resource use
- Multi-platform/ Internet resource discovery
- Reliance on use of hardcopies
- Use of computers across multiple sites
- Technical problems
- Insufficient E-Resources/ databases
- Study support development not adequate
- Group / peer working or communication problems
- Use of Library computers due to need for computing
- Too many documents provided in VLE
- Library/IT Lab noise and disruption issues
- Use of too many databases and platforms
- Referencing support problems
- Commuting to study
- Relies on VLE mostly for course materials
- E-resource databases don't provide relevant results
- Considerable use of Google for E-Resources
- Feelings of isolation/ isolated nature of study
- Use of Library computers due to need for quiet space
- Use of a range of computers/operating systems
- Computer compatibility problems
- Used techniques to manage information such as folders, favourites
- Internet access or cost issues
- Studies whilst travelling using mobile computing
- Work related worries such as fee contribution
- Working to develop IT and study skills due to use of VLE
- Problems searching the WWW, e.g. irrelevant results
- IT skills support development not accessible
- VLE under-used by programme
- E-resource databases difficult to use
- Use of VLE communication tools
- Communication tools e.g. email or social networks important to study
- VLE under-used by other students
- Library database skills development not adequate
- Multiple platform sign-in problems
- Lack of confidence in IT skills
- Printing expense or access problems
- VLE difficult to navigate or usability problems
- IT support difficulties

• Difficulties obtaining software • Insufficient Library/IT Lab PC availability • Work has links to programme e.g. custom programme, work based case studies	• E-resource databases lack full text access • Library or IT Lab PCs slow or have other problems • Electronic communications underused for distance learning • University or Library Web pages difficult to navigate • Printers or scanners not widely available

Table 4: List of Open Codes from the Pilot Study

These Open Codes (arguably all highly 'descriptive') were sorted using a further table listing process to provide 13 higher level Substantive Categories, these included –

- Part Time study
- Work/ Study/ Life balance
- Using ICT
- Using the Web
- Working remotely
- Using resources (ICT, paper, photocopying, travel expenses).
- Using communication tools
- Group work
- VLE use
- Word-processing / course-work preparation
- Document Management
- Using information sources
- Liaising with employer organisations

This sorting process used for the Pilot data analysis was fairly basic and was more representative of an aggregation process than a comparison process, using a linear table format.

i. Table of Developed (Descriptive) Codes

The following table was developed as part of the initial pilot analysis, following sorting of pilot memo indicators. The "Open Codes" derived from memos now comprise "properties" or a narrative description of the higher level Descriptive Codes which have been sorted from Open Codes. The "Developed Descriptive Codes" are shown in the first column, the second column displays their properties (derived from dependent "Open Codes", whilst the third column displays "Theory Bits" i.e. insight prompted by the emergent Developed Descriptive Code and Open Code-derived properties. The items shown in bold indicate Theory Bits which were considered to represent a higher level conceptual explanation for processes or behaviours within the associated group:

Developed Descriptive Categories/ Codes, (refined from initial Open Codes)	**Properties of Developed Descriptive Category/Code** ***Derived from Open i.e. initial Descriptive Codes developed from memos.***	**Theory Bits – early theoretical insight related to Descriptive categories (Higher level Theory Bits shown in bold)**
Part-Time study	Whilst the sample groups/ individuals interviewed were mostly on formal part-time courses, some individuals were approached ad-hoc in open learning areas, in some cases these turned out to be full-time students but consistently indicated they were attending class less than 10 hours a week. All the students interviewed (including 'full time' students)	Lone studying via ICT Self navigating Technologies Inter-location studying Remote peer-communicating

	indicated low-contact with staff and peers was a factor in their study, including travel times required, need for effective use of time in class and need for excellent ICT facilities on site during visits. Many students indicated they were 'lone' students, with varying levels of contact with peers or staff via ICT. Many of these students felt they received minimal or no support for issues such as ICT use, software use, learning support study skills, use of the Web and information sources, considering the support staff available in the library were helpful but lacking the intensive support some seemed to require (including induction and ongoing support).	**Multi-tasking commitments** Study-work Integrating ICT self-supporting ICT knowledge sharing ICT facility discovery ICT facility exploiting
Work/ Study/ Life balance	Many of the students indicated issues with juggling home, study and work issues, many indicated how their work and study was well complemented, while others indicated little employer support (in terms of time, resources). For some students, ICT was useful in a busy work-life context, for others it added to the study requirements and was something to be ignored as an optional extra they didn't have to do.	Commitment (life, work, study) accommodating Vocational study avoidance Vocational study exploitation/ appropriation VLE workload avoidance VLE information exploitation Career studying (voluntary / involuntary)
Using ICT	Using computers, printers, photocopiers, scanners, Using a range of computer software to process information. Dealing with ICT problems such as broken PCs, password problems. Learning to use systems, software and related facilities. Accessing ICT in order to undertake the coursework and project work. Many prefer to use own laptops saying PCs provided are too few and unsatisfactory (too slow, presence of adverts) Using several different platforms (in some cases, such as Mac).	ICT familiarising ICT self-supporting Lone studying via ICT Goal-based ICT appropriation Self navigating Technologies ICT problem navigating Support network developing ICT software/ systems/ equipment ownership (literal owner and stakeholder) Cross-system/ platform coping ICT systems, software, Web resource, VLE navigation **ICT self-reliance**
Using the Web	Using basic search engines such as Google (few other search engines were mentioned) and Google Scholar,	Web credentialising/ evaluating Institutional Web navigating/

	Using institutional Web pages (in some cases, but reported difficult to find) to access evaluated academic information. Using favourites to store Web links. Using Blackboard (in many cases) to discover links to relevant Web sites. Attempting to use Web resources in an integrated way (but having often to break out of the VLE in order to do so). Difficulties in evaluating Web content.	awareness building Google-based Web experiencing Web sorting Web resource storing/ retrieving Cross-system Web navigating VLE-based Web browsing/searching **Web space integrating** Web-resource trusting
Working remotely	Many students study from their work-place, small number described studying whilst abroad on work business using laptops or devices such as blackberries. Some comments that technology is not suitable for easy working away from home (e.g. need for bulky laptop to do word-processing).	Overseas VLE studying Mobile ICT exploiting
Using resources (ICT, paper, photocopying, travel expenses).	Many students described how most course documentation is digital and onus is on themselves to print materials, in some cases they are required to print their own materials. Students studying in a work-related capacity also indicated they used work facilities to print with or without work approval. Some students expressed the demand on them to have certain levels of ICT equipment in order to study, a minority indicated they had to come into the institute more regularly due to lack of own PC. Others complained their PCs were not adequate or did not have the necessary software. Others indicated they had shared use of a PC which provided some facilities for the course but could prove inadequate. Some students complained regarding the cost of internet costs.	VLE document managing **Digital resource selecting/ incorporating** Digital transforming (digital copy to hard copy) Work facilitated document transformation ICT facility dependency Managing ICT resource availability Sharing ICT resources (peers, family, friends)
Using communication tools	Attempting to use email despite various email systems and addresses (work, NEWI, Blackboard email system, home & work email systems). Setting preferences within systems to try to use email in an integrated way (e.g. in Blackboard). Vast majority seem to use personal rather than NEWI email. Use email infrequently but more frequently during group work. Most seem to use Blackboard more (i.e. checking for new content rather than communications from tutors).	Email navigating System preferencing Traditional email dependency VLE-email interrelating **Tutor network developing/ maintaining**
Group work	Many of the students indicated they had been engaged in group work at some point, this often involved developing	Remote group participating

	documentation or presentations collaboratively. In some cases, students felt group work was difficult due to the need to access peers outside formal lecturers linked to the limited time available in class. Students reported exchanging personal emails to communicate and exchange materials for projects (via email). In one class, a business-based group described using a Wiki to develop a collaborative document, all group members had participated in the wiki but some had difficulties using the software.	**Social (Peer) network developing/ maintaining** Shared e-document creation/ development Group time managing/ prioritising/ coordinating
VLE use	Required for access to course materials. Email, External links, Emphasis on content rather than communication. Regular checking for updates. Some students indicated a dependence on VLE use and habitual use of the system for all aspects of the study, i.e. they would consult the VLE as the first stage in being given any task such as coursework. These students indicated the VLE provided everything required for the course, making books and external materials unnecessary. There was a lack of consistency for many students in the way the VLE was used across different modules, with some lecturers using the VLE as a content repository, others as a communication medium, others infrequently and others not at all. The structure of the VLE was also criticised often in terms of the general tabular structure being too poorly integrated (with other systems such as institutional email, Web based library resources and Student Web pages) and the course structures themselves being unstructured and difficult to navigate. Some students felt the depth of information was superfluous within certain course-sites, or was not tailored specifically enough to their course (e.g. for sites devoted to a number of programmes or modules).	VLE document seeking/ navigation Habitual VLE visiting Habitual VLE avoidance VLE course / course-requirement dependence VLE-literature (books) navigation VLE styles navigation/ reconciliation VLE content deficit reconciliation VLE-external systems navigation VLE-Web reconciliation VLE-course/programme structure reconciliation Course content specificity reconciliation/ navigation
Word-processing / course-work preparation	Managing hardcopy and digital documents. Travelling to location of ICT facilities (in some cases). Negotiating ICT issues such as password problems, faulty equipment. Some students indicated study facilities were an issue, with noisy/ busy home or work environment meaning they felt the institute provided a better study environment, however some students complained that whilst all the open access areas had PCs, there was no 'quiet study' area for reading and other study purposes.	ICT-hardcopy multitasking/ reconciliation/ e-studying **Multiple location e-studying** Desktop computer problem reconciliation Quiet-e-studying reconciliation
Document Management	Many students described issues managing digital and hardcopy resources such as excerpts, photocopies, digital texts or Web extracts, expressing difficulties when	**Digital document multitasking** Digital / hardcopy resource

	organising the wide range of materials they had to read. Some students had developed personal systems for organising material e.g. using desktop folders in Windows or use of customised directories using Windows Explorer. Other students found the experience of accessing, internalising and processing documentation was difficult – partly due to the large number of sources (and open ended nature of Web resources/portals) but also due to the amount of material being provided via the VLE. Many students indicated they were inclined to print everything off since they felt unable to cope with the quantity of digital materials, for some this printing issue was a financial & resource problem. Some students clearly had an idea of multi-tasking on a computer environment; others were obviously unable to work with digital texts in this way.	reconciliation. Web resource/ excerpt integration Digital resource sorting, labelling and situating Digital document internalising Digital document processing Digital document volume reduction/ management Digital document filtering Digital document credentialising
Using information sources	Using ICT to access information sources. Using hardcopy systems such as library indexes. Using software and Web-based resources such as search engines and portals. Evaluating information sources. Dealing with web-based plagiarism issues. Ensuring citation and quotation of sources is appropriate. Some students already had a professional or work-related knowledge of Web-based resources. Some students reported using e-books delivered via the VLE, indicating use of full-text journals and books in lieu of hardcopy resources, these students commented that whilst the availability of e-books ensured all students had access to reading material, this also posed problems for printing material off (where this was the preferred medium for working). Few students indicated they used the online journal system, with some suggesting they were not aware of any online library resources. Many students indicated that whilst they felt happy using Web-based search engines and online information sources outside the VLE, they would only do so on request from their tutor. Others indicated anxiety regarding citation and authority of online sources (mentioning concerns of tutors or even having been asked never to use Web-based information). Students also described varying levels of comfort using search keywords in search engines and online journal systems with many expressing dissatisfaction with keyword searching as yielding too many irrelevant results.	Digital resource discovery Assimilation of online sources (of information) Credentialising, labelling, storing and retrieving information sources Plagiarism avoiding Integrating professional and study sources (of information) **Accommodating/ reconciling digital documents** Transforming digital to hardcopy resources Integrating information sources Awareness acquiring of information sources **VLE course resource dependence (as information portal)** Search engine digital resource dependence Search engine results interpreting **Information systems traversing**

	Students indicated they would value further support in using keyword searching techniques. Many students said they used 'Google' but felt a lack of facility using the internet effectively. Some students expressed difficulty using Athens-based information portals, indicating the process for logging in was too complex and often impossible to use.	
Liaising with employer organisations	Negotiating work-based projects. Dealing with confidentiality issues in coursework.	Employer stake-holding Employer study internalising

Table 5: Table of Developed (Descriptive) Codes from the Pilot Study

Higher-level Theory Bits (shown in bold in the previous table) were sorted or aggregated from related Theory Bits using simple Word-based tables. These emergent or higher-level Theory Bits seemed to inter-relate to form tentative or emergent Theoretical Codes, including the following:

- *Multi-tasking commitments* – describing the need to balance study, family life, personal caring and other commitments, this also included participation in diverse educational activities including Web based platforms and remote collaboration with peers via the VLE; this variable also included the need to work across diverse locations and need to 'self-navigate' physical and digital environments encountered. This theoretical code was considered closely related to the 'Part Time Study' developed descriptive category above.
- *ICT self-reliance* – this theoretical code described the diverse array of software and digital platforms used by the student, including the imperative to become familiar with systems, issues concerning personal acquisition and maintenance of computer devices, developing skills for networking with peers

and tutors via ICT and the imperative to develop skill in navigation of diverse platforms.

- *Web space integrating* – this included developing awareness of resources on the World Wide Web and credentialising these resources for quality and reliability, sorting and retrieving search results and digital content, navigating across diverse platforms when these are presented seamlessly, developing awareness of institutional digital resources, navigating and searching the VLE and developing a sense of trust for credible resources.
- *Digital resource selecting/ incorporating* – this included managing documentation in the VLE, transforming documents between diverse formats, including physical and hardcopy, developing dependencies on ICT systems such as search engines, managing study in response to limited ICT equipment availability and sharing ICT resources with peers.
- *Tutor network developing/ maintaining* – this included navigating and using email and messaging systems, dependency on traditional email vs. emerging communication systems, inter-relating between diverse online communications systems and developing/ maintaining networks with tutors.
- *Social (Peer) network developing/ maintaining* – this included managing group working priorities and coordinating activities with peers, shared digital document creation, participation with groups remotely and developing/maintaining peer networks.
- *Multiple location e-studying* – this included reconciling multi-location studying, managing the use of multiple points of access to ICT and reconciling environmental issues such as noise.

- *Digital document multitasking* – including managing digital and hardcopy documentation and diverse formats, managing, sorting and using digital resources in appropriate circumstances, managing volumes of digital content, filtering relevant digital content and credentialising digital information.
- *Accommodating/ reconciling digital documents* – this variable inter-related with 'Information systems traversing' shown below.
- *VLE course resource dependence* - this variable was inter-related with 'Information systems traversing' shown below.
- *Information systems traversing* – this emerged as the tentative Core Category for the pilot and was shown to inter-relate to all other higher level theoretical codes - including digital resource discovery, assimilation of online sources (of information), credentialing/evaluation and retrieval of digital information/resources, avoiding plagiarism, integration of formal and informal sources of information, navigation of Web resources (and other variables shown in the previous table).

The inter-relationship of the theoretical codes was demonstrated using a series of radial style visuals at the pilot MMU/ NEWI presentation; in the following example, the emergent Theoretical Code 'ICT Self-Reliance' (relating to the Developed Code 'Using ICT' as shown in the previous table) is shown to inter-relate to two other emergent Theoretical Codes ('Digital resource selecting/ incorporating' and 'Web space integrating'). Non-bold items below reflect Theory Bits:

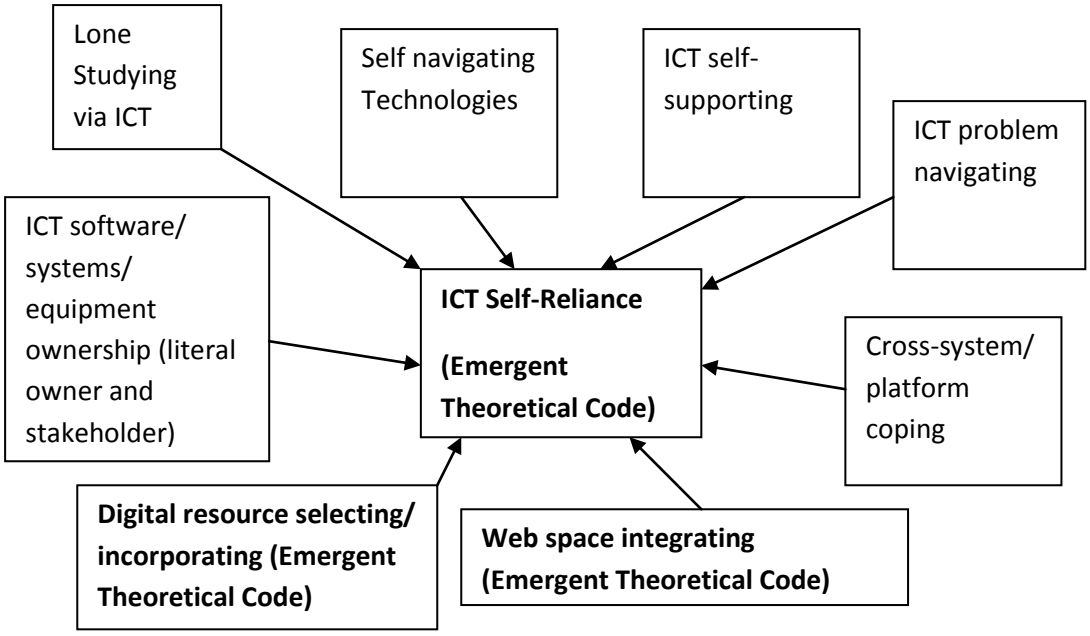


Figure 11: Emergent Theoretical Code derived from the Pilot Study: 'ICT Self-Reliance' mapped to Theory Bits/ Theoretical Insight (Catherall, 2007b)

A tentative 'Core Category' was suggested at the MMU/NEWI presentations: 'Self-Led Multi-Systems Traversing' – the following diagram illustrates this outcome. Following the pilot study, several emergent Theoretical Codes were apparent in the data, these higher level codes or categories were derived from Theory Bits (early theoretical codes or insight) via sorting, comparison and contrast – to define higher level theoretical categories. A fuller venn diagram illustrating the relationship between all emergent Theoretical Codes and the tentative Core Category is included in the following pages:

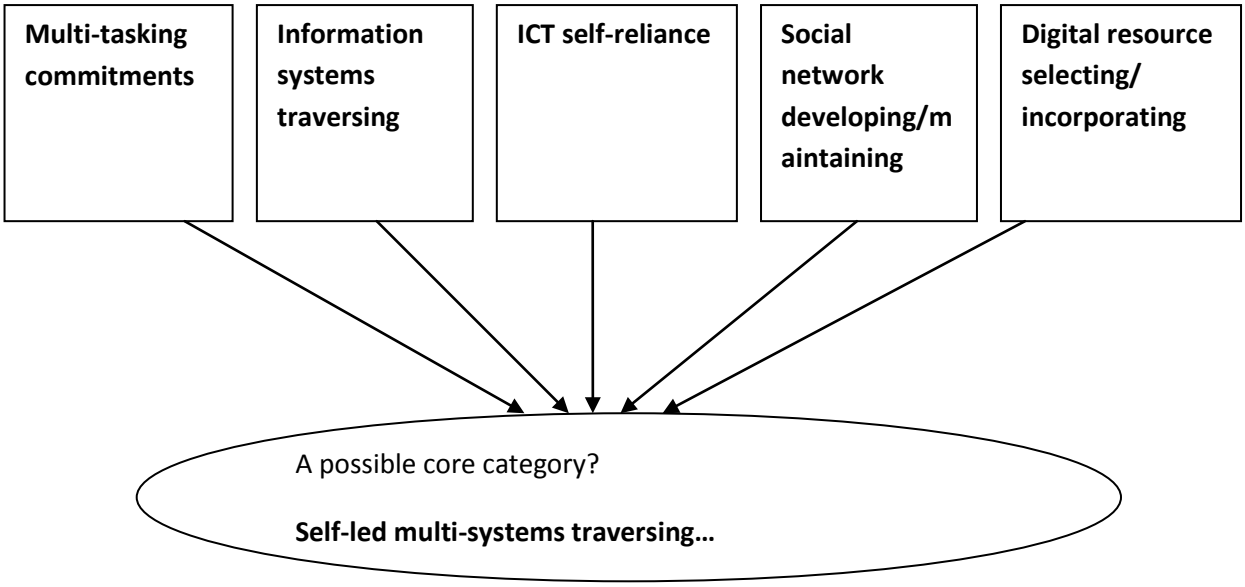


Figure 12: Tentative Core Category and Emergent Theoretical Codes (Catherall, 2007b)

The following radial venn diagram illustrates the tentative Core Category mapped to 'Developed Descriptive Codes' (Developed Descriptive Codes are previously shown in Table 3 in the left side column), illustrating narrative level discussion on student perceptions or behaviours:

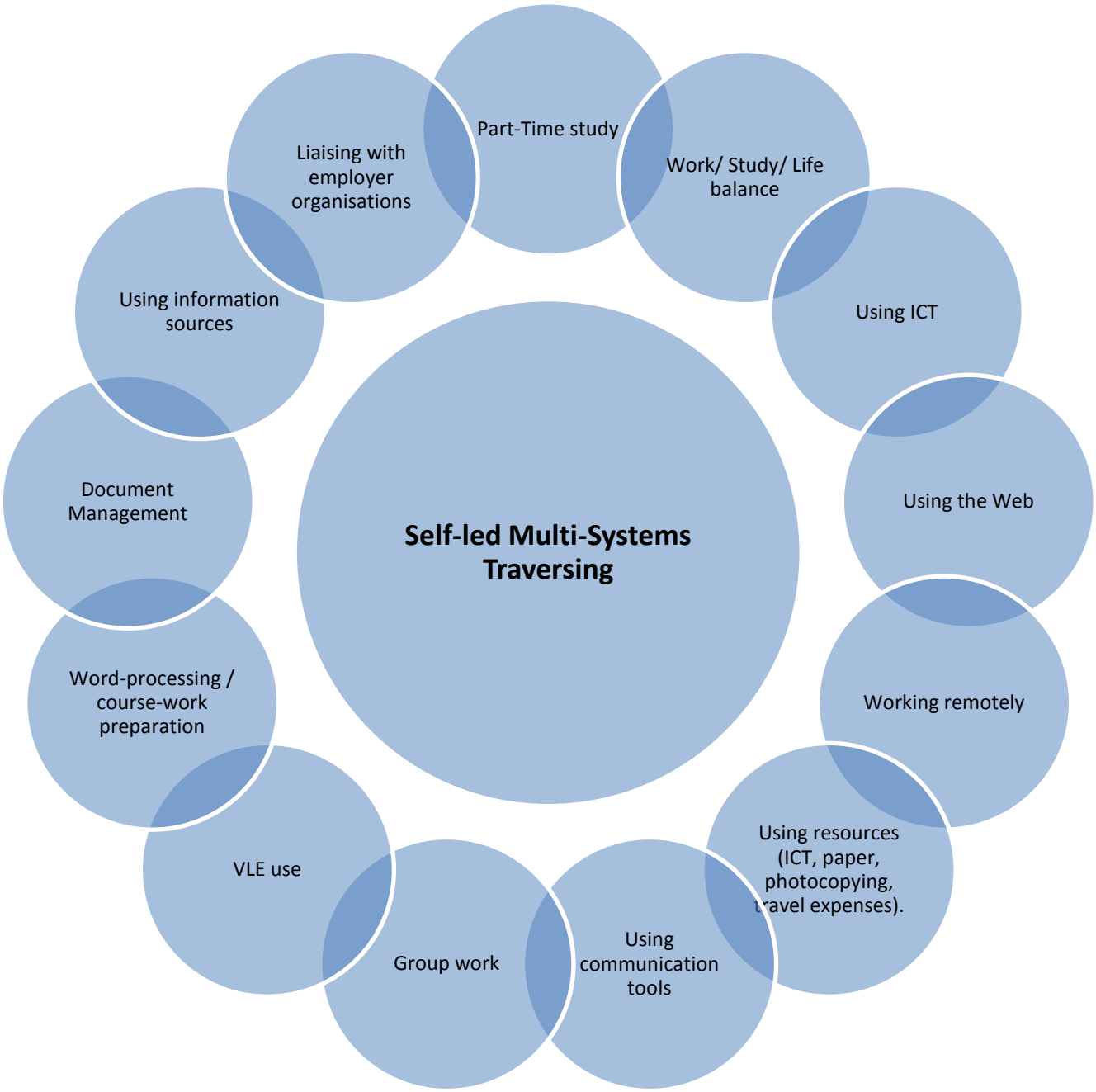


Figure 13: Tentative Core Category Mapped to all Developed Level Descriptive Codes

The following radial diagram illustrates tentative Core Category mapped to the emergent Theoretical Codes sorted from the Theory Bits, illustrating an emergent

conceptual explanation for processes and behaviours (emergent Theoretical Codes are previously listed in bold in Table 3):

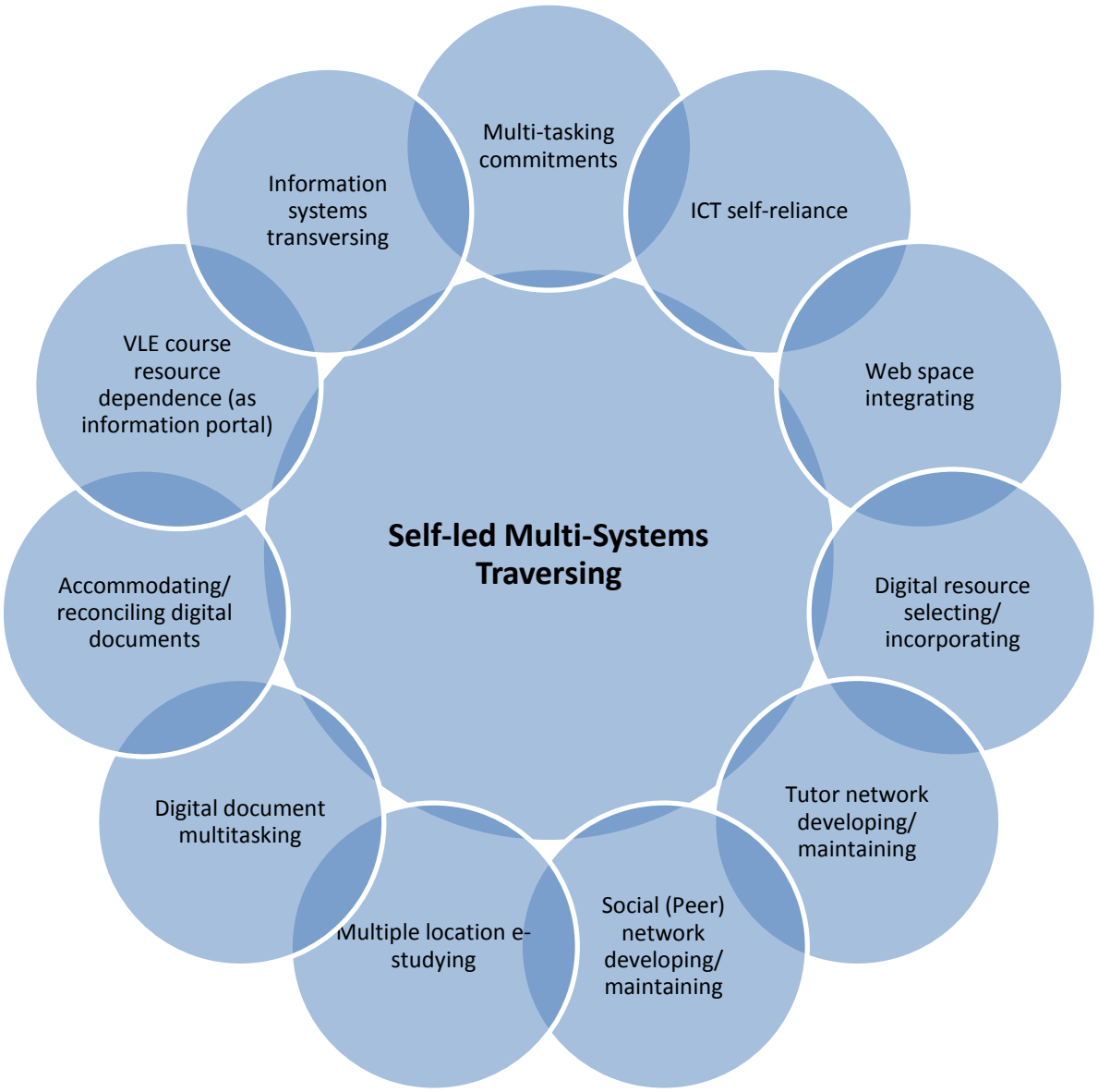


Figure 14: Tentative Core Category Mapped to all High Level Theoretical Codes

An informal presentation issued at NEWI (2007) and subsequent report defined the tentative Core Category 'Self-Led Multi-Systems Traversing' as: "'Self-led multi-systems traversing' this basically indicates the primary and core concern of the

student is related to managing a disparate array of systems, digital and hardcopy resources, logins, PC-based applications and Web-based systems. Some considerations for this tentative core category could include ICT literacy of intake students i.e. having sufficiently high ICT skills to cope with the breadth of ICT requirements for a Higher Education course delivered via blended learning and associated technologies, and support issues for the training, induction, and ongoing support for users in a low-contact/ part-time context. The self-led issue is perhaps the most important sub-category, indicating the sense the student has of isolation and demands placed on them to perform a range of basic ICT functions within the VLE and in the use of wider systems." (Catherall, 2007b).

The pilot study was an imperfect example of Grounded Theory in practice, but provided an opportunity to explore the concepts of this methodology, critically reflect on practical implementation of Grounded Theory methods and develop more efficient techniques for storing, codifying and developing data into theoretical categories.

Part 9: Approaches for Full Data Coding/Analysis

i. Rationale for Re-Analysis of Data, Methodology Appraisal, Assimilation of Pilot

Due to considerable periods away from studies after 2009 and due to the need to more properly assimilate two disparate sets of data comprising the pilot and full phase practical research, it was felt appropriate to migrate the data from basic tabular format (see previous sections) into a more extensive and adaptive software environment. Various software applications were explored during the study,

including the qualitative data analysis software NUDIST and mind mapping software such as Mind Genius. As noted in previous sections, the Grounded Theory methodology does not assimilate well with many software applications due to the fluid and subjective nature of the coding, sorting and comparison processes. It was also necessary to codify the data further to enable more refined analysis and category development; to this effect, a number of techniques were identified for data management, including data input and storage, development of visualisations, use of statistical frequency testing and taxonomy-style control terms. The following section attempts to define these techniques and illustrate systematic processes used for storing and analysing the data.

Methodology Appraisal – Data Analysis Process Strategies

The original pilot study presented a fairly basic approach in terms of generating a limited set of Developed Descriptive Codes, derived from initial Open Codes. During the pilot, each Substantive Descriptive Code and its properties was considered largely in isolation for the generation of related Theory Bits (effectively sorting or aggregating Theory Bits from dependent Open Codes within each Developed Descriptive Code). However, further comparison or sorting occurred when defining the higher level, or emergent Theoretical Codes derived from Theory Bits, demonstrating greater use of Grounded Theory approaches, such as the Constant Comparative Method and Interchangability of Indices.

Following the full phase practical research stage, it was felt that a more robust analysis could be possible by assimilating the pilot and full phase data sets; to this effect a formal structure was defined for input and management of both the pilot and full phase data using an Excel ‘workbook’ containing multiple ‘worksheets’ designed

for specific aspects of the Grounded Theory method. This approach would reflect a more precise implementation of the Grounded Theory methodology, illustrating use of Selective Coding, contributing directly to the generation of categories in an assimilated format, clearer demonstration of Early and Developed Code development and definition of processes used for generation of High Level Theoretical Codes. Furthermore, the new structure for data entry would demonstrate Theoretical Sensitivity contributing early Theory Bits/Insight and would also provide a more structured approach for defining the emergent Core Category.

Adjustments of Grounded Theory Process/ Interpretation/ Analysis since the Pilot Stage Analysis

At this stage it may be useful to discuss both the terminology used in the Pilot phase, and resulting terms emphasised in the full phase and what this means for the practical research. As is often pointed out in Grounded Theory literature, there is no precise formula for generating data using this methodology; hence the researcher has to some extent adapted Grounded Theory methods and concepts to define a practicable and systematic approach for data input, annotation, sorting and use of taxonomies for development of early codes. Glaser comments on the interpretive role of the researcher, allowing for greater "ownership" of the methodology and resulting theory generated, suggesting "…I simply mean the concept are his as well as the resulting theory generated..." (Glaser, 1998, p.98).

In the pilot stage practical, we saw the use of Memo Indicators to refer to data annotated or transcribed from memo forms using a tabular digital format (Microsoft Word), these indicators were then sorted and aggregated into early Open Codes or Categories, then into Developed Descriptive Codes or Categories; the initial Open

Codes became dependant variables for the Developed Descriptive Codes; the generation of early Theory Bits was achieved almost entirely as a separate process after interviews were complete, by grouping and comparing substantive codes and properties to subjectively determine conceptual processes occurring, this was achieved using a linear sorting table in Microsoft Word (see Appendix 14).
Following both practical phases, a new workbook style data structure was created for data entry and an assimilated analysis of all data, this approach used the Grounded Theory terminology a little differently than had been seen in the pilot:

- Memo responses were considered invariably 'Descriptive' and comprised the first 'indicator' stage in data recording; in this context the original hand-written annotations are inputted into a memo worksheet page in three columns: 1: 'Comment' - signifying the annotated memo response summarised in a form which, whilst not machine-readable can be assessed and used more systematically. 2: 'Descriptive Code (Indicator)' – synonymous with the Open Coding seen in the pilot, this code represents an attempt to classify the comment using a highly concise term (e.g. "Commitment issues" or "Low Contact Study"), however as the data was entered, these were delineated into a taxonomy style array of Control Terms, hence column 2 is shown fully as 'Descriptive Code (Indicator) (refined as Control Term)', finally we have 3: 'Descriptive Code Properties' – comprising a brief, retrospective narrative of the Code (added after the memo process at data entry).

- Use of the label 'Substantive Codes/Categories' to signify descriptive codes developing directly from the Open Coding (Memo Descriptive Codes/Indicators).

- Continued reliance on the use of the Theory Bits/ Insight method during initial Open Coding and for handling non-interview sources as data, e.g. Theoretical Sensitivity based contributions from the wider literature are also codified in the workbook with any corresponding Theory Bit/Insight. Similarly, the (Developed Descriptive Codes) 'Substantive Codes' worksheet provided scope for generation of Theory Bits, these are termed 'Cumulative Theory Bits, Insights', since they refer to Theory Bits prompted by multiple Open Codes (Memo Descriptive Codes/Indicators). For a list of all Theory Bits encountered and later used for generation of Early Theoretical Codes, see Appendix 12.

- Use of a Selective Coding worksheet (also referred in Grounded Theory as 'Selective Sampling') to document codes which have been tested or explored further - with a narrative account of how this has happened or justification for the selective sampling.

- Use of Three levels of Theoretical Codes, each with their own worksheet: 1: 'Early Theoretical Codes' (aggregated and sorted from 'Theory Bits') - in this worksheet, all Theory Bits derived from all sources are listed (including Theory Bits from Memo Indicator insight, Substantive Codes, Theoretical Sensitivity) then allocated a Control Term (a shared term for commonly occurring variables), this worksheet also lists 'Early Theoretical Codes' derived from a separate sorting table, where all Theory Bit Control Terms had been sorted, compared and aggregated into a series of 'Early Theoretical Codes'; 2: 'Developed Theoretical

Codes' – based on the sorting, comparing and aggregation of Early Theoretical Codes and 3: 'High Level Theoretical Codes'.

Assimilation of Pilot Data

The Grounded Theory pilot data, comprising initial Memo indicators was felt to be incompatible in some respects with highly annotated indicators which had begun to be input into a basic Excel table; in comparison with these later annotations, the pilot annotations were verbose (reflecting a 'narrative' style - the weaknesses of the pilot stage phase of the research has been outlined in previous sections).

As a consequence of the need to assimilate the pilot and full phase data, the earlier pilot memo comments were inputted into the new electronic workbook structure alongside the full phase data, with new annotated codes – i.e. 'Descriptive Code (Indicator) refined as Control Term'.

The merging of pilot and full phase data, with allocation of Control Terms (for commonly occurring variables) allowed for rapid and systematic provision of aggregated Indicators (Open Codes) for sorting into Substantive Code Categories (developed Substantive Descriptive Codes).

Grounded Theory Re-Analysis

Upon resumption of studies in 2013, all data existing in annotated form was re-compiled into a new electronic workbook structure to achieve more robust coding/ development of categories and to demonstrate the Grounded Theory methods used in a more transparent, systematic and graphical form. Figures shown in later sections of this chapter will illustrate the process used to re-analyse and assimilate

data from both practical research phases (note – the sorting process sometimes mentioned is further documented in later sections of this chapter and was achieved using a parallel technique using Microsoft Word based floating labels to create virtual sorting ‘cards’:

Input of Data into a Qualitative-Compatible Data Package

An Excel workbook was used to provide a delineated approach to data entry and codification of each distinct part of the practical research (see later sections of this chapter for an overview of the Workbook elements). The Excel application was chosen due to its broad flexibility for handling qualitative data, such as provision of open-ended query tools, filtering and ability to use the package more creatively than other qualitative packages.

Memo Indicator Sorting as Control Terms/ Taxonomies

The memo comments were input into a worksheet within the Excel workbook, this included annotation of all comments using standardised Control Terms and provision of Descriptive Code Properties to describe the code in more detail. Note - each ‘session’ (interview discussion) could contain multiple comments, the comments were applied Control Terms for basic sorting to establish low level descriptive codes. It was possible for similar comments to be raised by participants within differing sessions. If more than one salient comment was raised in a session this was handled as a separate comment and was sorted individually.

Frequency Analysis of Control Terms

Excel formulae tools were used to determine the frequency of each Indicator/Control Term and the Frequency Distribution (percentage share/ weighing) of that Control Term, these quantitative approaches provided an efficient and systematic approach for identifying high dependence variables for sorting the Indicator/Control Terms as Open Coding for generation of developed Substantive Codes.

Recording of Theory Bits from the Indicators

As has been mentioned previously, the Memo Descriptive Code (Indicator) - refined as a Control Terms and their properties sometimes yielded Theory Bits or early insight, these were used alongside Theory Bits derived from other sources such as Theoretical Sensitivity derived readings to generate Control Terms, leading to sorting for Early Theoretical Codes. For a list of all Theory Bits encountered and later used for generation of Early Theoretical Codes, see Appendix 12: Index of All Theory Bits and Control Terms .

Categorisation of Indicators via Sorting Application for Substantive Codes

The Control Terms comprising aggregated / commonly occurring Descriptive Code Indicators were sorted to create Substantive Codes (developed Descriptive level codes).

Selective Coding of High Frequency Indicators/ Substantive Codes

Emerging codes eventually used to develop the Memo Descriptive Codes (Indicators) and emerging Substantive Codes were sometimes tested, verified or contrasted with other codes, or were used at interview to confirm or explore

developing Descriptive understanding of processes, concerns or behaviours, these were largely annotated in an earlier, more basic Excel document and later annotated in the new workbook (see Appendix 10: Practical Research Excel Worksheet Samples, then see Table 3: Worksheet 3 - Selective Coding - to validate developing Indicators/Substantive Codes).

Identification of Theory Bits/ Insights from Substantive Codes

The substantive code worksheet was based on sorting of Memo Descriptive Codes (Indicators), whilst sorting occurred thematically and based on shared properties, the frequency distribution of Indicator Control Terms was also used to illustrate the weighting or frequency of terms, the total frequency score (aggregating all dependent Control Code weightings) was also illustrated alongside the developed Substantive Code, indicating the importance of each code for consideration in developing Theoretical insights (Theory Bits) or for later selective sampling.

Input of Theoretical Sensitivity-derived Theory Bits/Insights

Theoretical Sensitivity related readings were annotated as data and these generated Theory Bits for use alongside Memo and other Theory Bits for generation of Early Theoretical Codes.

Categorisation of all Theory Bits as Control Terms and Emergence of Early Theoretical Codes from Controlled Theory Bit Sorting

As has been mentioned, all Theory Bits, whether derived from descriptive codes or Theoretical Sensitivity were aggregated into commonly occurring variables in the form of Control Terms, thus creating aggregated Theory Bits for sorting into Early

Theoretical Codes. This process represented the earliest stage of theoretical sorting and was achieved directly in the worksheet; all Theory Bits and Theory Bit Control terms are shown in Appendix 12.

Sorting of Early Theoretical Codes into Developed Theoretical Categories, Sorting of Developed Theoretical Categories into High Level Categories

As has been mentioned, theoretical codes were systematically sorted, compared and aggregated into higher level forms.

Sorting of High Level Theoretical Codes via Properties into Core Category

The emergent High Level Theoretical Codes were sorted according to their Properties to establish a Core Category which shared all these properties (Interchangability of Indices); this was not achieved in the workbook structure but via an adapted sorting table (see Appendix 14 for sorting tables).

Part 10: Selection and Explanation of Tools and Methods

This section attempts to describe the techniques used for data analysis of the pilot and full phase practical research; for a detailed overview of data analysis itself, see Chapter 4 (a): Presentation of the Emergent Theory and Chapter 4 (b): Explanation of the Theory of Improvised Learning.

i. Excel as a Qualitative Data Analysis Tool

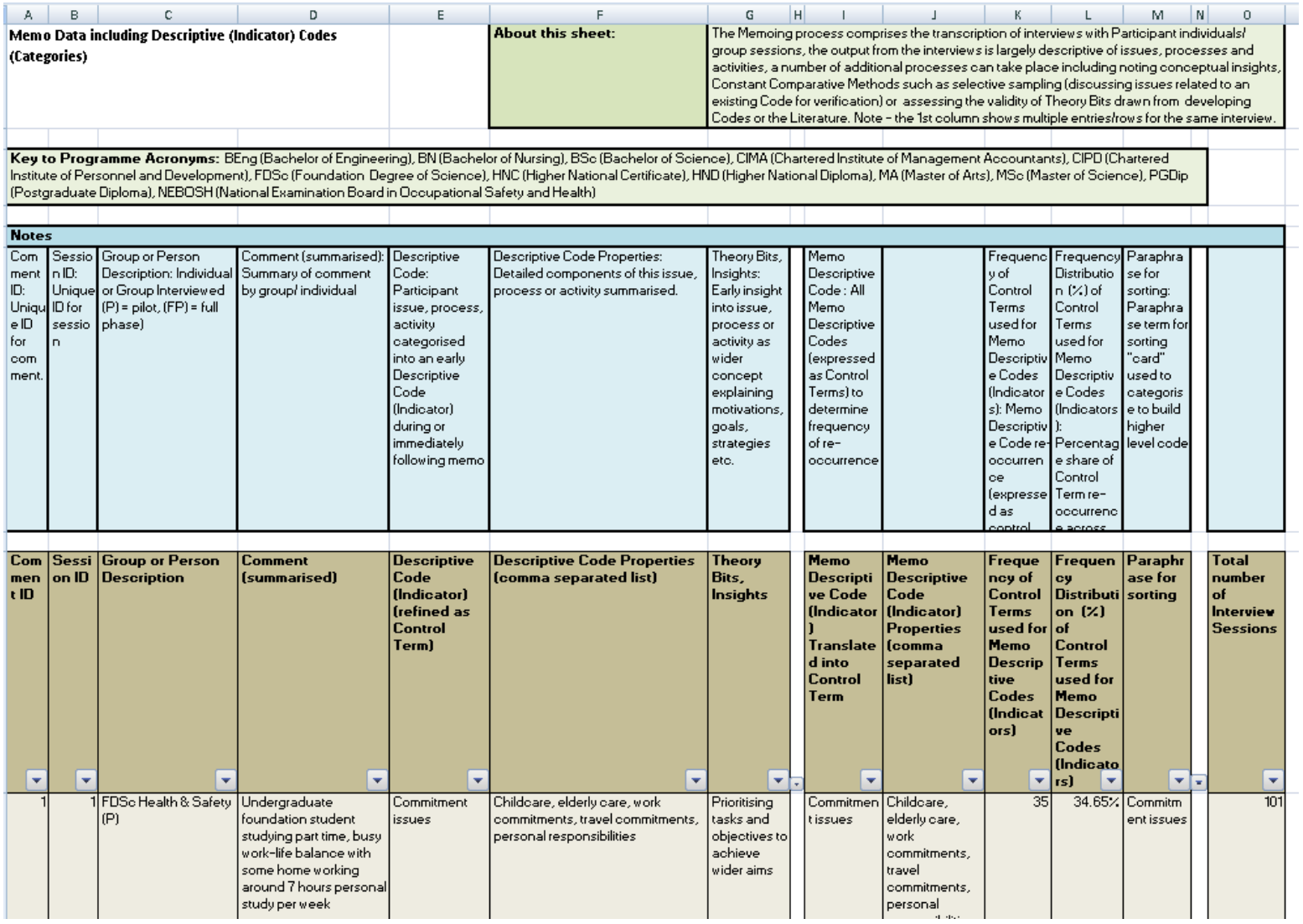
Meyer and Avery (2008, p.91) propose use of Excel as a flexible qualitative data analysis tool, for generation of graphical display data and handling of variables and attributes, suggesting Excel can be "useful as a qualitative tool. It can handle large amounts of data, provide multiple attributes, and allow for a variety of display techniques."; the use of Excel's formulae is described as a means of processing data and returning statistical information on qualitative values, allowing for organisation and interpretation of qualitative data, commenting, "formula functions are really logical and can operate on nonnumerical data as well. Functions such as IF/THEN, LOOKUP, and CONCATENATE can all be utilized with text."" The use of the Excel filter tool in this context is described as a means of quickly generating a report or delineated view of data. This can limit the display to quickly assess data matching particular criteria, including parameters such as "Equals", "Does not Equal", "Contains", "Does not Contain, these tools are outlined in terms of qualitative data handling, i.e. "…searches can be limited to a particular column or involve wildcards. A more sophisticated tool is the filter." (Meyer and Avery, 2008, p.100). The use of colour (e.g. cell formatting) is also described as a useful means of identifying or coding data and for display and layout purposes, commenting that "background color, border, and so forth, can all be changed at will…" (Meyer and Avery, 2008, p.105). The ability of Excel to provide qualitative and quantitative functions is described, summarising useful features found in this package for qualitative analysis, suggesting Excel can "house information - quantitative or qualitative. This includes the ability to organize data in meaningful ways." (Meyer and Avery, 2008, p.105).

ii. Use of Excel Tools and Features for Grounded Theory Analysis

The Excel application provided a wide range of practical tools for data input, enhanced visualisations and reporting, these tools included:

Visualisation

Colour, borders, cell shading and other visual features of Excel were used to delineate on-screen notes in the workbook, column headers and to indicate the relationship between columns:



Memo Data including Descriptive (Indicator) Codes (Categories)

About this sheet: The Memoing process comprises the transcription of interviews with Participant individuals/ group sessions, the output from the interviews is largely descriptive of issues, processes and activities, a number of additional processes can take place including noting conceptual insights, Constant Comparative Methods such as selective sampling (discussing issues related to an existing Code for verification) or assessing the validity of Theory Bits drawn from developing Codes or the Literature. Note – the 1st column shows multiple entries/rows for the same interview.

Key to Programme Acronyms: BEng (Bachelor of Engineering), BN (Bachelor of Nursing), BSc (Bachelor of Science), CIMA (Chartered Institute of Management Accountants), CIPD (Chartered Institute of Personnel and Development), FDSc (Foundation Degree of Science), HNC (Higher National Certificate), HND (Higher National Diploma), MA (Master of Arts), MSc (Master of Science), PGDip (Postgraduate Diploma), NEBOSH (National Examination Board in Occupational Safety and Health)

Notes

Comment ID: Unique ID for comment.	Session ID: Unique ID for session	Group or Person Description: Individual or Group Interviewed (P) = pilot, (FP) = full phase)	Comment (summarised): Summary of comment by group/ individual	Descriptive Code: Participant issue, process, activity categorised into an early Descriptive Code (Indicator) during or immediately following memo	Descriptive Code Properties: Detailed components of this issue, process or activity summarised.	Theory Bits, Insights: Early insight into issue, process or activity as wider concept explaining motivations, goals, strategies etc.	Memo Descriptive Code : All Memo Descriptive Codes (expressed as Control Terms) to determine frequency of re-occurrence		Frequency of Control Terms used for Memo Descriptive Codes (Indicators): Memo Descriptive Code re-occurrence (expressed as control	Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators): Percentage share of Control Term re-occurrence across	Paraphrase for sorting: Paraphrase term for sorting "card" used to categorise to build higher level code	
Comment ID	**Session ID**	**Group or Person Description**	**Comment (summarised)**	**Descriptive Code (Indicator) (refined as Control Term)**	**Descriptive Code Properties (comma separated list)**	**Theory Bits, Insights**	**Memo Descriptive Code (Indicator) Translated into Control Term**	**Memo Descriptive Code (Indicator) Properties (comma separated list)**	**Frequency of Control Terms used for Memo Descriptive Codes (Indicators)**	**Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators)**	**Paraphrase for sorting**	**Total number of Interview Sessions**
1	1	FDSc Health & Safety (P)	Undergraduate foundation student studying part time, busy work-life balance with some home working around 7 hours personal study per week	Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities	Prioritising tasks and objectives to achieve wider aims	Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal	35	34.65%	Commitment issues	101

Figure 15: Visual Characteristics of the Excel Workbook for Data Input

Workbook Structure

The workbook provided tabulated access to distinct worksheets for handling each area of the practical research; this structure provided a simply yet highly effective means to manage data:

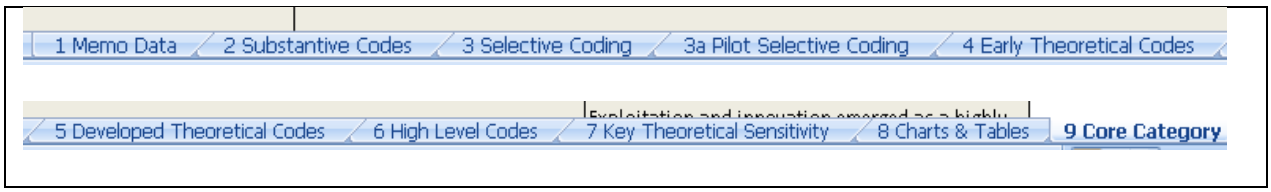


Figure 16: Tabulated Access to Workbook Content

Filters

The filter tool in Excel allowed for use of logical operators to refine the data displayed in a report style view, this included operators such as “Equals”, “Does not Equal”, “Contains”, “Does not Contain”, this feature can provide a valuable means of displaying a view of the data matching a particular code, variable or property:

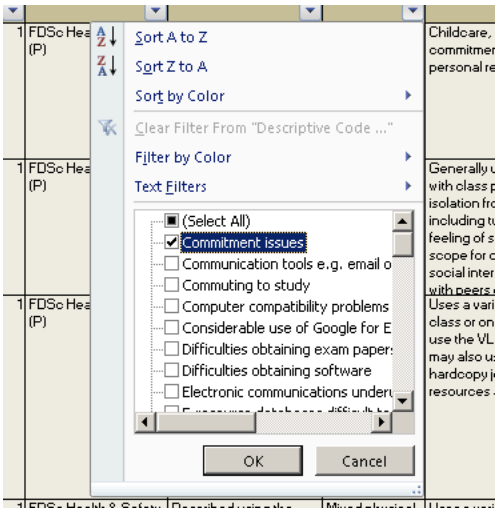


Figure 17: Filters in the Excel Workbook

In the following example, the Descriptive Code Properties heading has been filtered on the presence on the term “low contact”:

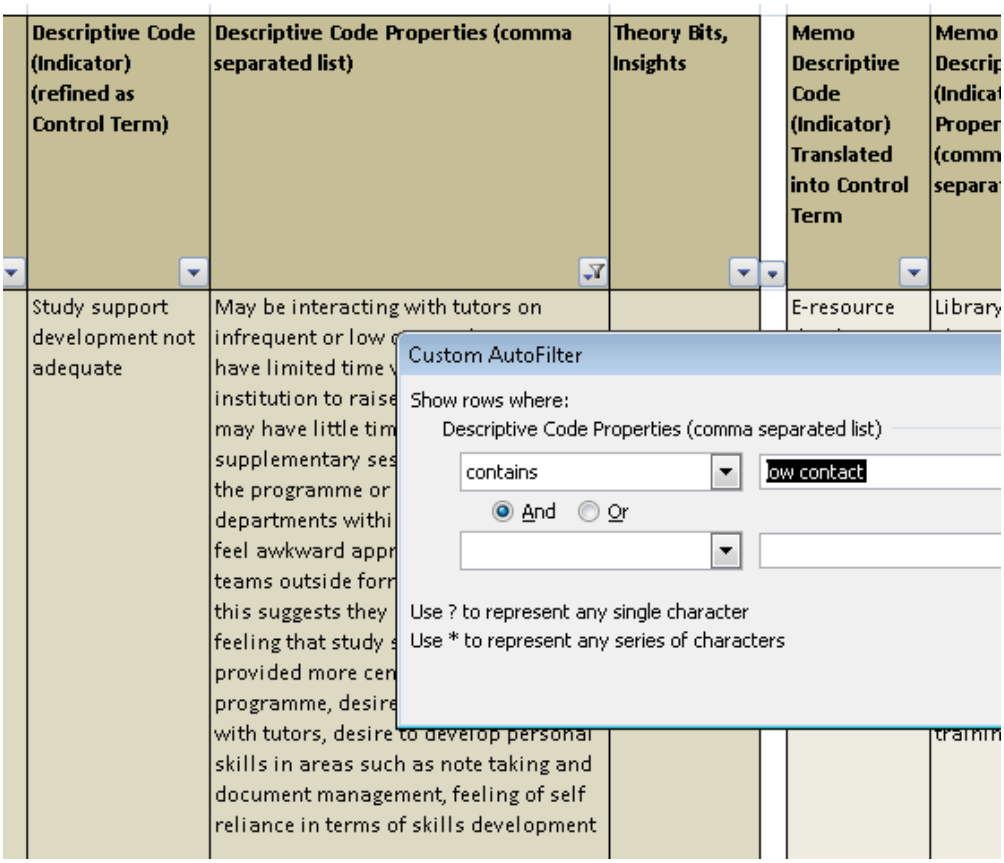


Figure 18: Filtering the Descriptive Code Properties Heading in 'Worksheet 1: Memo Data including Descriptive (Indicator) Codes (Categories)'

Formulae

Excel's formulae was used to generate automated display of some statistical style data in the workbook, this included:

- Frequency of Control Terms used for Memo Descriptive Codes (Indicators):

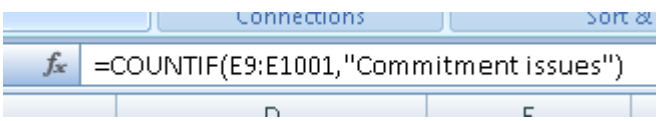


Figure 19: Excel Formula for Frequency of Control Terms used for Memo

Descriptive Codes (Indicators)

- Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators) - this simply displayed the above as a percentage of the above cell value divided by the total number of interview sessions:

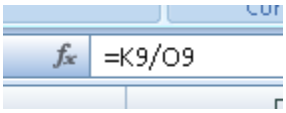


Figure 20: Excel Formula for Frequency Distribution (%) of Control Terms for Memo Descriptive Codes (Indicators)

Use of Frequency/ Frequency Distribution for Developing Substantive Categories

The above formulae can be visualised in the Memo table worksheet as shown below; the Memo worksheet included a smaller Frequency Distribution table alongside the main comments table. In the Frequency Distribution column below we can see the Control Term “Commitment Issues” was allocated to 35 interview comments and this occurred on average in 34.65% of all interview sessions (this was calculated against interview sessions, rather than all 512 interviews, since the present calculation indicates the average frequency of the Control Term within discreet interview sessions, where comments may have occurred within a group setting):

Memo Descriptive Code (Indicator) Translated into Control Term	Memo Descriptive Code (Indicator) Properties (comma separated list)	Frequency of Control Terms used for Memo Descriptive Codes (Indicators)	Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicator:	Paraphrase for sorting	Total number of Interview Sessions
Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities	35	34.65%	Commitment issues	101
Communication tools e.g. email or social networks important to study	Email, Social Network usage via Facebook or similar, use of course provided communication tools	13	12.87%	Comms tools importance	

Figure 21: Visual example of Frequency/ Frequency Distribution for Developing Substantive Categories

For an overview of the main Memo comments table with samples see Appendix 10, Table 1.

Control Terms

Control Terms were used to aggregate similar or near identical Memo Comments into Control Term-based Indicators and were also used to transform all (informal) Theory Bits (derived from multiple sources such as early Memo insight, Theoretical Sensitivity) into similar Control-Term-based or aggregated Theory Bits. For a full list of Memo Control Terms, see Appendix 11. In the example below we can see Memo

comments matched with Control Terms i.e. the “Descriptive Code (Indicator) refined as Control Term”:

Comment ID	Session ID	Group or Person Description	Comment (summarised)	Descriptive Code (Indicator) (refined as Control Term)	Descriptive Code Properties (comma separated list)	Theory Bits, Insights
1	1	FDSc Health & Safety (P)	Undergraduate foundation student studying part time, busy work-life balance with some home working around 7 hours personal study per week	Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities	Prioritising tasks and objectives to achieve wider aims
2	1	FDSc Health & Safety (P)	Around 6 hours classes per week considered fairly low contact with tutors/peers	Low Contact Study	Generally under ten hours contact with class per week, Sense of isolation from the institution including tutors and peer students, feeling of self-reliance and less scope for obtaining support, lack of social interaction and socialisation with peers or staff	

Figure 22: Control Term Generation in the Excel Workbook

In the following example we can see Control Terms used to reduce the number of original Theory Bits, thus similarly generating aggregated Theory Bits; these are displayed in the Early Theoretical Codes worksheet and sorting table as “Theory Bit/ Insight (refined as Control Term)”, whilst the original Theory Bits, derived from multiple sources such as Memo Insights are labelled “Informal Theory Bits and Insights”. There were approximately 180 Theory Bits and these were sorted directly in Worksheet 4 (see Appendix 10, Table 5) to consolidate the Theory Bits into around 120 Control Terms:

All Informal Theory Bits and Insights listed from Memo Data sheet, Substantive Descriptive Code sheet and Theoretical Sensitivity sheet	Theory Bit/ Insight (refined as Control Term)
Prioritising tasks and objectives to achieve wider aims	Prioritising tasks, aims and objectives
Using a variety of online and oncampus services and tools to obtain a more holistic range of sources and services	Exploiting oncampus and online services

Figure 23: Example of Control Term Generation for Theory Bits

Charts and Tables

Charts and tables were generated using Excel Chart features, e.g. in the following example we can see a histogram indicating Frequency of Control Terms used for Memo Descriptive Codes (Indicators):

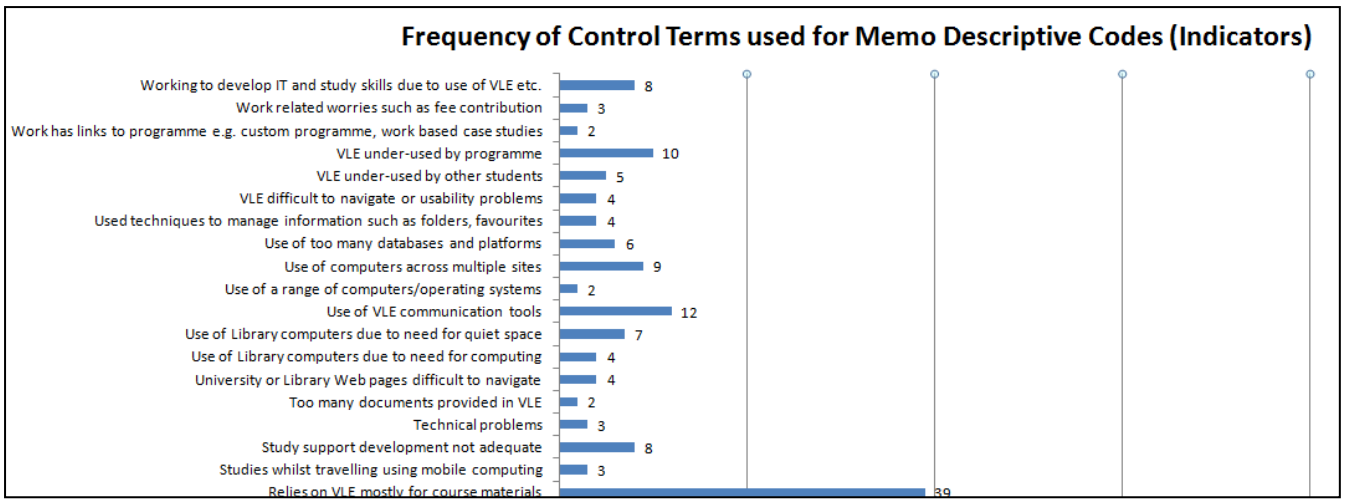


Figure 24: Example Chart Generated in the Excel Workbook

Note – Further sample chart data is shown in Appendix 13.

iii. Explanation of the Workbook and Sorting Structure , Worksheet 1 Memo Data

The Memoing process comprised the transcription of interviews in an annotated format with Participant individuals/ group sessions, the output from the interviews is largely descriptive of issues, processes and activities; a number of additional processes could occur during memo recording including noting conceptual insights, Constant Comparative Methods such as selective sampling (discussing issues related to an existing Code for verification) or assessing the validity of Theory Bits drawn from developing Codes or the Literature. Note - the 1st column shows multiple entries/rows for comments within the same interview. Note – comments transcribed into memos were associated with a control term used to aggregate comments for development of substantive codes. For all memo Control Terms used to develop descriptive codes, see Appendix 11.

Key to Programme Acronyms

BEng (Bachelor of Engineering), BN (Bachelor of Nursing), BSc (Bachelor of Science), CIMA (Chartered Institute of Management Accountants), CIPD (Chartered Institute of Personnel and Development), FDSc (Foundation Degree of Science), HNC (Higher National Certificate), HND (Higher National Diploma), MA (Master of Arts), MSc (Master of Science), PGDip (Postgraduate Diploma), NEBOSH (National Examination Board in Occupational Safety and Health).

Notes on fields used in this worksheet:

- Comment ID: Unique ID for comment.
- Session ID: Unique ID for session.
- Group or Person Description: Individual or Group Interviewed (P) = pilot, (FP) = full phase.
- Comment (summarised): Summary of comment by group/ individual.
- Descriptive Code: Participant issue, process, activity categorised into an early Descriptive Code (Indicator) during or immediately following memo.
- Descriptive Code Properties: Detailed components of this issue, process or activity summarised.
- Theory Bits, Insights: Early insight into issue, process or activity as wider concept explaining motivations, goals, strategies.

The following figure provides a structural overview of this worksheet:

Key to Programme Acronyms: BEng (Bachelor of Engineering), BN (Bachelor of Nursing), BSc (Bachelor of Science), CIMA (Ch Institute of Personnel and Development), FDSc (Foundation Degree of Science), HNC (Higher National Certificate), HND (Higher Nati (Postgraduate Diploma), NEBOSH (National Examination Board in Occupational Safety and Health)

Notes

Comment ID: Unique ID for comment.	Session ID: Unique ID for session	Group or Person Description: Individual or Group Interviewed (P) = pilot, (FP) = full phase)	Comment (summarised): Summary of comment by group/ individual	Descriptive Code: Participant issue, process, activity categorised into an early Descriptive Code (Indicator) during or immediately following memo	Descriptive Code Properties: Detailed components of this issue, process or activity summarised.	Theory Bits, Insights: Early insight into issue, process or activity as wider concept explaining motivations, goals, strategies etc.
Comment ID	**Session ID**	**Group or Person Description**	**Comment (summarised)**	**Descriptive Code (Indicator) (refined as Control Term)**	**Descriptive Code Properties (comma separated list)**	**Theory Bits, Insights**
1	1	FDSc Health & Safety (P)	Undergraduate foundation student studying part time, busy work-life balance with some home working around 7 hours personal study per week	Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities	Prioritising tasks and objectives to achieve wider aims

Figure 25: Visual Characteristics of 'Worksheet 1: Memo Data including Descriptive (Indicator) Codes (Categories)'

Note - Sample data for this worksheet is shown in Appendix 10, Table 1.

Explanation of sub-table used in Worksheet 1 - Memo Indicator Control Terms Used to Develop Substantive Codes

Comments transcribed into memos were associated with a Control Term used to aggregate comments for development of substantive codes. The following table

shows the control terms associated with individual comments followed by a detailed “descriptive” list of code properties, the numerical total of comments associated with the control term, the frequency distribution of control terms used and an additional short phrase provided for additional sorting purposes.

Notes on fields used in this worksheet:

- Memo Descriptive Code: All Memo Descriptive Codes (expressed as Control Terms) to determine frequency of re-occurrence.
- Frequency of Control Terms used for Memo Descriptive Codes (Indicators): Memo Descriptive Code re-occurrence (expressed as control terms).
- Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators): Percentage share of Control Term re-occurrence across all interviews.
- Paraphrase for sorting: Paraphrase term for sorting "card" used to categorise to build higher level code.

The following table also displays the frequency of Memo Indicator Control Terms and provides the Frequency Distribution or share of these terms across all interviews, i.e. in the example below “Commitment Issues” was allocated as a Control Term to 35 interview comments and this occurred on average in 34.65% of all interview sessions:

Memo Descriptive Code (Indicator) Translated into Control Term	Memo Descriptive Code (Indicator) Properties (comma separated list)	Frequency of Control Terms used for Memo Descriptive Codes (Indicators)	Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators)	Paraphrase for sorting
Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities	35	34.65%	Commitment issues
Communication tools e.g. email or social networks important to study	Email, Social Network usage via Facebook or similar, use of course provided communication tools	13	12.87%	Comms tools importance
Commuting to study	Considerable distance between study location (usually over 10 miles), use of public or personal transport with associated costs, lack of local access to the	12	11.88%	Commutes

Figure 26: Sub-Table Displaying Memo Indicator Control Terms Used To Develop Substantive Codes

Note - Sample data is shown in Appendix 11

iv. Worksheet 2 Substantive Code (Categories) Creation

The Descriptive Codes developed via memos were processed using the Constant Comparative Method to create Substantive Codes i.e. higher level categories (or Codes) describing shared issues, processes or activities, these Substantive Codes can also suggest new Theory Bits contributing to the development of Theoretical Codes.

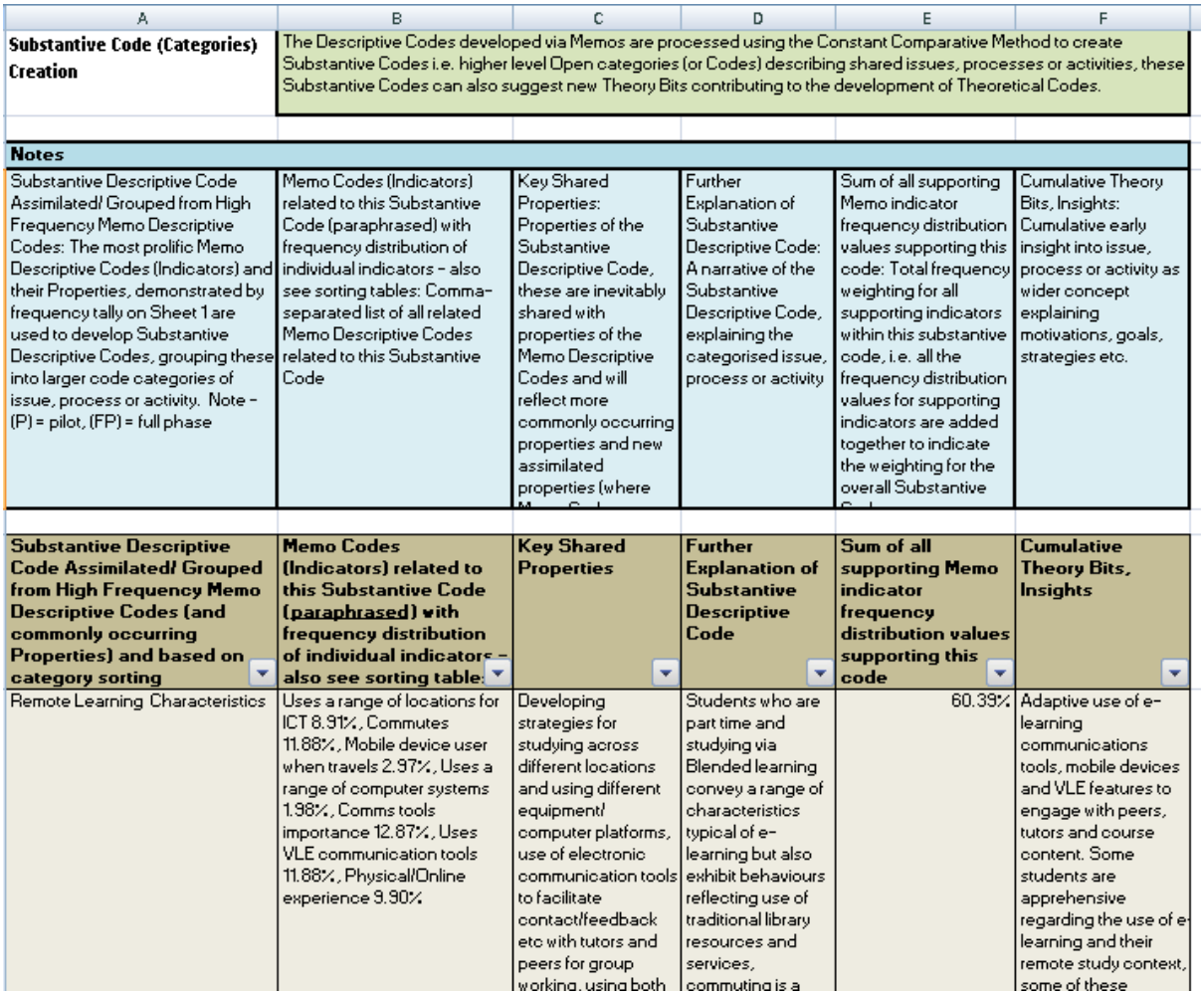
Notes on fields used in this worksheet:

- Substantive Descriptive Code Assimilated/ Grouped from High Frequency Memo Descriptive Codes: The most prolific Memo Descriptive Codes (Indicators) and their Properties, demonstrated by frequency tally on worksheet 1 are used to develop Substantive Descriptive Codes, grouping

these into larger code categories of issue, process or activity. Note - (P) = pilot, (FP) = full phase.

- Memo Codes (Indicators) related to this Substantive Code (paraphrased) with frequency distribution of individual indicators - i.e. a comma-separated list of all related Memo Descriptive Codes related to this Substantive Code.
- Key Shared Properties: Properties of the Substantive Descriptive Code, these are inevitably shared with properties of the Memo Descriptive Codes and will reflect more commonly occurring properties and new assimilated properties (where Memo Code properties are grouped into common categories).
- Further Explanation of Substantive Descriptive Code: A narrative of the Substantive Descriptive Code, explaining the categorised issue, process or activity.
- Sum of all supporting Memo indicator frequency distribution values supporting this code: Total frequency weighting for all supporting indicators within this substantive code, i.e. all the frequency distribution values for supporting indicators are added to indicate the weighting for the overall Substantive Code.
- Cumulative Theory Bits, Insights: Cumulative early insight into issue, process or activity as wider concept explaining motivations, goals, strategies.

The following figure provides a structural overview of this worksheet:



A	B	C	D	E	F
Substantive Code (Categories) Creation	The Descriptive Codes developed via Memos are processed using the Constant Comparative Method to create Substantive Codes i.e. higher level Open categories (or Codes) describing shared issues, processes or activities, these Substantive Codes can also suggest new Theory Bits contributing to the development of Theoretical Codes.				
Notes					
Substantive Descriptive Code Assimilated/ Grouped from High Frequency Memo Descriptive Codes: The most prolific Memo Descriptive Codes (Indicators) and their Properties, demonstrated by frequency tally on Sheet 1 are used to develop Substantive Descriptive Codes, grouping these into larger code categories of issue, process or activity. Note - (P) = pilot, (FP) = full phase	Memo Codes (Indicators) related to this Substantive Code (paraphrased) with frequency distribution of individual indicators - also see sorting tables: Comma-separated list of all related Memo Descriptive Codes related to this Substantive Code	Key Shared Properties: Properties of the Substantive Descriptive Code, these are inevitably shared with properties of the Memo Descriptive Codes and will reflect more commonly occurring properties and new assimilated properties (where	Further Explanation of Substantive Descriptive Code: A narrative of the Substantive Descriptive Code, explaining the categorised issue, process or activity	Sum of all supporting Memo indicator frequency distribution values supporting this code: Total frequency weighting for all supporting indicators within this substantive code, i.e. all the frequency distribution values for supporting indicators are added together to indicate the weighting for the overall Substantive	Cumulative Theory Bits, Insights: Cumulative early insight into issue, process or activity as wider concept explaining motivations, goals, strategies etc.
Substantive Descriptive Code Assimilated/ Grouped from High Frequency Memo Descriptive Codes (and commonly occurring Properties) and based on category sorting	**Memo Codes (Indicators) related to this Substantive Code (paraphrased) with frequency distribution of individual indicators - also see sorting table**	**Key Shared Properties**	**Further Explanation of Substantive Descriptive Code**	**Sum of all supporting Memo indicator frequency distribution values supporting this code**	**Cumulative Theory Bits, Insights**
Remote Learning Characteristics	Uses a range of locations for ICT 8.91%, Commutes 11.88%, Mobile device user when travels 2.97%, Uses a range of computer systems 1.98%, Comms tools importance 12.87%, Uses VLE communication tools 11.88%, Physical/Online experience 9.90%	Developing strategies for studying across different locations and using different equipment/ computer platforms, use of electronic communication tools to facilitate contact/feedback etc with tutors and peers for group working, using both	Students who are part time and studying via Blended learning convey a range of characteristics typical of e-learning but also exhibit behaviours reflecting use of traditional library resources and services, commuting is a	60.39%	Adaptive use of e-learning communications tools, mobile devices and VLE features to engage with peers, tutors and course content. Some students are apprehensive regarding the use of e-learning and their remote study context, some of these

Figure 27: Visual Characteristics of 'Worksheet 2 - Substantive Code (Categories) Creation'

Note - Sample data for this worksheet is shown in Appendix 10, Table 2.

v. Worksheet 3 - Selective Coding to validate Developing Indicators

The following figure outlines how Memo Indicators (Comments) and emerging Substantive (Descriptive) Codes have been selected for verification or further discussion/ exploration with participants. The use of Selective Coding (or sampling) generates new data, codes, properties and Theory Bits via the Interview Process, allowing for repeated arising of discussions which can be coded and recorded using

Control Terms; Selective Coding may also result in no related data or the development of entirely new indicators.

Notes on fields used in this worksheet:

- Memo Comments and developing Substantive Codes (in bold) derived from Full Phase interviews and identified for Selective Sampling in subsequent interviews. Because these early codes were still not fully refined or translated into Control Terms these indicators do not match final Control Terms; Substantive Codes being developed and refined can be verified at interview. This table lists selected Indicator Codes from the interviews and emergent Substantive Codes.
- Justification/ Reason for Selective Sampling of this Indicator/ Code: Reason why the Indicator/ Code was explored/ verified or explored at further interviews

The following figure provides a structural overview of this worksheet:

A	B
Selective Coding - Selective sampling to validate developing Indicators/ Substantive Codes	This table outlines how Memo Indicators (Comments) and emerging Substantive (Descriptive) Codes have been selected for verification or further discussion/ exploration with participants. The use of Selective Coding (or sampling) generates new data, codes, properties and Theory Bits via the Interview Process, allowing for repeated arising of discussions which can be coded and recorded using Control Terms, Selective Coding may also result in no related data or the development of entirely new indicators.
Notes	
Memo Comments and developing Substantive Codes (in bold) derived from Full Phase interviews and identified for Selective Sampling in subsequent interviews. Because these early codes were still not fully refined or translated into Control Terms these indicators do not match final Control Terms: Substantive Codes being developed and refined can be verified at interview. This table lists selected Indicator Codes from the interviews and emergent Substantive Codes.	Justification/ Reason for Selective Sampling of this Indicator/ Code: Reason why the Indicator/ Code was explored/ verified or explored at further interviews
Memo Comments and developing Substantive Codes (in bold) derived from Full Phase interviews and identified for Selective Sampling in subsequent interviews. Because these early codes were still not fully refined or translated into Control Terms these indicators	**Justification/ Reason for Selective Sampling of this Indicator/ Code**
Role of Communication tools	To ascertain if online communication tools are used alongside static course content as suggested in early pilot interviews.
Use of the WWW	To verify usability issues using formal databases as suggested in early pilot and throughout many interviews in the full phase, also to ascertain user confidence and skills in using the WWW and diverse WWW sources.
Database issues	To confirm problems reported using Library databases as part of the repertoire of WWW/e-resources.

Figure 28: Visual Characteristics of 'Worksheet 3 - Selective Coding - to validate developing Indicators/Substantive Codes'

Note - Sample data is shown in Appendix 10, Table 3.

vi. Worksheet 3a Coding and Selective Coding from the Pilot Interviews

This worksheet outlines how Pilot-derived emerging Codes have been selected for verification or further discussion/ exploration with participants. The use of Selective Coding (or sampling) generates new data, codes, properties and Theory Bits via the Interview Process, allowing for repeated arising of discussions which can be coded and recorded using Control Terms, Selective Coding may also result in no related data or the development of entirely new indicators.

Notes on fields used in this worksheet:

- Pilot-derived developing Substantive Codes available for Selective Coding at later interviews.
- Reason why the Indicator/ Code was explored/ verified or explored at further interviews.
- Early pilot-derived Theoretical Codes associated with this Substantive Code.
- Early pilot-derived Developed Theoretical Codes associated with this Substantive Code.

The following figure provides a structural overview of this worksheet:

A	B	C	D
Coding and Selective Coding from the Pilot Interviews	This table outlines how Pilot-derived emerging Codes have been selected for verification or further discussion/ exploration with participants. The use of Selective Coding (or sampling) generates new data, codes, properties and Theory Bits via the Interview Process, allowing for repeated arising of discussions which can be coded and recorded using Control Terms, Selective Coding may also result in no related data or the development of entirely new indicators.		
Notes			
Pilot-derived developing Substantive Codes available for Selective Coding at later interviews.	Reason why the Indicator/ Code was explored/ verified or explored at further interviews	Early pilot-derived Theoretical Codes associated with this Substantive Code	Early pilot-derived Developed Theoretical Codes associated with this Substantive Code
Pilot derived Substantive Code used for Selective Sampling in later	**Justification/ Reason for Selective Sampling of this Indicator/ Code**	**Associated Tentative Theoretical Codes**	**Associated Tentative Developed Code**
Low contact study (characteristics & strategies)	Whilst the sample groups/ individuals interviewed were mostly on formal part-time courses, some individuals were approached ad-hoc in open learning areas, in some cases these turned out to be full-time students but consistently indicated they were attending class less than 10 hours a week. All the students interviewed (including 'full time' students) indicated low contact with staff and peers was a factor in their study, including travel times required, need for effective use of time in class and need for excellent ICT facilities on site during visits. Many students indicated they were 'lone' students, with varying levels of contact with peers or staff via ICT. Many of these students felt they received minimal or no support for issues such as ICT use, software use, learning support study skills, use	Lone studying via ICT; Self navigating Technologies; Inter-location studying; Remote peer-communicating; Study-Work Integrating; ICT self-supporting; ICT knowledge sharing; ICT facility discovery; ICT facility exploiting	Multi-tasking commitments

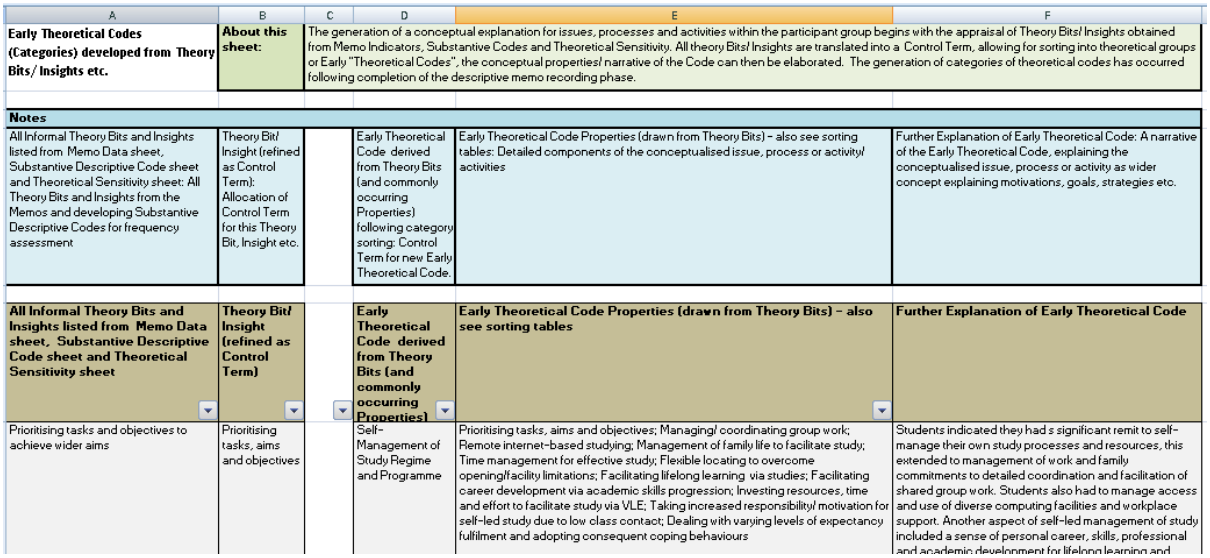
Figure 29: Visual Characteristics of 'Worksheet 3a - Coding and Selective Coding from the Pilot Interviews'

Note - Sample data is shown in Appendix 10, Table 4.

vii. Worksheet 4 Early Theoretical Codes (Categories) from Theory Bits/ Insights

The generation of a conceptual explanation for issues, processes and activities within the participant group begins with the appraisal of Theory Bits/ Insights obtained from Memo Indicators, Substantive Codes and Theoretical Sensitivity. All Theory Bits/ Insights are translated into a Control Term, allowing for sorting into theoretical groups or Early 'Theoretical Codes', the conceptual properties/ narrative of the Code can then be elaborated. The generation of categories of theoretical codes has occurred following completion of the descriptive memo recording phase.

The following figure provides a structural overview of this worksheet:



A	B	C	D	E	F
Early Theoretical Codes (Categories) developed from Theory Bits/ Insights etc.	**About this sheet:**	The generation of a conceptual explanation for issues, processes and activities within the participant group begins with the appraisal of Theory Bits/ Insights obtained from Memo Indicators, Substantive Codes and Theoretical Sensitivity. All theory Bits/ Insights are translated into a Control Term, allowing for sorting into theoretical groups or Early "Theoretical Codes", the conceptual properties/ narrative of the Code can then be elaborated. The generation of categories of theoretical codes has occurred following completion of the descriptive memo recording phase.			
Notes					
All Informal Theory Bits and Insights listed from Memo Data sheet, Substantive Descriptive Code sheet and Theoretical Sensitivity sheet: All Theory Bits and Insights from the Memos and developing Substantive Descriptive Codes for frequency assessment	Theory Bit/ Insight (refined as Control Term): Allocation of Control Term for this Theory Bit, Insight etc.		Early Theoretical Code derived from Theory Bits (and commonly occurring Properties) following category sorting: Control Term for new Early Theoretical Code.	Early Theoretical Code Properties (drawn from Theory Bits) – also see sorting tables: Detailed components of the conceptualised issue, process or activity/ activities	Further Explanation of Early Theoretical Code: A narrative of the Early Theoretical Code, explaining the conceptualised issue, process or activity as wider concept explaining motivations, goals, strategies etc.
All Informal Theory Bits and Insights listed from Memo Data sheet, Substantive Descriptive Code sheet and Theoretical Sensitivity sheet	**Theory Bit/ Insight (refined as Control Term)**		**Early Theoretical Code derived from Theory Bits (and commonly occurring Properties)**	**Early Theoretical Code Properties (drawn from Theory Bits) – also see sorting tables**	**Further Explanation of Early Theoretical Code**
Prioritising tasks and objectives to achieve wider aims	Prioritising tasks, aims and objectives		Self-Management of Study Regime and Programme	Prioritising tasks, aims and objectives; Managing/ coordinating group work; Remote internet-based studying; Management of family life to facilitate study; Time management for effective study; Flexible locating to overcome opening/facility limitations; Facilitating lifelong learning via studies; Facilitating career development via academic skills progression; Investing resources, time and effort to facilitate study via VLE; Taking increased responsibility/ motivation for self-led study due to low class contact; Dealing with varying levels of expectancy fulfilment and adopting consequent coping behaviours	Students indicated they had s significant remit to self-manage their own study processes and resources, this extended to management of work and family commitments to detailed coordination and facilitation of shared group work. Students also had to manage access and use of diverse computing facilities and workplace support. Another aspect of self-led management of study included a sense of personal career, skills, professional and academic development for lifelong learning and

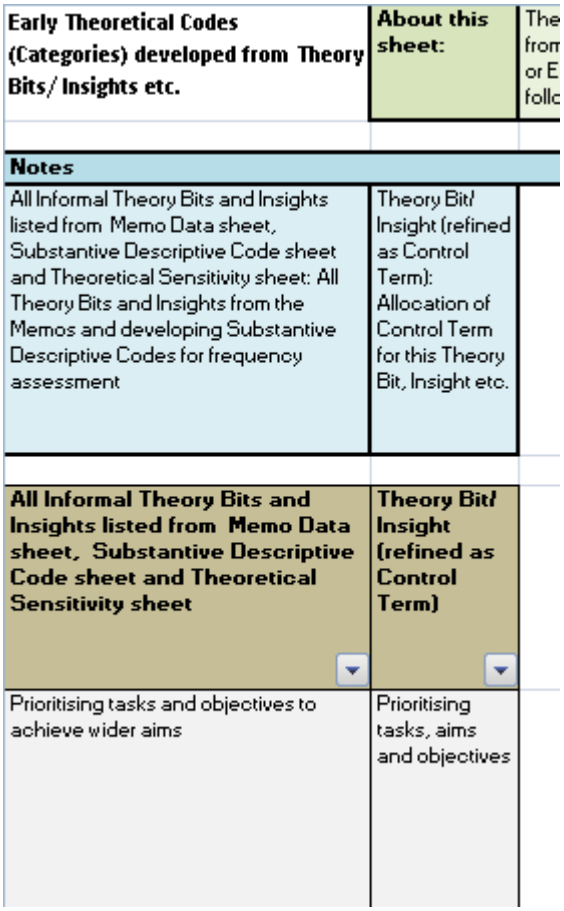
Figure 30: Visual Characteristics of 'Worksheet 4 - Early Theoretical Codes (Categories) developed from Theory Bits/Insights'

Notes on fields used in this worksheet:

- All Informal Theory Bits and Insights listed from Memo Data sheet, Substantive Descriptive Code sheet and Theoretical Sensitivity sheet: All

Theory Bits and Insights are listed from sources such as memo insights and developing Substantive Descriptive Codes.

- Theory Bit/ Insight (refined as Control Term): Allocation of Control Term for this Theory Bit/ Insight.:



Early Theoretical Codes (Categories) developed from Theory Bits/ Insights etc.	About this sheet:	The from or E follo
Notes		
All Informal Theory Bits and Insights listed from Memo Data sheet, Substantive Descriptive Code sheet and Theoretical Sensitivity sheet: All Theory Bits and Insights from the Memos and developing Substantive Descriptive Codes for frequency assessment	Theory Bit/ Insight (refined as Control Term): Allocation of Control Term for this Theory Bit, Insight etc.	
All Informal Theory Bits and Insights listed from Memo Data sheet, Substantive Descriptive Code sheet and Theoretical Sensitivity sheet	**Theory Bit/ Insight (refined as Control Term)**	
Prioritising tasks and objectives to achieve wider aims	Prioritising tasks, aims and objectives	

Figure 31: Theory Bit/ Insight (refined as Control Term) in Worksheet 4

- Early Theoretical Code derived from Theory Bits (and commonly occurring Properties) following category sorting: Control Term for new Early Theoretical Code.
- Early Theoretical Code Properties (drawn from Theory Bits): Detailed components of the conceptualised issue, process or activity/ activities.

- Further Explanation of Early Theoretical Code: A narrative of the Early Theoretical Code, explaining the conceptualised issue, process or activity as wider concept explaining motivations, goals or strategies.

The following figure provides a structural overview of the 'Early Theoretical Codes' worksheet element:

Early Theoretical Code derived from Theory Bits (and commonly occurring Properties) following category sorting: Control Term for new Early Theoretical Code.	Early Theoretical Code Properties (drawn from Theory Bits) – also see sorting tables: Detailed components of the conceptualised issue, process or activity/ activities	Further Explanation of Early Theoretical Code: A narrative of the Early Theoretical Code, explaining the conceptualised issue, process or activity as wider concept explaining motivations, goals, strategies etc.
Early Theoretical Code derived from Theory Bits (and commonly occurring Properties)	**Early Theoretical Code Properties (drawn from Theory Bits) – also see sorting tables**	**Further Explanation of Early Theoretical Code**
Self-Management of Study Regime and Programme	Prioritising tasks, aims and objectives; Managing/ coordinating group work; Remote internet-based studying; Management of family life to facilitate study; Time management for effective study; Flexible locating to overcome opening/facility limitations; Facilitating lifelong learning via studies; Facilitating career development via academic skills progression; Investing resources, time and effort to facilitate study via VLE; Taking increased responsibility/ motivation for self-led study due to low class contact; Dealing with varying levels of expectancy fulfilment and adopting consequent coping behaviours	Students indicated they had s significant remit to self-manage their own study processes and resources, this extended to management of work and family commitments to detailed coordination and facilitation of shared group work. Students also had to manage access and use of diverse computing facilities and workplace support. Another aspect of self-led management of study included a sense of personal career, skills, professional and academic development for lifelong learning and workplace security. Students also indicated varying levels of support/facilities expectancy and indicated methods to source or engage in a variety of strategies, support networks or developmental processes to accommodate the realities of these expectations.

Figure 32: Structural overview of the 'Early Theoretical Codes' in Worksheet 4

Note – for a list of all control terms used to categorise all informal theory bits and insights, see Appendix 12. Sample data is also shown in Appendix 10, Table 5.

viii. Worksheet 5 Developed Theoretical Codes (Categories)

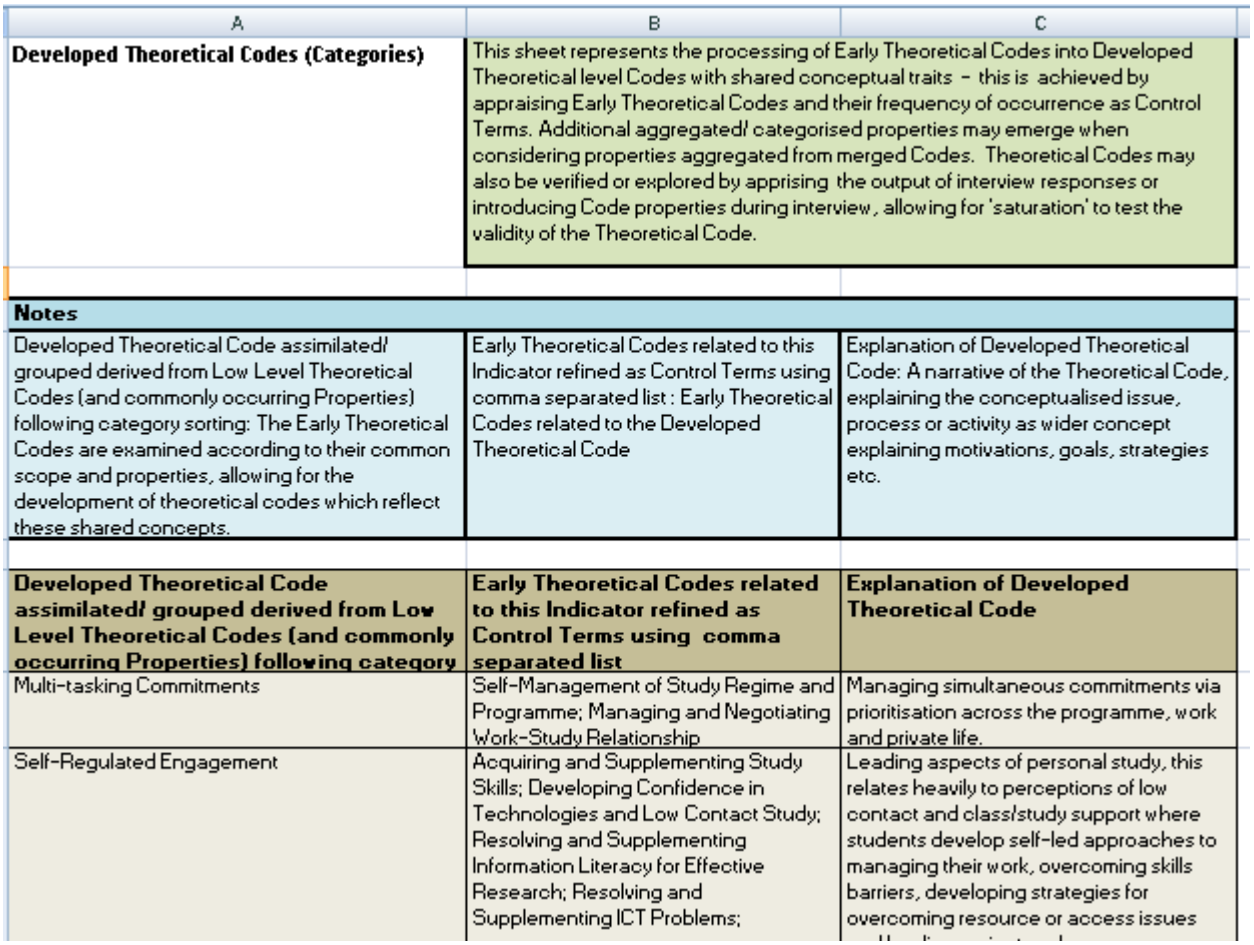
This worksheet represents the processing of Early Theoretical Codes into Developed Theoretical level Codes with shared conceptual traits - this is achieved by appraising Early Theoretical Codes and their frequency of occurrence as Control Terms.

Additional aggregated/ categorised properties may emerge when considering properties aggregated from merged Codes. Theoretical Codes may also be verified or explored by apprising the output of interview responses or introducing Code properties during interview, allowing for 'saturation' to test the validity of the Theoretical Code.

Notes on fields used in this worksheet:

- Developed Theoretical Code assimilated/ grouped derived from Low Level Theoretical Codes (and commonly occurring Properties) following category sorting: The Early Theoretical Codes are examined according to their common scope and properties, allowing for the development of theoretical codes which reflect these shared concepts.
- Early Theoretical Codes related to this Indicator refined as Control Terms using comma separated list : Early Theoretical Codes related to the Developed Theoretical Code
- Explanation of Developed Theoretical Code: A narrative of the Theoretical Code, explaining the conceptualised issue, process or activity as wider concept explaining motivations, goals or strategies.

The following figure provides a structural overview of this worksheet:



A	B	C
Developed Theoretical Codes (Categories)	This sheet represents the processing of Early Theoretical Codes into Developed Theoretical level Codes with shared conceptual traits – this is achieved by appraising Early Theoretical Codes and their frequency of occurrence as Control Terms. Additional aggregated/ categorised properties may emerge when considering properties aggregated from merged Codes. Theoretical Codes may also be verified or explored by apprising the output of interview responses or introducing Code properties during interview, allowing for 'saturation' to test the validity of the Theoretical Code.	
Notes		
Developed Theoretical Code assimilated/ grouped derived from Low Level Theoretical Codes (and commonly occurring Properties) following category sorting: The Early Theoretical Codes are examined according to their common scope and properties, allowing for the development of theoretical codes which reflect these shared concepts.	Early Theoretical Codes related to this Indicator refined as Control Terms using comma separated list : Early Theoretical Codes related to the Developed Theoretical Code	Explanation of Developed Theoretical Code: A narrative of the Theoretical Code, explaining the conceptualised issue, process or activity as wider concept explaining motivations, goals, strategies etc.
Developed Theoretical Code assimilated/ grouped derived from Low Level Theoretical Codes (and commonly occurring Properties) following category	**Early Theoretical Codes related to this Indicator refined as Control Terms using comma separated list**	**Explanation of Developed Theoretical Code**
Multi-tasking Commitments	Self-Management of Study Regime and Programme; Managing and Negotiating Work-Study Relationship	Managing simultaneous commitments via prioritisation across the programme, work and private life.
Self-Regulated Engagement	Acquiring and Supplementing Study Skills; Developing Confidence in Technologies and Low Contact Study; Resolving and Supplementing Information Literacy for Effective Research; Resolving and Supplementing ICT Problems;	Leading aspects of personal study, this relates heavily to perceptions of low contact and class/study support where students develop self-led approaches to managing their work, overcoming skills barriers, developing strategies for overcoming resource or access issues

Figure 33: Visual Characteristics of 'Worksheet 5 - Developed Theoretical Codes (Categories)'

Note - Sample data is shown in Appendix 10, Table 6.

ix. Worksheet 6 High Level Theoretical Codes (Categories)

This worksheet represents the processing of Developed Theoretical Codes into 'High Level Theoretical Codes' with shared conceptual traits - this is achieved by appraising Developed Theoretical Codes. Additional aggregated/ categorised properties may emerge when considering properties aggregated from merged Codes.

Notes on fields used in this worksheet:

- High Level Theoretical Code assimilated/ grouped derived from Developed Theoretical Codes (and commonly occurring Properties) following category sorting: The Developed Theoretical Codes are examined according to their common scope and properties, allowing for the development of High Level Theoretical codes which reflect these shared concepts.
- Developed Theoretical Codes related to this Indicator refined as Control Terms using comma separated list : Developed Theoretical Codes related to the High Level Theoretical Code
- Explanation of High Level Theoretical Code: A narrative of the High Level Theoretical Code, explaining the conceptualised issue, process or activity as wider concept explaining motivations, goals or strategies.

The following figure provides a structural overview of this worksheet:

A	B	C
High Level Theoretical Codes (Categories)	This sheet represents the processing of Developed Theoretical Codes into High level Code 'Categories' with shared conceptual traits – this is achieved by appraising Developed Theoretical Codes and their frequency of occurrence as Control Terms. Additional aggregated/ categorised properties may emerge when considering properties aggregated from merged Codes.	
Notes		
High Level Theoretical Code assimilated/ grouped derived from Developed Theoretical Codes (and commonly occurring Properties) following category sorting: The Developed Theoretical Codes are examined according to their common scope and properties, allowing for the development of High Level Theoretical codes which reflect these shared concepts.	Developed Theoretical Codes related to this Indicator refined as Control Terms using comma separated list : Developed Theoretical Codes related to the High Level Theoretical Code	Explanation of High Level Theoretical Code: A narrative of the High Level Theoretical Code, explaining the conceptualised issue, process or activity as wider concept explaining motivations, goals, strategies etc.
High Level Theoretical Code assimilated/ grouped derived from Developed Theoretical Codes (and commonly occurring Properties)	**Developed Theoretical Codes related to this Indicator refined as Control Terms using comma separated list**	**Explanation of High Level Theoretical Code**
Transitional Physicalisation of Online Learning	Transitional Physicalisation of Online Learning	Most students exhibit some level of transitional or traditional approaches to study, the most evident aspect of this behaviour is the heavy reliance on printed media amongst some students, other characteristics include avoidance of wider e-resource/database engagement or poor engagement within group work or associated electronic/VLE communication tools. Students may also have anxieties regarding management or storage of digital media and may rely on printed textbooks. Students may also either avoid the VLE where there are options to work around this platform or minimise usage. Students who exhibit these kind of tendencies could be considered

Figure 34: Visual Characteristics of 'Worksheet 6 - High Level Theoretical Codes (Categories) '

Note - Sample data is shown in Appendix 10, Table 7.

x. Worksheet 7 Key Theoretical Sensitivity from the Literature

Theoretical Sensitivity refers to the use of theoretical insights found principally in the on-going Literature Review or related sources used to inform the development of early stage Theoretical Codes via 'Theory Bits'. Whilst Theoretical Codes developed from Theoretical Sensitivity should not be used to pre-empt or lead interviews,

Codes derived in part from Theoretical Sensitivity can be validated at the interview stage by comparing responses/Memo Code indicators with existing Descriptive or Theoretical Codes.

Notes on fields used in this worksheet:

- Explanation: Properties/ narrative of the Theory Bit, explaining the conceptualised issue, process or activity.
- Citation: Citation to the article, conference proceedings or other source where the Theory Bit was located.
- Full Reference: Full Bibliographic Reference to the article, conference proceedings or other source where the Theory Bit was located.

The following figure provides a structural overview of this worksheet:

A	B	C	D
Key Theoretical Sensitivity from the Literature	**About this sheet:**	Theoretical Sensitivity refers to the use of theoretical insights found principally in the on-going Literature Review or related sources used to inform the development of early stage Theoretical Codes via 'Theory Bits'. Whilst Theoretical Codes developed from Theoretical Sensitivity should not be used to pre-empt or lead interviews, Codes derived in part from Theoretical Sensitivity can be validated at the interview stage by comparing responses/Memo Code indicators with existing Descriptive or Theoretical Codes.	
Notes			
Theory Bits derived from Literature: Theoretical Sensitivity is not used to pre-empt Selective Coding for the practical interviews, but can be used to develop any level of Theoretical Code by evaluating these 'Theory Bits' alongside similar insights derived from the interviews, in this way, material from the Literature has the same status	Explanation: Properties/ narrative of the Theory Bit, explaining the conceptualised issue, process or activity	Citation: Citation to the article, conference proceedings or other source where the Theory Bit was located	Full Reference: Full Bibliographic Reference to the article, conference proceedings or other source where the Theory Bit was located
Theory Bits derived from Literature	**Explanation**	**Citation**	**Full Reference**
Blended learning (for detailed overview see Theoretical Sensitivity worksheet)	"Online learning has its drawbacks. One of the main disadvantages is the lack of social interaction which is taken as given in conventional settings. This creates a special need to motivate the less independent student ...The need for a compromise	Heinze and Procter	Heinze, A., & Procter, C. T. (2004). Reflections on the use of blended learning.

Figure 35: Visual Characteristics of 'Worksheet 7 - Key Theoretical Sensitivity from the Literature'

Note - Sample data is shown in Appendix 10, Table 8.

xi. Worksheet 9 Core Category

This worksheet represents the processing of High Level Theoretical Codes into Core Codes or 'Categories' with broadly shared conceptual traits - this is achieved by appraising High Level Theoretical Codes and their commonly occurring Properties. Additional aggregated/ categorised properties may emerge when considering properties aggregated from merged Codes. The Core Category is an attempt to conceptually explain the wider issue, process or activity central to the participant group. This category should also have universal appeal and relevance as a grounded theory narrative beyond the particular participant group to explain broadly similar motivations, strategies or goals sought amongst any sector, industry or social group.

Notes on fields used in this worksheet:

- Core Category assimilated/ grouped based on Developed (High Level) Theoretical Categories: The High Level Theoretical Codes are examined according to their common scope and properties, allowing for the development of a single Core Category reflecting all these shared concepts.
- Principal Developed (High Level) Categories related to this Category: Codes related to the Category.
- Explanation of this Category: A narrative of the Category explaining the conceptualised issue, process or activity as wider concept explaining

motivations, goals or strategies, including scope for application beyond the Participant Group.

The following figure provides a structural overview of this worksheet (note – the following table illustrates the structure of the spreadsheet only to demonstrate the management of data):

Core Category	This sheet represents the processing of High Level Theoretical Codes into Core Codes or 'Categories' with broadly shared conceptual traits – this is achieved by appraising High Level Theoretical Codes and their commonly occurring Properties. Additional aggregated/ categorised properties may emerge when considering properties aggregated from merged Codes. There are two stages for the development of the Core Category including the Tentative Core Category (the result of the pilot phase practical study) and the single, over-arching Core Category itself (the result of all aggregated data, including the pilot phase). The Core Category is an attempt to conceptually explain the wider issue, process or activity central to the participant group, this category should also have universal appeal and relevance as a grounded theory narrative beyond the particular participant group to explain broadly similar motivations, strategies or goals sought amongst any sector, industry or social group.	
Notes		
Core Category assimilated/ grouped based on Developed (High Level) Theoretical Categories: The High Level Theoretical Codes are examined according to their common scope and properties, allowing for the development of a single Core Category reflecting all these shared concepts.	Principal Developed (High Level) Categories related to this Category: Codes related to the Category	Explanation of this Category: A narrative of the Category explaining the conceptualised issue, process or activity as wider concept explaining motivations, goals, strategies etc., including scope for application beyond the Participant Group
Core Category assimilated/ grouped based on Developed (High Level) Theoretical	**Principal Developed (High Level) Categories related to this Category**	**Explanation of this Category**
Improvised Learning	Transitional Physicalisation of Online Learning; Motivational adaption and improvisation via Online Learning; Navigating diverse platforms, equipment, locations	Improvisation concerns strategies to access on-demand support, resource location or learning needs such as use of support networks within the social or family sphere, exploitation of University or other local services such as local libraries or improvisation such as use of WWW search engines to locate e-resources or supplement formal databases for literature searching. Exploitation and innovation emerged as a highly important strategy and process for literature searching due to perceived

Figure 36: Visual Characteristics of 'Worksheet 9 - Core Category'

Note - Sample data is shown in Appendix 10, Table 9.

xii. Sorting Templates via Microsoft Office Drag and Drop Functionality

The sorting process was carried out using a template created via Microsoft Word using the "text box" feature; this approach approximated virtual paper cards for sorting codes into categories. In practice, the proposed use of colour-coded

indicators to display frequency distribution was not used as shown below, however some sorting tables do display frequency distribution (share of occurrence across all incidents), e.g. Memo Indicator (Control Terms) sorted to create Substantive (Descriptive) Codes. The text box asset can be configured to display in front of other objects on the page, so can be dragged and dropped to any location; they can also be layered over other objects or other text boxes, in practice this attribute was useful to layer the text boxes over a table structure, thus allowing for virtual card sorting:

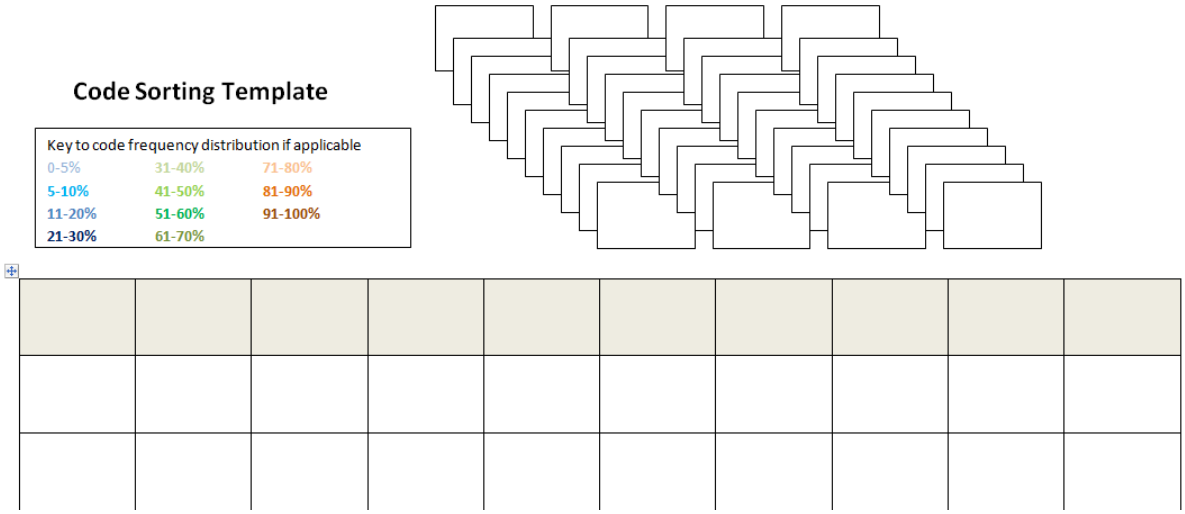


Figure 37: Sorting Templates via Microsoft Office Drag and Drop Functionality

Example Sorting Development Stages

In the example below we can see an early stage in the sorting of the Control Term-based memo indicators, the “cards” must be right-clicked in Word, then text can be added within the frame, the text box can then be dragged and placed on-screen at any location, additionally, the boxes can be re-sized to accommodate slightly larger labels:

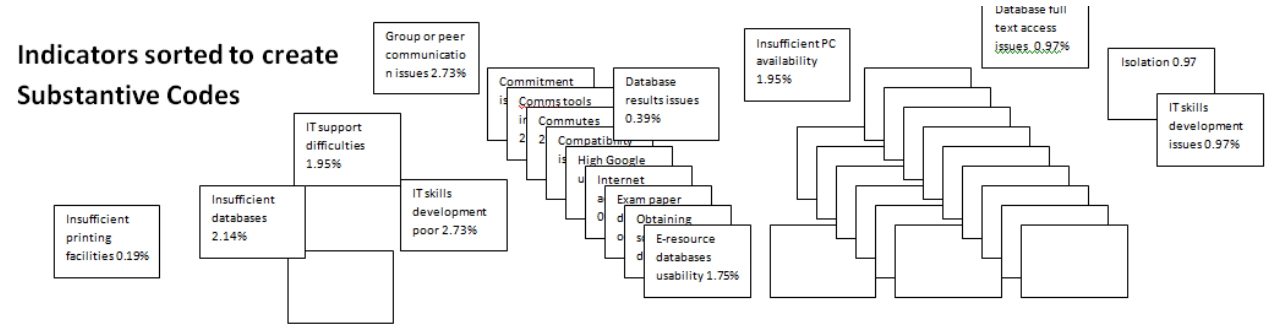


Figure 38: Early Sorting Development

In this later stage of sorting we can see a wider array of completed “cards” for sorting:

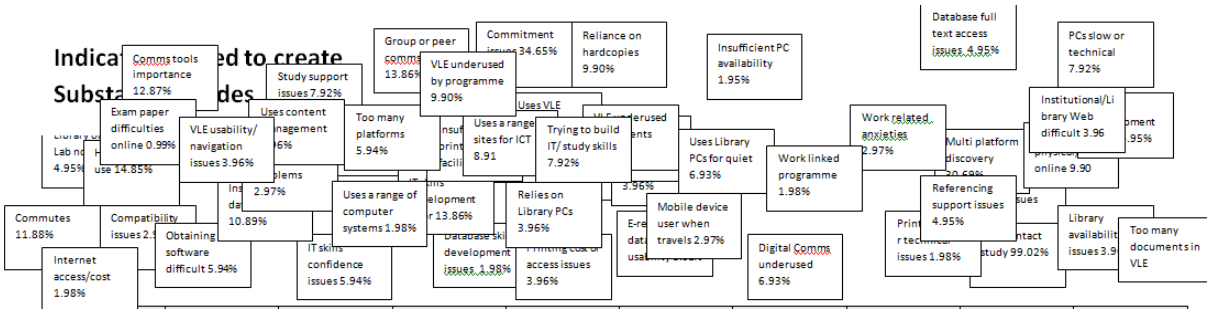
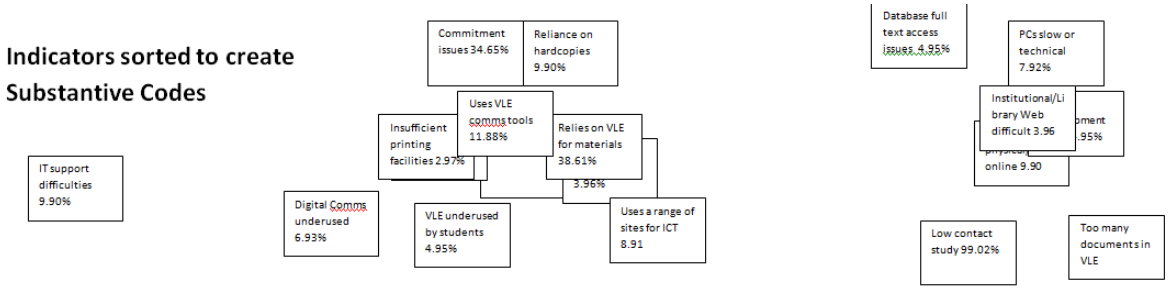


Figure 39: Later Stage Sorting Development

By the following stage, the table headers have been populated with proposed category names/codes and a title has been added (also using a floating text box to position the title appropriately on the page); the text box “cards” can now be sorted and re-assembled as required, providing a usable facility to re-work sorting later if required. The availability of a blank area at the top of the page provides a location to store “cards” as they are being sorted or considered:



Remote Working	Skills	Resource Discovery	Material and Resourcing	Technical Challenges	Approaches to Study and Research	Online/ Blended Learning	Environmental	Personal/ Vocational	
	IT skills confidence issues 5.94%	Insufficient databases 10.89%	Internet access/cost 1.98%	Compatibility issues 2.97%	High Google use 14.85%	VLE usability/ navigation issues 3.96%	Library or IT Lab noise 4.95%	Work related anxieties 2.97%	
Commutes 11.88%	Database skills development issues 1.98%	Too many platforms 5.94%	Obtaining software difficult 5.94%	Technical problems 2.97%	Trying to build IT/ study skills 7.92%	Study support issues 7.92%		Uses Library PCs for quiet study 6.93%	
Mobile device user when travels 2.97%	IT training service poor 13.86%	E-resource databases usability 8.91%	Exam paper difficulties online 0.99%	Printer/scanner technical issues 1.98%	Uses content management skills 3.96%	VLE underused by programme 9.90%		Work linked programme 1.98%	
Uses a range of computer systems 1.98%	Referencing support issues 4.95%	Multi platform discovery 30.69%	Insufficient PC availability 1.95%		Relies on Library PCs 3.96%	Group or peer comms issues 13.86%			
Comms tools importance 12.87%		Multi platform login issues 4.95%	Printing cost or access issues 3.96%						

Figure 40: Advanced Stage Sorting Development

In the following stage, the “cards” have all been sorted, producing a graphical representation of the new categories, this structure can of course be modified or re-sorted at any time if required; additionally, the category names can be modified. One drawback of this approach is its linearity, requiring a “card” to be allocated to a particular category, i.e. if a “card” is felt to belong to more than one category. However a duplicate can be created by selecting, then copying the text box:

Indicators sorted to create Substantive Codes

Remote Working Characteristics	Skills challenges (Skills problems and concerns raised)	Resource Discovery challenges	Material and Resourcing (Resourcing problems reported)	Technical Challenges (Technical Problems reported)	Study and Research Approaches	Study and Research Challenges	Environmental	Personal/ Vocational
Uses a range of sites for ICT 8.91	IT skills confidence issues 5.94%	Insufficient databases 10.89%	Internet access/cost 1.98%	Compatibility issues 2.97%	High Google use 14.85%	VLE usability/ navigation issues 3.96%	Library or IT Lab noise 4.95%	Work related anxieties 2.97%
Commutes 11.88%	Database skills development issues 1.98%	Too many platforms 5.94%	Obtaining software difficult 5.94%	Technical problems 2.97%	Trying to build IT/ study skills 7.92%	Study support issues 7.92%		Uses Library PCs for quiet study 6.93%
Mobile device user when travels 2.97%	IT training service poor 13.86%	E-resource databases usability 8.91%	Exam paper difficulties online 0.99%	Printer/scanner technical issues 1.98%	Uses content management skills 3.96%	VLE underused by programme 9.90%		Work linked programme 1.98%
Uses a range of computer systems 1.98%	Referencing support issues 4.95%	Multi platform login issues 4.95%	Insufficient PC availability 1.95%	PCs slow or technical issues 7.92%	Relies on Library PCs 3.96%	Group or peer comms issues 13.86%		Commitments issues 34.65%
Comms tools importance 12.87%	IT skills development issues 4.95%	WWW search results issues 3.96%	Printing cost or access issues 3.96%	IT support difficulties 9.90%	Relies on VLE for materials 38.61%	Low contact study 99.02%		
Uses VLE comms tools 11.88%		Database results issues 1.98%	Library availability issues 3.96%		Reliance on hardcopies 9.90%	Too many documents in VLE		
Isolation 4.95%		Institutional/Library Web difficult 3.96	Insufficient printing facilities 2.97%			Digital Comms underused 6.93%		
Mixed physical/ online 9.90		Database full text access issues 4.95%				VLE underused by students 4.95%		
		Requires multi platform use 30.69%						

Figure 41: Final Stage Sorting Development

Note - The full sorting tables are shown in Appendix 14.

xiii. Use of Office Relationships Hierarchies Tool for Visual Representations

Whilst the sorting tables described above provided a means to virtually sort Codes into Categories and provided a flexible and adaptable model for all sorting activities, it was felt the practical research outputs could be visualised more effectively using a hierarchical representation application. A number of applications were explored, including Mind Genius (mind mapping application). These applications did not however provide the kind of simple and illustrative hierarchies sought. Finally the

solution presented itself in the form of the Microsoft Office “hierarchies” feature which can be constructed in most Office applications such as Microsoft Word, providing a flexible and expansive tool for development of hierarchies (accessible in Office 2010 from the “Insert > Smart Art > Hierarchy” option):

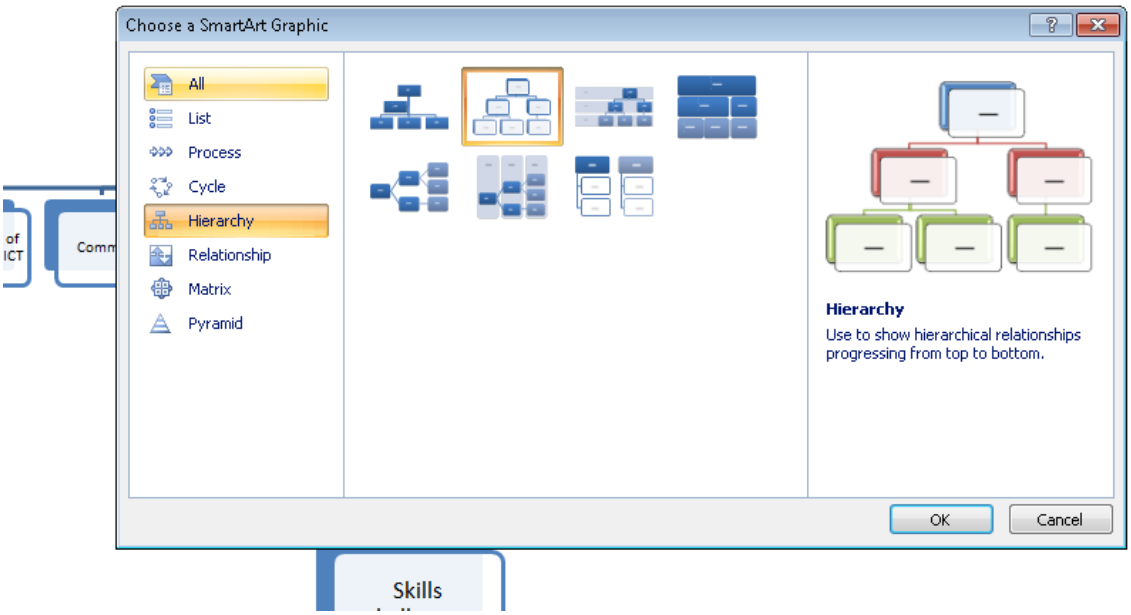


Figure 42: Example Hierarchy Visualisation Features

Hierarchies allow for either visual editing using the hierarchy cells shown on-screen:

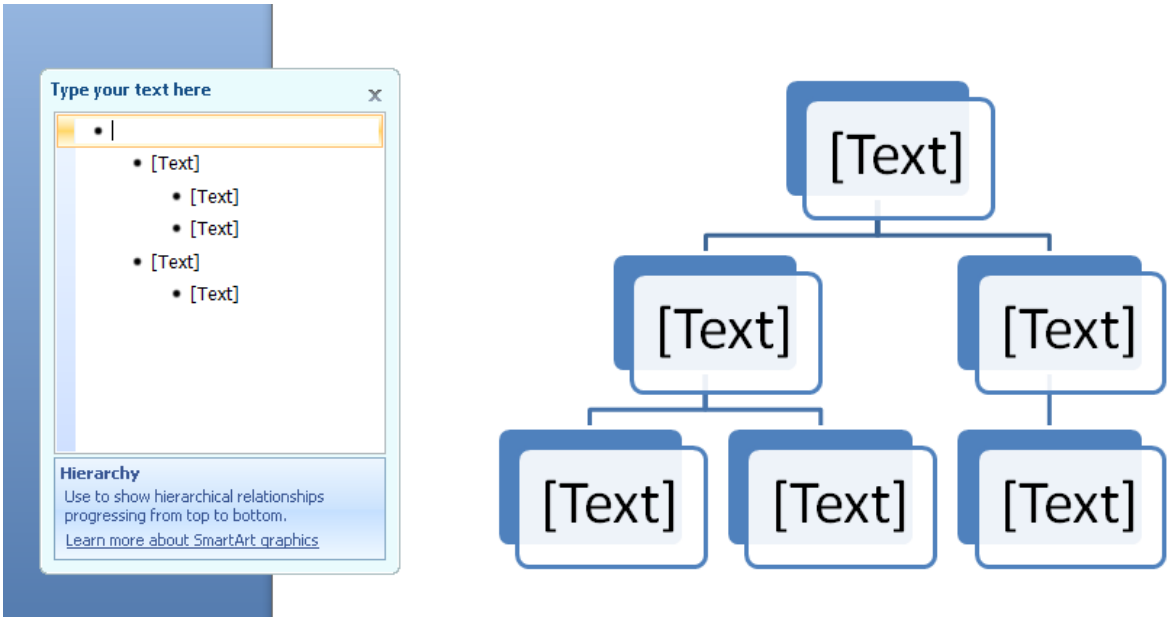


Figure 43: Hierarchy Cells Demonstrating Editing Mode and Resulting Structure

The hierarchy can also be edited using a structure called the “Text Pane” (accessed by clicking the “Text Pane” option when viewing the “Design” ribbon tab:

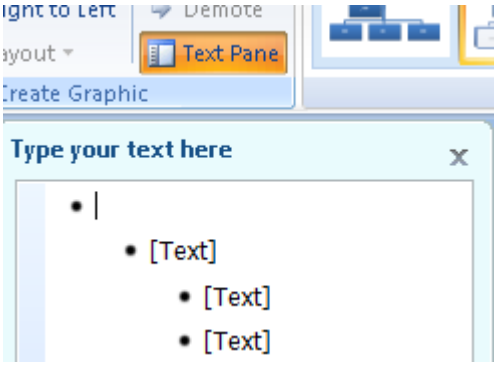


Figure 44: using the Text Pane for Editing Hierarchies

In the example below a few examples are shown in a single level hierarchy. This is represented in the Text Pane by a top level bulleted item, followed by a series of sub-bullet items; the graphical visualisation updates the screen display as text is added; the keyboard tab key or tools provided in the Text Pane can be used to indent (downgrade) or un-indent (upgrade) an item to a lower or higher level:

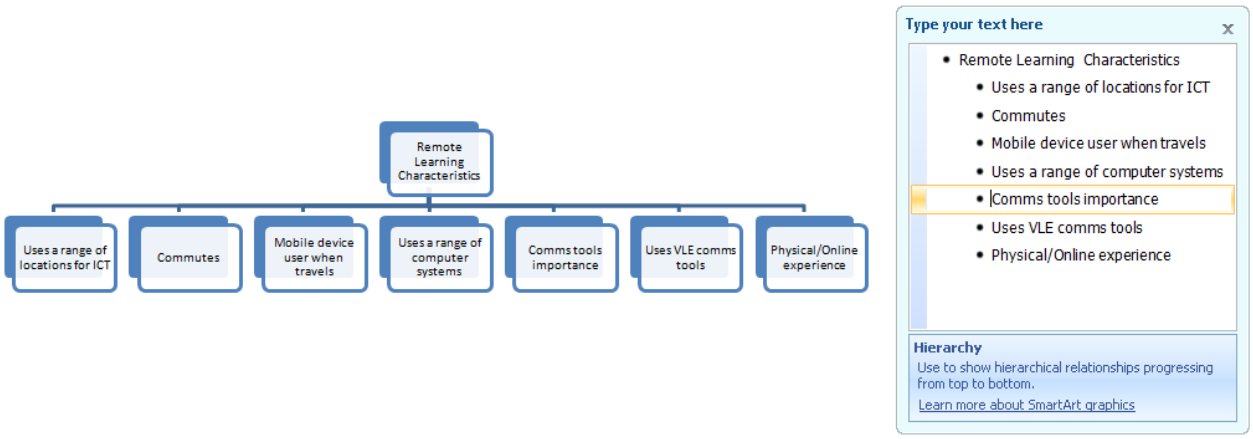


Figure 45: Full Preview of a Hierarchy

The example below illustrates a more complex example with multiple sub-levels represented in the Text Pane, these are replicated in the graphical display as a deeper hierarchy:

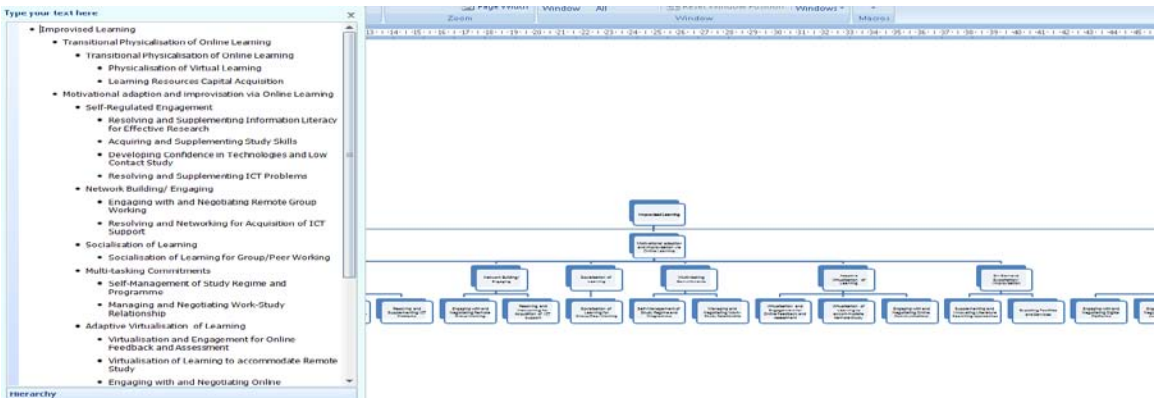


Figure 46: A Complex Hierarchy

Occasionally, other Microsoft derived Chart tools are used for later visualisation in the thesis, for example the Venn diagram features in Office provide a means to visually represent relationships between entities:

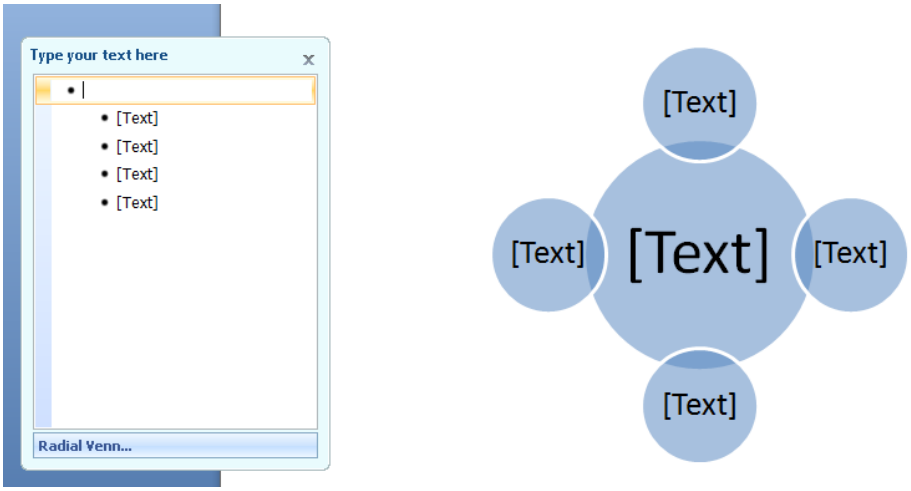


Figure 47: Venn Diagram with Text Pane

Part 11: Concluding Statement

This chapter has outlined the process for the development of the research design, from the inception of the study in an early research proposal and presentation of the proposal during a Grounded Theory seminar in London with the co-originator of the methodology, Barney Glaser, to planning and implementation of a pilot stage study for generation of early descriptive and theoretical codes cumulating in a tentative Core Category. This early Core Category and its properties or dependant theoretical codes provided early data for later assimilation within the larger body of data during and following the full phase stage of the research, the process of assimilation, including use of Grounded Theory techniques such as comparison and verification has also been outlined, demonstrating how emergent theoretical codes contributed to the data obtained during the full phase stage of the study. The chapter has also

appraised the approaches developed for data coding and analysis from a practical perspective, outlining methods for sorting, comparison and category generation to define high level theoretical codes. Tools and approaches such as the use of sorting tables generated with Microsoft Office and the Excel workbook structure for early direct refinement of indicators can be seen to have been effective in assimilating pilot and full stage data. The emergence of the tentative Core Category via the pilot study provided a descriptive model for a potential core or unified code explaining participant concerns or process they are continually trying to resolve, this was defined as ‘Self-led multi-systems traversing’, emphasising the diverse range of systems, applications and Web-based platforms used across a range of educational and support functions. The context and significance of the emergent, tentative Core Category arising from the pilot study will be discussed further in the following chapter.

CHAPTER 4 (a): PRESENTATION OF THE EMERGENT THEORY

Part 1: Introductory Statement

This chapter outlines the emergent categories or codes arising from the practical research phase, initially considering the generation of early substantive descriptive categories which informed the development of theoretical insight (Theory Bits) which in turn were refined, compared and ultimately allowed for the generation of higher level theoretical codes to explain participant concerns. The chapter also explains the relevance of the inductive approach derived from the methodology in the development of the theoretical codes. Visual and hierarchical figures are used across the chapter to illustrate the interchangability of lower level codes i.e. contribution to High Level Theoretical Codes which explain high level conceptual insight into participant concerns.

The chapter also provides visuals/ figures illustrating the dependence of lower level theoretical codes informing High Level Theoretical Codes which aggregate or categorise lower level codes.

The repeated inclusion of similar or identical code terminology or labels for different codes, at differing levels often illustrates a cascadence or inheritance of code properties within higher level codes, where a High Level Theoretical Code has effectively aggregated with a range of lower level codes and retained an inherited label to indicate the most prolific, unifying conceptual code property.
The emergent Core Category, a code which can be shown to encompass all other codes and their properties is briefly discussed in relation to emergent theoretical codes.

Note – emergent theoretical perspectives or explanation for participant concerns, behaviours or strategies were generated via highly structured approaches of sorting, cross-comparison and other techniques as outlined in the previous research design chapter. For the purposes of the present study, these techniques were implemented in an operational manner via the use of tabular and other formalised sorting forms, it should be observed that the use of tabular figures is therefore sometimes used in the presentation of emergent Descriptive and Theoretical Codes, to most effectively convey groups of related codes and their properties, including tabular headings where these impart essential information regarding the tabular arrangement for codes and their properties. However, tables are sometimes supplemented by less formalised textual narrative, particularly where tabular series or lists rely less on tabular headings, or where less complex or extensive codes are discussed.

Part 2: Open Coding to Generate Substantive Categories

i. Categorisation of Memo Indicators for Early Indicators/ Control Terms

As has been mentioned in previous sections, Memo comments were inputted into a revised Excel-based workbook structure, with annotated participant comments informing translation into Descriptive Indicators. The development of these Descriptive Indictors comprised an initial Open Coding stage closely reflecting the Substantive Coding method described by Barney Glaser: “...pick a memo. ...Then pick another memo and see by comparing it how it is related to the first one picked. Upon comparison they will relate empirically in some fashion like the substantive area is integrated.” (Glaser, 1998, p.189). However in this case, the researcher used

the Excel workbook structure (see Appendix 10: Table 1) to digitally sort the comments into initial Open Codes (Descriptive Code Indicators).

Each comment was allocated a tentative descriptive Indicator directly within the worksheet as a means of Open Coding. In the example below we can see an example comment translated into an initial Descriptive Code (Indicator), alongside the code properties describing this code in detail:

Comment ID	Session ID	Group or Person Description	Comment (summarised)	Descriptive Code (Indicator) (refined as Control Term)	Descriptive Code Properties (comma separated list)
269	49	BN Nursing (FP)	Part time nurse practitioner, studies around 8 hours per week, in class around 4 hours per week.	Low Contact Study	Generally under ten hours contact with class per week, Sense of isolation from the institution including tutors and peer students, feeling of self-reliance and less scope for obtaining support, lack of social interaction and socialisation with peers or staff

Table 6: Example Comment Data - Derived from 'Worksheet 1: Memo Data including Descriptive (Indicator) Codes (Categories)

Within this sorting process, new Indicators were compared with existing Descriptive Code Indicators and modified or deleted as appropriate. In contrast to hardcopy sorting, this systemised approach provided a virtualised implementation of Glaser's method for Open Coding whilst allowing for generation of computer-readable Control Terms rather than sorting for visual or graphical impact. This approach also provided an opportunity to assimilate the pilot and full phase data for unified category

creation. It should be noted that sorting for higher level categories would be achieved via Microsoft Word-based sorting tables rather than direct sorting in the workbook; another use of direct workbook sorting included sorting approximately 180 Theory Bits into standardised Control Terms - also see Chapter 4 (a): Presentation Of The Emergent Theory, Part 3: Early Theoretical Codes.

There were two reasons for generating the Descriptive Code Indicators in this way:

1. It was felt that the Memo comments were difficult to process in the graphical sorting table designed for the analysis (see Appendix 14) this was due to having around 500 distinct comments, hence the use of the Excel workbook structure proved a more efficient method for initial Open Coding to generate Descriptive Code Indicators as Control Terms.
2. The sorting of Memo comments into Descriptive Code Indicators – categorised and listed in Excel would allow for a systemized use of data as ‘Control Terms’; this would allow for statistical reporting via Excel Formulae to display frequency and frequency distribution (percentage share) of Indicators across the entire body of interview sessions (i.e. how many times a particular Control Term occurred across all interview sessions - including group and individual sessions). This feature would provide a useful tool for assessing the importance of Descriptive Categories in a weighted context.
3. Similar reasons are given for the systemised sorting of Theory Bits as Control Terms as mentioned above.

Evidence for emergent development of the Descriptive Code Indicators is demonstrated in the following list of redundant/ removed Control Terms/Indicators (including justification for removal from the taxonomy/Control Terms list):

- ‘Blended E-Learning’ - deprecated in favour of 'Mixed online and oncampus experience'.
- ‘Insufficient referencing support’ - deprecated in favour of 'Referencing support problems'.
- ‘Lack of internet access at home causes problems’ - deprecated in favour of 'Internet access or cost issues'.
- ‘Mixed online and oncampus experience’ - deprecated for 'Mixed physical-online resource use'.
- ‘Peer motivation issues’ - deprecated for 'VLE under-used by other students'.
- ‘Potential funding issues causing study stress’ - deprecated in favour of 'Work related worries such as fee contribution'.
- ‘Prefer personal choice of platforms rather than Institutional systems’ - deprecated for 'Multi-platform/ Internet resource discovery'.
- ‘Studying externally via VLE’ - deprecated in favour of 'Relies on VLE mostly for course materials'.
- ‘Use of shared documentation e.g. Wikis’ - deprecated for 'Communication tools e.g. email or social networks important to study’.

In total there were 512 memo comments across 101 distinct interview sessions, the above Open Coding process generated 54 Descriptive Code Indicators. It was possible to filter all dependant Memo comments sorted under a particular Descriptive

Code Indicator, this is possible due to the precise Control Term provided for the Code and via use of the ‘Text’ Filter tool applied to the Descriptive Code header in the Excel workbook, e.g.:

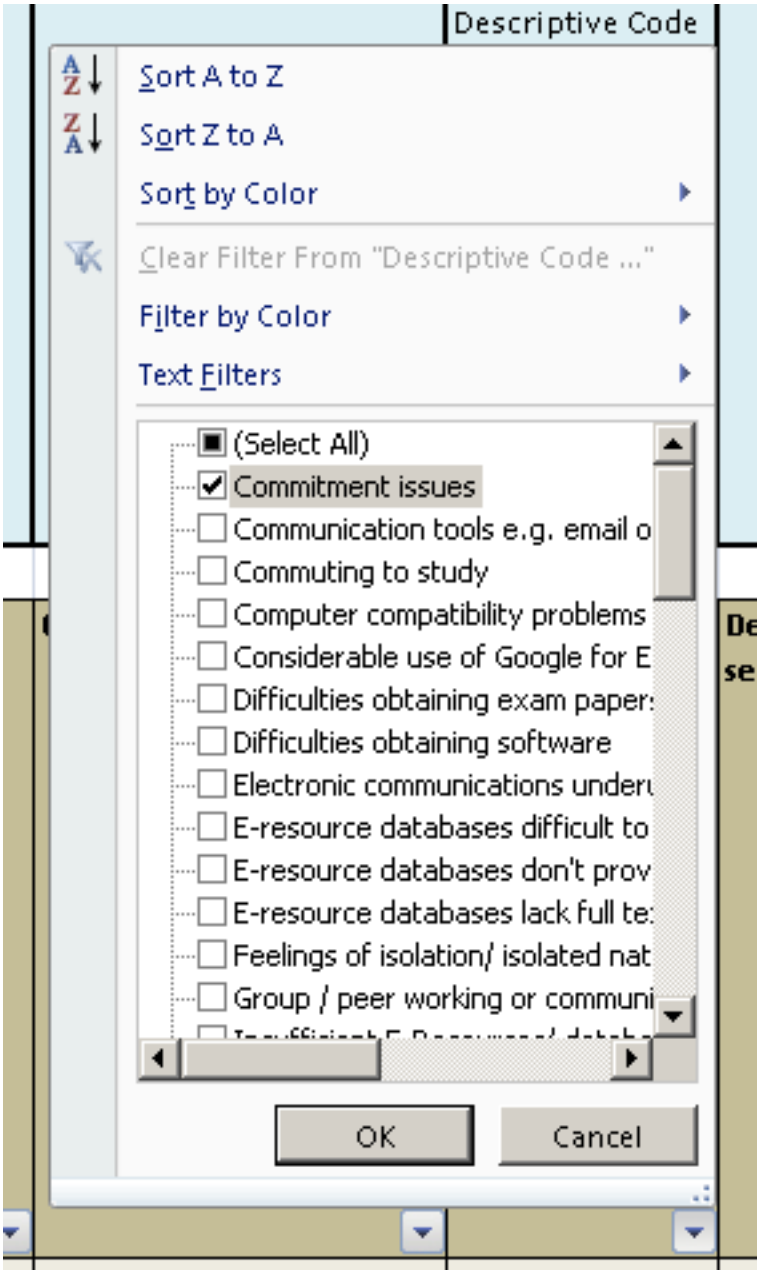


Figure 48: Filtering all dependant Memo comments (Example shown is 'Commitment Issues')

The following example demonstrates the use of standardised Control Term values and the Excel Filter tool to visualise all dependant Memo comments comprising the Descriptive Code Indicator “Commitment Issues”. The properties of this Control Term were:

> “Childcare, elderly care, work commitments, travel commitments, personal responsibilities.”

There was a frequency of 35 instances of this Control Term/Descriptive Code across all interviews, comprising a 34.65% average frequency distribution rate across all interview sessions, i.e. the Code occurred in 34.65% of the interview sessions:

Group or Person Description	**Comment (summarised)**
FDSc Health & Safety (P)	Undergraduate foundation student studying part time, busy work-life balance with some home working around 7 hours personal study per week
BSc Health & Safety (P)	Time consuming nature of study, juggling personal commitments
BSc Health & Safety (P)	Primary issue expressed was managing busy family life or children with study
MA Humanities (P)	Family life issues, also works part time
MSc Environment (P)	Students reported busy schedules, family life commitments and need to balance these needs
MSc Environment (P G 5)	Difficulties attending classes due to personal commitments, difficulties attending group sessions
MA Public Sector (P)	Has childcare and other family commitments
MA Literature (P)	Busy schedule, family commitments, balance of work, home and study
MA Literature (P)	Main constraint expressed was time management to deal with busy schedule
CIMA Diploma (P)	Described pressure to obtain qualification for career progression, need to learn new skills to do this but overall a positive experience
CIMA Diploma (P)	Mainly studies from home, but difficulties with family commitments and disruption, need to set aside time to study.
MSc Adv. Clinical Nursing (P)	Family, work and study balance an issue, worked in a demanding clinical role outside study
MSc Adv. Clinical Nursing (P)	Expressed heavy workload issues in contrast to personal work commitments
MSc Adv. Clinical Nursing (P)	Issues balancing family life and study including child care and elderly care.
MBA Business Admin. (P)	Discussed work/life issues in managing the study
MBA Business Admin. (P)	Busy family life main issue when studying
MBA Business Admin. (P)	Some family commitments can make it difficult to balance personal needs and study
CIPD (FP)	More pressure due to personal and work commitments
CIPD (FP)	Has a demanding schedule which can impact study unsure if will complete the programme due to workload issues
PGCE Cert Ed (FP)	Works in a full time role in post statutory education can be difficult getting time off work
FdSc Electrical Eng. (FP)	Some difficulties attending group sessions due to work commitments

BSc Health & Safety (FP)	Balances personal, work and study life, can present difficulties regarding child care
BN Nursing (FP)	Some personal commitments can make attending class difficult
BN Nursing (FP)	Personal family commitments, can make group work difficult
MA Business (FP)	Some personal issues can make it difficult to study
BSc Built Environment (FP)	Some personal issues accessing classes/ work/study balance
BSc Computing (FP)	Some family commitments conflict with study regime email
Nurse Prescribing (FP)	Busy professional life can be a challenge to accommodate study, works from home or work as far as possible
Occupational Therapy (FP)	Fairly busy schedule with family/work balance required, often need to cram study in work time due to family commitments
Post Registration Nursing (FP)	Juggling family and demanding work commitments
NEBOSH (Health & Safety) (FP)	Difficult to interact with the other students due to work issues, family pressures
BSc Sports Science (FP)	Family commitments can make study demanding
BA Childhood Studies (FP)	Can be difficult travelling to University for seminars due to family and work constrains
Supplementary Prescribing (FP)	Work and personal demands can conflict with studies e.g. childcare
BA Social Work (FP)	Some issues due to demanding nature of work and need to get assignments in on time

Table 7: Using the Excel Filter tool to Visualise Dependant Memo Comments Comprising the Descriptive Code Indicator “Commitment Issues”

The dependant variables (Memo Comments) are shown below for the Descriptive Code: “Multi-platform/ Internet resource discovery”, with properties as follows:

> “May use Library databases such as Swetswise or other recommended platforms/portals such as BIDS or BiZED, may use open Internet sources such as PubMED or the Internet Information Archive, may use open source journals such as the Social Sciences Research Network, may use a variety of Library systems such as catalogue or inter library request Web site, may use a variety of VLE tools and features such as discussions or group tools, may also use WWW search engines and portals to locate information”.

There was a frequency of 31 instances of this Control Term/Descriptive Code across all interviews, comprising a 30.69% average frequency distribution rate across all

interview sessions, i.e. the Code occurred in 30.69% of the interview sessions. In the example below we can see all comments within the early Descriptive Code 'Multi-platform/ Internet resource discovery':

Group or Person Description	Comment (summarised)
FDSc Health & Safety	Used health and safety related databases and Google based searching
BSc Health & Safety	Comfortable using the VLE including links to ebooks, but used own email, also used Google to locate other resources
BSc Health & Safety	Complained had been asked to use NEWI email and Library databases but was unfamiliar with these facilities, preferred to use own email
MA Public Sector	Used electronic information sources but also uses Google
MA Public Sector	Uses a variety of software applications and platforms, less confident using the VLE
MA Literature	Does not use the VLE but uses a range of IT services and applications including Institutional email, some Library databases, WWW sources, including WWW portals to information and the Library Catalogue
MSc Adv. Clinical Nursing	Would prefer to rely on books, developing skills and confidence for electronic platforms
MBA Business Admin.	Uses the VLE to access library links/ WWW papers.
MBA Business Admin.	Discussed using a range of platforms such as Blackboard, Swetswise, Emerald, Intute and paper/article uploads within the VLE without any problem, expressing the importance of these sources for writing course work and the dissertation
CIMA Intermediate	Uses VLE and mainly WWW/ Google to obtain information sources
CIMA Intermediate	Uses email, VLE and has used some Library platforms/Web pages/ suggested portals
PGCE Cert Ed	Internet (Google) is important for accessing information sources, including wide range of Web sites/government agencies and standards bodies.
FdSc Electrical Eng.	Accesses some Library recommended Web portals
BSc Health & Safety	Some links are provided in the VLE but often needs to visit the Library, navigate to the database and search this separately, sometimes being directed to additional 3rd party databases, Web sites or legislation
BA Criminal Justice	Some use of email, library portals and journals for social sciences linked in Blackboard
BN Nursing	Uses mainly government and freely accessible NHS/health sources, census and local government sources, ONS and some major portals
BA Humanities	Uses some Web portals, key English Literature Web sites and hardcopy resources
BSc Built Environment	Prefers to use WWW sources due to travel involved in using the Library has founds some good WWW portals for built environment and links from Blackboard
BSc Built Environment	Often follows recommended links to Web sites/portals from Blackboard, uses the Library Catalogue to locate physical items
BSc Computing	Overall very comfortable using Blackboard and WWW resources
HND Business	Generally comfortable using Blackboard, also use a local Library and online portals such as BizEd, Informs; uses Yahoo online favourites to store commonly used links
NEBOSH (Health & Safety)	Mainly refer to online sources, legislation, the Stationary Office publications, government parliamentary papers and Health and Safety Executive Web pages, some content is available in Blackboard
NEBOSH (Health & Safety)	Reasonably confident using the Web site, Blackboard, email and online information sources, prefer to use these rather than books to work from home/place of work
NEBOSH (Health & Safety)	Comfortable with course work, Blackboard, would like to see materials posted online
NEBOSH (Health & Safety)	Have not used Blackboard very extensively, use the course handbook and HSE guides and WWW sources
MA Human Resources	Most course materials on Blackboard with links to electronic reading materials, WWW pages and links to the Library, however sometimes visit the Library pages to access additional databases.

BA Social Work	Use government sources, legislation and physical Library materials. Also finds Web portals such as SOSIG and Intute helpful
BA Social Work	Use Blackboard and a number of different databases and platforms. Also use Inter-Library lending services provided by the Library occasionally. Accesses hardcopy journals taken by the Library
BA Criminal Justice	Uses Blackboard for course notes, presentations, discussions, also uses a variety of Web sites, government department pages, legislation, professional body sites.
BSc Electrical Eng.	Uses a number of sources for study including national standards Web sites, ISO, British standards Web site, will often visit these outside the Library
MA Education	Accesses a range of government and public sector Web sites and portals such as ERIC and open access journal sites such as Social Sciences Research Network

Table 8: Using the Excel Filter tool to Visualise Dependant Memo Comments Comprising the Descriptive Code Indicator “Multi-platform/ Internet resource discovery”

The following table illustrates all 54 descriptive codes derived from the memos translated into Control Terms, listed by order of frequency. Components of the table include:

- Memo Descriptive Code (Indicator) Translated into Control Term: this represents a Control Term applied to Memo items to standardise the memo comment for sorting within the Excel workbook.
- Memo Descriptive Code (Indicator) Properties (comma separated list): these represent the collective properties of the Control Term, derived from the range of properties associated with memo items comprising the resultant Control Term.
- Frequency of Control Terms used for Memo Descriptive Codes (Indicators): a simply frequency rate was obtained using Excel formulae to indicate how frequently the Control Term occurred across all sessions.

- Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators: the above as a percentage, indicating the frequency as a ratio across all sessions.
- Paraphrase for sorting: a shorter “Paraphrased” version of the Descriptive Code Indicator Control Term was also added for more efficient sorting.

Note (1) Frequency of Control Terms used for Memo Descriptive Codes (Indicators).

Note (2) Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators).

Memo Descriptive Code (Indicator) Translated into Control Term	**Memo Descriptive Code (Indicator) Properties (comma separated list)**	**(1)**	**(2)**	**Paraphrase for sorting**
Low Contact Study	Generally under ten hours contact with class per week, Sense of isolation from the institution including tutors and peer students, scope for obtaining support, lack of social interaction and socialisation with peers or staff feeling of self-reliance and less.	99	98.02%	Low contact study
Relies on VLE mostly for course materials	May use the VLE for obtaining course notes or syllabus information, may access video or other interactive resources in the VLE, may use the VLE learning object tools and assessments/quizzes, may use communication tools such as group sharing and discussion or core module discussion boards for class participation, may use the VLE to view grades, may access ebooks and other kinds of links to library database content or WWW links, may use the VLE informally to communicate with peers and tutors (internal email or messaging features), may use the VLE to access technical and study support.	39	38.61%	Relies on VLE for materials
Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities.	35	34.65%	Commitment issues

Multi-platform/ Internet resource discovery	May use Library databases such as Swetswise or other recommended platforms/portals such as BIDS or BiZED, may use open Internet sources such as PubMED or the Internet Information Archive, may use open source journals such as the Social Sciences Research Network, may use a variety of Library systems such as catalogue or inter library request Web site, may use a variety of VLE tools and features such as discussions or group tools, may also use WWW search engines and portals to locate information.	31	30.69%	Requires multi platform use
Considerable use of Google for E-Resources	Starting point is often Google or Google Scholar for library type e-resources, may search Google rather than bibliographic or Library platforms, attempt to locate full text e-resources via Google rather than seek help via Library systems or support.	15	14.85%	High Google use
IT skills support development not accessible	Student struggles with IT skills such as use of software or Web based platforms, Student finds training or incidental support is difficult to obtain either in person or via email, Course performance negatively impacted by lower IT skills.	14	13.86%	IT skills training access issues
Communication tools e.g. email or social networks important to study	Email, Social Network usage via Facebook or similar, use of course provided communication tools.	13	12.87%	Comms tools importance
Group / peer working or communication problems	Participation of group members may be a problem, May be issues related to travel or infrequent access to institution, Poor or low uptake of technologies such as email or VLE group tools, Lack of responsiveness of individuals to electronic communication.	13	12.87%	Group or peer comms issues
Commuting to study	Considerable distance between study location (usually over 10 miles), use of public or personal transport with associated costs, lack of local access to the institution.	12	11.88%	Commutes
Use of VLE communication tools	Student may use VLE discussion board, messaging tool, email forms to send conventional email from the VLE, interactive quiz or survey tools, group features such as a shared file area or discussion board.	12	11.88%	Uses VLE comms tools
Insufficient E-Resources/ databases	Subject or sector coverage not sufficient to provide full text or bibliographic information, existing databases may not be providing full text access easily, may be no specialist coverage for this subject area.	11	10.89%	Insufficient database
IT support difficulties	Student finds obtaining ad hoc support for incidental matters difficult, password issues often cited as a problem, support on weekends and evenings cited as poor due to closure or low staffing, waiting times cited as a problem by email and in person, lack of tutor or IT staff knowledge of some issues.	10	9.90%	IT support difficulties
Insufficient Library/IT Lab PC availability	PCs in Library or IT Labs used to capacity preventing access to a computer when required, insufficient PC booking facilities, PCs may be used in appropriately due to lack of policing or systems policy.	10	9.90%	Insufficient PC availability

Mixed physical-online resource use	Uses a variety of online tools and class or oncampus support, may use the VLE and associated tools, may also use print texts, may use hardcopy journals alongside e-resources and databases.	10	9.90 %	Physical/Online experience
Reliance on use of hardcopies	May rely on hardcopies due to lack of confidence or skills in managing digital documentation, may lack skills in sorting or storing documents online, may have difficulties or access problems viewing digital documents in applications such as Word, Acrobat, may be unfamiliar with features to view digital documents such as zoom or page view, may not be confident using document management applications or computer features such as My Documents in Windows.	10	9.90 %	Reliance on hardcopies
VLE under-used by programme	Student may consider the VLE does not contain enough course materials, student may prefer to access entire course materials via the VLE but find they have to use hardcopy materials in the Library or WWW sources, student may consider the tutor is not active enough on the VLE, in some cases the student may consider the VLE is not being used at all, the student may consider themselves at a disadvantage to students on programmes where the VLE is being more heavily used to assist with offcampus and part time study.	10	9.90 %	VLE underused by programme
E-resource databases difficult to use	Interface or navigation difficulties using library or recommended databases and bibliographic platforms, security issues such as additional passwords required, searching parser difficult to use or produces unwanted or irrelevant results.	9	8.91 %	E-resource databases usability
Use of computers across multiple sites	Student may use computers at work or home, student may use Library/ IT Lab PCs, student may use computing services when travelling such as internet cafes, computing facilities may be very different in each location including differences in terms of computer specifications and internet access and bandwidth speed or system reliability.	9	8.91 %	Uses a range of locations for ICT
Library or IT Lab PCs slow or have other problems	PCs slow starting, may crash or exhibit unresponsive behaviour, screen problems may be present such as dim monitor back light, PCs may not start at all, peripherals such as keyboard or mouse may be missing.	8	7.92 %	PCs slow or technical issues
Study support development not adequate	May be interacting with tutors on infrequent or low contact basis, may have limited time when attending the institution to raise issues with staff, may have little time to attend supplementary sessions provided on the programme or via other support departments within the institution, may feel awkward approaching support teams outside formal routine in case this suggests they lack academic skills, feeling that study support should be provided more centrally within the programme, desire to interact more with tutors, desire to develop personal skills in areas such as note taking and document management, feeling of self reliance in terms of skills development.	8	7.92 %	Study training /development issues

Working to develop IT and study skills due to use of VLE	Student may recognise need to develop personal skills in IT or study skills, student may be seeking to develop library or e-resource skills to utilise more current information beyond printed textbooks, student may be seeking to develop skills in use of the VLE to participate more actively in group work or use of course materials, student may wish to develop better information skills to search and assess useful materials on the WWW such as legislation or academic publications.	8	7.92 %	Trying to build IT/ study skills
Electronic communications underused for distance learning	Seeking to use tools or features such as Blackboard messaging without peer uptake, poor response to emails or messages, low uptake of programme led tools such as Blackboard discussions, low tutor interaction e.g. In non-office hours.	7	6.93 %	Digital Comms under-used
Use of Library computers due to need for quiet space	Student may experience disruptive or noisy environment at home, work environment may be unsuitable due to vocational or manual nature of work or due to busy office environment and working demands during office hours.	7	6.93 %	Uses Library PCs for quiet study
Difficulties obtaining software	Software cost may be an issue, lack of access to general wordprocessing or office applications such as Project or PowerPoint, may have a minimal personal license lacking certain components or functionality required, lack of awareness of discounts or free software available via IT Services.	6	5.94 %	Obtaining software difficult
Lack of confidence in IT skills	Lack of familiarity with digital learning platforms, inexperience with technology causing lack of confidence in study.	6	5.94 %	IT skills confidence issues
Use of too many databases and platforms	Student may feel they have to learn to use a diverse range of VLE and WWW sites and platforms to achieve their studies, students may feel materials should be provided in a more central location such as the VLE, students may be aware of the need to explore sources for research and may be uncomfortable exploring diverse Web sites and Library platforms, students may lack confidence in using library or WWW platforms due to lack of familiarity with search interfaces or other usability issues.	6	5.94 %	Too many platforms
E-resource databases lack full text access	Lack of easy access to full document in PDF or similar accessible format, may supply a bibliographic citation only with no obvious way to access document, may be required to use physical library services to access documents, may prompt for payment for texts.	5	4.95 %	Database full text access issues
Feelings of isolation/ isolated nature of study	Working mainly alone during programme, high occurrence of personal study at home or using IT facilities in the Library or IT Labs, Few class hours per week, lack of contact with other students, lack of social contact with class peers or wider student population.	5	4.95 %	Feelings of Isolation as a student

IT or study skills development challenges	Student may find development of skills in IT or study difficult, Student may consult the WWW or friends to gain information or workarounds, Finds it easier to develop skills independently rather than wait for support via email or in person, Finds self led approach to skills development essential due to inadequate support, specific support gap in certain areas such as use of VLE tools or software applications such as Statistics packages.	5	4.95 %	IT/study development issues
Library/IT Lab noise and disruption issues	Other students may be talking loudly in the Library or other areas such as IT Labs, Students may be talking in quiet study areas, there may be behavioural issues such or students may be playing games using PCs.	5	4.95 %	Library or IT Lab noise
Multiple platform sign-in problems	Problems logging into Library platforms such as the catalogue, problems logging into databases subscribed by the Library, problems logging into PCs, problems logging into multiple databases which require unique logins such as Emerald via Athens.	5	4.95 %	Multi platform login issues
Referencing support problems	May have problems using in-text citation, may have problems using appropriate referencing format for resource type, may have problems identifying referencing style need to use for programme, may have difficulties exporting references from the WWW or databases to course notes, may have difficulties with referencing plugins or software such as Refworks.	5	4.95 %	Referencing support issues
VLE under-used by other students	Students may be attempting to use communication or interactive tools such as email forms or messaging but finding other students are not engaged with these features, students may consider tutors are not engaging widely enough with communication tools, students may find they are unable to complete shared projects due to lack of engagement by other students may be attempting to use communication or interactive tools such as email forms or messaging but finding other students are not engaged with these features, students may consider tutors are not engaging widely enough with communication tools, students may find they are unable to complete shared projects due to lack of engagement by other students.	5	4.95 %	VLE under-used by students
Library opening/access issues	Library not open enough hours or on enough days, issues of opening during late evenings or Sundays, desire for working using IT facilities 24/7.	4	3.96 %	Library availability issues
Printing expense or access problems	Printing may be expensive, printing may be inaccessible due to travel distances or opening times, may rely on printing due to study methods.	4	3.96 %	Printing cost or access issues
Problems searching the WWW, e.g. irrelevant results	May have issues assessing WWW content, using interfaces to search engines or WWW portals/ directories, may not be familiar with search filters or advanced options, may not be able to use Boolean operators to limit results shown, may be struggling with synonyms and industry or academic jargon or terminology to limit searching to relevant terms or expressions used in the appropriate sector.	4	3.96 %	WWW search results issues

University or Library Web pages difficult to navigate	Student may find the Library pages are difficult to navigate to locate specific resources such as databases or Library platforms - such as the library catalogue, the main University pages may also be difficult to navigate to locate course information or other administrative or support materials, student support services may be similarly difficult to use or difficult to locate due to use of institutional terminology, other platforms or systems may present difficulties such as inter-library or booking web pages.	4	3.96 %	Institutional/Library Web difficulties
Use of Library computers due to need for computing	Student may use Library PCs due to lack of adequate or personal computing at home or work, student may prefer computer equipment at the Library or IT labs due to system resources and internet availability, may need to share computer facilities at home with family members, may be unable to use work computing facilities or time for this purpose.	4	3.96 %	Relies on Library PCs
Used techniques to manage information such as folders, favourites	Students may use Windows My Documents area to store documents locally on a PC, students may back up work to a CD or external storage device such as a flash disk, students may copy files to their network storage folder, students may categorise content into named folders or use pre-configured folders available in My Documents, students may create an original folder hierarchy on the computer hard drive, students may store materials on a variety of external disks such as Zip/ Iomega disks or re-writable CDS, students may use favourites in Windows or within the Web browser, students may use external storage options such as Google spaces or store files in the VLE shared areas, students may use social bookmarking sites such as Yahoo bookmarking.	4	3.96 %	Uses content management skills
VLE difficult to navigate or usability problems	Students may find the VLE structure or tabs difficult to navigate, students may find the course content menu (usually configured by the tutors) hard to understand or interpret, students may have difficulty browsing content organised into areas corresponding to tutor names rather than topics or subject areas, students may have problems navigating particular features or tools in the VLE such as the grades or assessment areas, students may have difficulties using the drop box or other interactive features.	4	3.96 %	VLE usability/ navigation issues
Computer compatibility problems	Poor functionality between course platforms or software and personal computer, possibly no availability of platforms or software on personal computing equipment.	3	2.97 %	Compatibility issues
Printers or scanners not widely available	Printers may be inaccessible due to long queues, maintenance issues or not enough coverage across the Library or IT Labs, colour printers may be scarce.	3	2.97 %	Insufficient printing facilities
Studies whilst travelling using mobile computing	May use a laptop or mobile devices to access the VLE or email, may use internet cafes or other wifi hot spots, may use smaller mobile technology such as Blackberry phones to access course materials or email.	3	2.97 %	Mobile device user when travels

Technical problems	May have problems regarding personal PC or other peripherals, may have maintenance problems with work PCs, may have maintenance problems when using institutional PCs, technical problems may include Windows or other operations system errors causing reduced functionality or non functionality, technical issues can include system compatibility problems or firewall issues connecting to the institutional network, technical problems can also include specific features not working properly in the VLE due to computer or VLE errors this could include assessment manager not working or even the entire VLE being down due to errors or maintenance, other technical issues can include network downtime at work or on campus or similar disruption at work.	3	2.97 %	Technical problems
Work related worries such as fee contribution	Student may feel under pressure due to mandatory nature of programme within work context, student may experience anxieties regarding fee contributions by employer, student may be relying on programme for career progression, student may have anxieties regarding progression in order to succeed in the workplace student may be disinclined to undertake work sponsored studies due to lack of personal motivation.	3	2.97 %	Work related anxieties
Internet access or cost issues	Cost of internet may be perceived as added or hidden cost of study, may have no home internet access making study difficult via VLE or electronic resources.	2	1.98 %	Internet access/cost
E-resource databases don't provide relevant results	Library databases showing mismatched results, may be unsure of process to refine searching or find the interface for filtering or refining searches too complex, database may require on operators or training.	2	1.98 %	Database results issues
Library database skills development not adequate	Finds library databases and bibliographic platforms difficult to use, has not been provided with specific training in searching such as use of operators or search refinement techniques.	2	1.98 %	Database skills development issues
Printers or scanners have technical related issues	Printers have run out of paper or display errors, printers may not offer the correct dimensions or colour printing options, scanners may have technical problems or may be too complex for use without staff assistance, configuration options such as resizing may be difficult without staff help.	2	1.98 %	Printer/scanner technical issues
Too many documents provided in VLE	VLE may present a lot of course materials such as class notes or presentations, materials may be presented in an unstructured form which makes navigation difficult leading to feelings of having too many documents to digest or manage, VLE may have a large number of optional supporting materials or external links which may distract the student from course class activities.	2	1.98 %	Too many documents in VLE
Use of a range of computers/operating systems	Student may use Macintosh, Linux, Windows or other types of computer platform.	2	1.98 %	Uses a range of computer systems

Work has links to programme e.g. custom programme, work based case studies	Student may be undertaking programme with strong employer interest, course may be integrated into working pattern/working day, student may be preparing for use of work related cases or products as part of dissertation or substantive assignment.	2	1.98 %	Work linked programme
Difficulties obtaining exam papers online	Seeking exam papers to view comparable prior assessments, seeking online/ electronic version of exam papers for convenience to avoid liaising with programme or Library staff to source hardcopies.	1	0.99 %	Digital exam paper issues
Insufficient print resources in the library	Lack of hardcopy books or journals, boor or journal usage may exceed quota of copies available, lack of e-resource equivalent may be a problem.	1	0.99 %	Insufficient printed texts in Library

Table 9: Memo Descriptive Codes in Order of Frequency

ii. Sample Control Terms (Descriptive Code Indicators in the Excel workbook) with Properties and Example Memo Comments

The use of control terms to sort memo comments directly within the workbook structure enabled a simple form of early categorisation for the generation of higher level Descriptive Codes and their properties. The following illustrates a sample of these control terms (termed Descriptive Code Indicators within the Excel workbook structure for the purposes of later sorting) alongside key properties and example memo comments, note this is not an exhaustive list of all the Descriptive Code Indicators, for this please see the previous table.

Descriptive Code Indicator: Communication tools e.g. email or social networks important to study

Descriptive Code Properties (comma separated list): Email, Social Network usage via Facebook or similar, use of course provided communication tools.

Example Memo Comments:

- Has set up a Wiki to plan group activities with peers using a WWW option, providing the ability to develop shared documentation/notes and share information.
- Have been using Microsoft Spaces to share work for group projects outside of NEWI systems.
- Importance of networking with students to learn about (work related) industry, used Blackboard to keep in touch with peers and tutors.

Descriptive Code Indicator: E-resource databases difficult to use

Descriptive Code Properties (comma separated list): Interface or navigation difficulties using library or recommended databases and bibliographic platforms, security issues such as additional passwords required, searching parser difficult to use or produces unwanted or irrelevant results.

Example Memo Comments:

- Finds navigating the Library databases difficult at times, these should be designed better, is about to try using print and online library databases but lacks confidence.
- Some databases were very hard to use or even access at all such as the OHS database.
- Often hard to use Library Web pages, databases, would prefer to use a simpler system like Google.

Descriptive Code Indicator: Group / peer working or communication problems

Descriptive Code Properties (comma separated list): Participation of group members may be a problem, May be issues related to travel or infrequent access to institution, Poor or low uptake of technologies such as email or VLE group tools, Lack of responsiveness of individuals to electronic communication.

Example Memo Comments:

- Reported difficulties working in groups, logistic issues setting up sessions with peers in the Library, expectation on students to facilitate their own group working.
- Expressed difficulty in carrying out group work due to additional travel to meet students, would prefer to use the VLE for this purpose and email, but some students don't like to use email for this purpose.
- Can be difficult to meet tutors and students, probably easier for full time students.

Descriptive Code Indicator: Multi-platform/ Internet resource discovery

Descriptive Code Properties (comma separated list): May use Library databases such as Swetswise or other recommended platforms/portals such as BIDS or BiZED, may use open Internet sources such as PubMED or the Internet Information Archive, may use open source journals such as the Social Sciences Research Network, may use a variety of Library systems such as catalogue or inter library request Web site, may use a variety of VLE tools and features such as discussions or group tools, may also use WWW search engines and portals to locate information.

Example Memo Comments:

- Does not use the VLE but uses a range of IT services and applications including Institutional email, some Library databases, WWW sources, including WWW portals to information and the Library Catalogue.
- Mainly refer to online sources, legislation, the Stationary Office publications, government parliamentary papers and Health and Safety Executive Web pages, some content is available in Blackboard.
- Accesses a range of government and public sector Web sites and portals such as ERIC and open access journal sites such as Social Sciences Research Network.

Descriptive Code Indicator: Studies whilst travelling using mobile computing

Descriptive Code Properties (comma separated list): May use a laptop or mobile devices to access the VLE or email, may use internet cafes or other wifi hot spots, may use smaller mobile technology such as Blackberry phones to access course materials or email.

Example Memo Comments:

- Travels for work often and uses a laptop computer to connect to the VLE, use ebooks. Praised the VLE for allowing remote working.
- Travels around UK on business, mobile computer access is important for study.
- Works abroad often, uses blackberry mobile device and laptop to stay connected.

Descriptive Code Indicator: Use of VLE communication tools

Descriptive Code Properties (comma separated list): Student may use VLE discussion board, messaging tool, email forms to send conventional email from the VLE, interactive quiz or survey tools, group features such as a shared file area or discussion board.

Example Memo Comments:

- Studies mainly from home, visits institute/Library to meet other students for some group work, the VLE also facilitates group work using shared group tools in Blackboard.
- Blackboard Group tools are used to share documents.
- Uses discussion board, notes, group tools to engage with peers but prefers meeting students in person for group working, Blackboard is useful to support this activity.

Descriptive Code Indicator: Work related worries such as fee contribution

Descriptive Code Properties (comma separated list): Student may feel under pressure due to mandatory nature of programme within work context, student may experience anxieties regarding fee contributions by employer, student may be relying on programme for career progression, student may have anxieties regarding progression in order to succeed in the workplace student may be disinclined to undertake work sponsored studies due to lack of personal motivation.

Example Memo Comments:

- Described importance of the programme for career purposes and how course is funded by employer, presented as a job requirement.

- Relies on work support to supplement cost of fees - concerned fees would continue to be paid.
- Work funding for fees mentioned as a potential problem.

Descriptive Code Indicator: Working to develop IT and study skills due to use of VLE

Descriptive Code Properties (comma separated list): Student may recognise need to develop personal skills in IT or study skills, student may be seeking to develop library or e-resource skills to utilise more current information beyond printed textbooks, student may be seeking to develop skills in use of the VLE to participate more actively in group work or use of course materials, student may wish to develop better information skills to search and assess useful materials on the WWW such as legislation or academic publications.

Example Memo Comments:

- Expressed need to develop good IT skills (had begun with poorer skills in use of the WWW, Library) now more confident, expressed view that developing these skills is important for this kind of study context.
- Needs to improve skills in using Web databases to access legislation, government papers or codes of practice.
- Cannot use the Library databases, but have been told need to access some materials on these, should develop better databases and provide easier access in Blackboard.

iii. Generating the Substantive Codes

All 54 Descriptive Code Indicators were sorted with the aim of generating refined descriptive categories (termed “Substantive Codes” in the workbook and visualisations) using the sorting template described in Chapter 3: Research Design, Part 10: Selection and Explanation of Tools and Methods.

Sorting the Memo Descriptive Codes to create higher level “Substantive Codes” involved comparison of the Memo Descriptive Codes and their properties – i.e. drawn from the detailed listing of these codes in the worksheet “Worksheet 1 Memo Codes” (Appendix 10, Table 1) to establish common properties (interchangability of indices).

Part of this process involved selective coding/sampling of initial memo comments and in-development Codes during later full-phase interviews, i.e. codes which were at various times proposed, inserted into the sorting table for consideration but perhaps modified or re-sorted; in some cases, emerging descriptive (emerging Open or emerging Substantive) codes had provided the basis for discussion at interview with student participants. Note – the process of coding, particularly at the lower level from memo data and emergent indicators (early descriptive codes) is a subjective process, reflecting multiple comments associated with diverse sessions, there should in theory be separation of comments into unique open/indicator codes, thus allowing for easier development of descriptive codes or categories.

iv. Pilot Derived Developed Descriptive Codes

The following displays examples of pilot-derived “Developed Descriptive Categories/Codes” and associated early Theory Bits which had been used for the development of a Tentative Core Category (also see Chapter 3: Research Design, Part 7: Overview of The Practical Research Phases); these descriptive and theoretical codes contributed to opening comments to begin interviews at the full phase research stage, thus allowing for further exploration and verification at the full phase stage of the research. These pilot codes contributed to constant comparison and verification of emergent codes during the full phase research element and contributed to suggestion of Control Terms for sorting the Early Theoretical Codes. In the table below, the first column contains the pilot-derived substantive code, followed by an explanation of the further selective sampling, this is followed by associated tentative theoretical codes (these were shown as Theory Bits in the Pilot study table of codes – see Chapter 3: Research Design, Part 7: Overview of The Practical Research Phases) and an associated developed Theoretical Code (these were shown in bold in the Pilot study table of codes):

Pilot derived Substantive Code used for Selective Sampling in later interviews	Justification/ Reason for Selective Sampling of this Indicator/ Code	Associated Tentative Theoretical Codes	Associated Tentative Developed Codes
Low contact study (characteristics & strategies)	Whilst the sample groups/ individuals interviewed were mostly on formal part-time courses, some individuals were approached ad-hoc in open learning areas, in some cases these turned out to be full-time students but consistently indicated they were attending class less than 10 hours a week. All the students interviewed (including 'full time' students) indicated low-contact with staff and peers was a factor in their study, including travel times required, need for effective use of time in class and need for excellent ICT facilities on site during visits. Many students indicated they were 'lone' students, with varying levels of contact with peers or staff via ICT. Many of these students felt they received minimal or no support for issues such as ICT use, software use, learning support study skills, use of the Web and information sources, considering the support staff available in the library were helpful but lacking the intensive support some seemed to require (including induction and ongoing support).	Lone studying via ICT; Self navigating Technologies; Inter-location studying; Remote peer-communicating; Study-work Integrating; ICT self-supporting; ICT knowledge sharing; ICT facility discovery; ICT facility exploiting	Multi-tasking commitments
Work/ Study/ Life balance	Many of the students indicated issues with juggling home, study and work issues, many indicated how their work and study was well complemented, while others indicated little employer support (in terms of time, resources). For some students, ICT was useful in a busy work-life context, for others it added to the study requirements and was something to be ignored as an optional extra they didn't have to do.	Commitment (life, work, study) accommodating; Vocational study avoidance; Vocational study exploitation/ appropriation; VLE workload avoidance; VLE information exploitation; Career studying (voluntary / involuntary)	None

Using ICT	Characteristics of this code included - Using computers, printers, photocopiers, scanners, Using a range of computer software to process information, Dealing with ICT problems such as broken PCs, password problems, Learning to use systems, software and related facilities, Accessing ICT in order to undertake the coursework and project work. Many prefer to use own laptops saying PCs provided are too few and unsatisfactory (too slow or display of commercial adverts on-screen). Using several different platforms (in some cases, such as Mac).	ICT familiarising; Goal-based ICT appropriation; ICT problem navigating; Support network developing; ICT software/ systems/ equipment ownership (literal owner and stakeholder); Cross-system/ platform coping; ICT systems, software, Web resource, VLE navigation	ICT self-reliance
Using the Web	Using basic search engines such as Google (few other search engines were mentioned) and Google Scholar, Using institutional Web pages (in some cases, but reported difficult to find) to access evaluated academic information. Using favourites to store Web links, Using Blackboard (in many cases) to discover links to relevant Web sites, Attempting to use Web resources in an integrated way (but having often to break out of the VLE in order to do so), Difficulties in evaluating Web content.	Web credentialising/ evaluating; Institutional Web navigating/ awareness building; Google-based Web experiencing; Web sorting; Web resource storing/ retrieving; Cross-system Web navigating; VLE-based Web browsing/searching; ; Web-resource trusting	Web space integrating (Becoming familiar with a wide range of Web platforms as an integral component of their study routine and research)
Working remotely	Many students study from their work-place, small number described studying whilst abroad on work business using laptops, or mobile devices such as blackberries. Some comments that technology is not suitable for easy working away from home (e.g. need for bulky laptop to do word-processing).	Overseas VLE studying; Mobile ICT exploiting	None

Using resources (ICT, paper, photocopying, travel expenses)	Many students described how most course documentation is digital and onus is on themselves to print materials, in some cases they are required to print their own materials. Students studying in a work-related capacity also indicated they used work facilities to print with or without work approval. Some students expressed the demand on them to have certain levels of ICT equipment in order to study, a minority indicated they had to come into the institute more regularly due to lack of own PC. Others complained their PCs were not adequate or did not have the necessary software. Others indicated they had shared use of a PC which provided some facilities for the course but could prove inadequate. Some students complained regarding the cost of internet costs.	VLE document managing; Digital transforming (digital copy to hard copy); Work facilitated document transformation; ICT facility dependency; Managing ICT resource availability; Sharing ICT resources (peers, family, friends)	Digital resource selecting/ incorporating
Using communication tools	Attempting to use email despite various email systems and addresses (work, NEWI, Blackboard email system, home & work email systems). Setting preferences within systems to try to use email in an integrated way (e.g. in Blackboard). Vast majority seem to use personal rather than NEWI email. Use email infrequently but more frequently during group work. Most seem to use Blackboard more (i.e. checking for new content rather than communications from tutors).	Email navigating; System referencing; Traditional email dependency; VLE-email interrelating	Tutor network developing/ maintaining
Group work	Many of the students indicated they had been engaged in group work at some point, this often involved developing documentation or presentations collaboratively. In some cases, students felt group work was difficult due to the need to access peers outside formal lecturers linked to the limited time available in class. Students reported exchanging personal emails to communicate and exchange materials for projects (via email). In one class, a business-based group described using a Wiki to develop a collaborative document, all group members had participated in the wiki but some had difficulties using the software.	Remote group participating; Shared e-document creation/ development; Group time managing/ prioritising/ coordinating	Social (Peer) network developing/ maintaining

VLE use	Required for access to course materials, Email. External links. Emphasis on content rather than communication. Regular checking for updates. Some students indicated a dependence on VLE use and habitual use of the system for all aspects of the study, i.e. they would consult the VLE as the first stage in being given any task such as coursework. These students indicated the VLE provided everything required for the course, making books and external materials unnecessary. There was a lack of consistency for many students in the way the VLE was used across different modules, with some lecturers using the VLE as a content repository, others as a communication medium, others infrequently and others not at all. The structure of the VLE was also criticised often in terms of the general tabular structure being too poorly integrated (with other systems such as institutional email, Web based library resources or Student Web pages) and the course structures themselves being unstructured and difficult to navigate. Some students felt the depth of information was superfluous within certain course-sites, or was not tailored specifically enough to their course (e.g. for sites devoted to a number of programmes or modules).	VLE document seeking/ navigation; Habitual VLE visiting; Habitual VLE avoidance; VLE course / course-requirement dependence; VLE-literature (books) navigation; VLE styles navigation/ reconciliation; VLE content deficit reconciliation; VLE-external systems navigation; VLE-Web reconciliation; VLE-course/programme structure reconciliation; Course content specificity reconciliation/ navigation	None
Word-processing / course-work preparation	Managing hardcopy and digital documents, Travelling to location of ICT facilities (in some cases). Negotiating ICT issues such as password problems, faulty equipment. Some students indicated study facilities were an issue, with noisy/ busy home or work environment meaning they felt the institute provided a better study environment, however some students complained that whilst all the open access areas had PCs, there was no ‘quiet study’ area for reading and other study purposes.	ICT-hardcopy multitasking/ reconciliation (e-studying); Desktop computer problem reconciliation; Quiet-e-studying reconciliation	Multiple location e-studying

Document Management	Many students described issues managing digital and hardcopy resources such as excerpts, photocopies, digital texts, Web extracts, expressing difficulties when organising the wide range of materials they had to read. Some students had developed personal systems for organising material e.g. using desktop folders in Windows or use of customised directories using Windows Explorer. Other students found the experience of accessing, internalising and processing documentation was difficult – partly due to the large number of sources (and open ended nature of Web resources/portals) but also due to the amount of material being provided via the VLE. Many students indicated they were inclined to print everything off since they felt unable to cope with the quantity of digital materials, for some this printing issue was a financial & resource problem. Some students clearly had an idea of multi-tasking on a computer environment, others were obviously unable to work with digital texts in this way.	Digital / hardcopy resource reconciliation.; Web resource/ excerpt integration; Digital resource sorting, labelling and situating; Digital document internalising; Digital document processing; Digital document volume reduction/ management; Digital document filtering; Digital document credentialising	Digital document multitasking

Using information sources	Student characteristics included Using ICT to access information sources, Using hardcopy systems such as library indexes. Using software and Web-based resources such as search engines and portals, Evaluating information sources, Dealing with web-based plagiarism issues. Ensuring citation and quotation of sources is appropriate. Some students already had a professional or work-related knowledge of Web-based resources. Some students reported using e-books delivered via the VLE, indicating use of full-text journals and books in lieu of hardcopy resources, these students commented that whilst the availability of e-books ensured all students had access to reading material, this also posed problems for printing material off (where this was the preferred medium for working). Few students indicated they used the online journal system, with some suggesting they were not aware of any online library resources. Many students indicated that whilst they felt happy using Web-based search engines and online information sources outside the VLE, they would only do so on request from their tutor. Others indicated anxiety regarding citation and authority of online sources (mentioning concerns of tutors or even having been asked never to use Web-based information). Students also described varying levels of comfort using search keywords in search engines and online journal systems, with many expressing dissatisfaction with keyword searching as yielding too many irrelevant results. Students indicated they would value further support in using keyword searching techniques. Many students said they used 'Google' but felt a lack of facility using the internet effectively. Some students expressed difficulty using Athens-based information portals, indicating the process for logging in was too complex and often impossible to use.	Digital resource discovery; Assimilation of online sources (of information); Credentialising, labelling, storing and retrieving information sources; Plagiarism avoiding; Integrating professional and study sources (of information); Transforming digital to hardcopy resources; Integrating information sources; Awareness acquiring of information sources; Search engine digital resource dependence; Search engine results interpreting	Information systems traversing; VLE course resource dependence (as information portal); Accommodating/ reconciling digital documents
Liaising with employer organisations	Negotiating work-based projects. Dealing with confidentiality issues in coursework.	Employer stake-holding; Employer study internalising	None

Table 10: Pilot-Derived "Developed Descriptive Categories/Codes" and Associated Theory Bits

v. Full Research Phase Derived Developed Descriptive Codes

The following table displays examples of emerging Developed Descriptive Codes following the full practical research phase, including a description of further exploration or verification (items in bold represent emerging formal codes):

Memo Comments and <u>developing</u> Substantive Codes (in bold) derived from Full Phase interviews and identified for Selective Sampling in subsequent interviews. Because these early codes were still not fully refined or translated into Control Terms these indicators do not match final Control Terms	**Justification/ Reason for Selective Sampling of this Indicator/ Code**
Role of Communication tools	To ascertain if online communication tools are used alongside static course content as suggested in early pilot interviews.
Use of the WWW	To verify usability issues using formal databases as suggested in early pilot and throughout many interviews in the full phase, also to ascertain user confidence and skills in using the WWW and diverse WWW sources.
Database issues	To confirm problems reported using Library databases as part of the repertoire of WWW/e-resources.
Results issues via Databases	To further confirm problems reported using Library databases as part of the repertoire of WWW/e-resources.
Full text (e-resource) location	To confirm issues reported when using bibliographic databases, also confirming that students increasingly expect bibliographic databases to supply full text rather than traditionally displaying citation details for physical item sourcing
Complaints regarding lack of electronic communications uptake by the programme	To confirm if students have higher expectations of electronic communications use than is currently implemented.
IT skills problems	To ascertain self confidence and a sense of skills development for using ICT, early pilot responses suggested students felt challenged when using some systems and platforms.
Problems accessing/utilising IT support	To ascertain if the student experience was negatively impacted by feelings of having insufficient IT support, and any strategies which may be employed to facilitate IT solutions.
Complaints regarding lack of databases/ lack of specialist databases	To further confirm problems reported using Library databases as part of the repertoire of WWW/e-resources.

IT confidence issues	To further ascertain self confidence and a sense of skills development for using ICT, early pilot responses suggested students felt challenged when using some systems and platforms.
Problems using electronic library databases	To ascertain if students felt they could engage with formal library research tools as software as part of their repertoire of study skills and any strategies they may employ to work around perceived lack of skills development.
Use of a range of on-campus and online services and facilities	To confirm early pilot and early full phase discussions concerning a blended approach to study and discover how far students are comfortable using electronic or physical resources and services, if there was any preference or desire to use either format and what strategies may be employed to access these services or use them most efficiently.
Context as a low-contact student, reduced class presence, tutor interaction	To confirm the time spent in contact with tutors and peers in class.
Challenges concerning need to access many platforms and systems	To follow up early pilot discussions concerning access to a wide range of WWW, library databases, WWW portals and University or Library Web pages and how successfully students were able to navigate and cope with use of diverse information sources.
Login issues, particularly related to lack of single sign in	To confirm the fairly widely held view expressed in the pilot and throughout the early full phase interviews that databases can be difficult to access due to multiple login credentials needed.
Problems using/ navigating the VLE interface	To ascertain the extent of issues using the VLE including issues accessing specific areas such as the assessment, grades, group and discussions areas.
Content/ file management challenges	To follow up a small number of comments on file management, use of multi-tasking and window management when using PCs, behaviour saving, sorting, labelling and managing files and other digital assets or WWW links.
Use of VLE heavily for weekly assignments/ research	To ascertain many early comments that students replied fairly heavily on the use of the VLE as a hub for core learning materials and study.
Engagement with VLE communications tools such as messaging	To ascertain the extent VLE communications tools were being used such as the messenger or group discussion tools.
Using differing operating systems/computers, including diverse locations such as work/home	To ascertain the extent that students function across diverse locations and computer equipment. This appears to be very common for these part time and mostly employed students who may often work using facilities at both the educational provider, work and home.
Working away from the institute	To ascertain the substantive code (early versions included "remote working", "remote study and VLE use") to establish the pattern of conducting study at diverse locations such as the home for a substantial aspect of the programme.
Problems developing/ accessing training for IT skills	To establish student perceptions of personal skills and shortfall in skills for IT
Problems accessing electronic versions of readings	To ascertain student perceptions of resource location problems via the WWW or library facilities as illustrated in many related memo indicators.

Study and research approaches e.g. Note taking, approaches for summarising readings	To query the kind of methods, strategies and approaches used by the student to optimise their study routine, implement efficiencies or practices to assist their research, writing or other activities.
Problems accessing study support	To establish student perceptions of problems they feel may be having an impact on their study due to shortfall in study and research skills.

Table 11: Emerging Developed Descriptive Codes Following the Full Research Phase

Note - common (initial Descriptive Code) properties inter-relating between the higher level “Substantive Codes” were documented in “Worksheet 2 Substantive Code (Categories) Creation” (Appendix 10, Table 2). The following (Substantive Code) example “Remote Learning Characteristics” - illustrates inter-relationships between lower level Descriptive Codes (Memo Indicators/ Control Terms) and higher level Substantive Codes. Features used in this table for sorting and comparison to develop higher level, descriptive “Substantive Codes” included:

- Placement of common Descriptive Codes with frequency distribution across all interviews.
- Annotated key shared properties derived from Memo Codes.
- A further narrative explanation of emergent Substantive Codes.
- The sum of all frequency distribution values is displayed for comparison against other Substantive Codes (indicating an aggregated percentile to demonstrate comparative weighting
- Cumulative Theory Bits or Insights are also developed for later use in theoretical categorisation.

The following table example illustrates development of the Substantive Code 'Remote Learning Characteristics':

Substantive Descriptive Code Assimilated/ Grouped from High Frequency Memo Descriptive Codes (and commonly occurring Properties) and based on category sorting	**Memo Codes (Indicators) related to this Substantive Code (paraphrased) with frequency distribution of individual indicators - also see sorting tables**	**Key Shared Properties**	**Further Explanation of Substantive Descriptive Code**	**Sum of all supporting Memo indicator frequency distribution values supporting this code**	**Cumulative Theory Bits, Insights**
Remote Learning Characteristics	Uses a range of locations for ICT 8.91%, Commutes 11.88%, Mobile device user when travels 2.97%, Uses a range of computer systems 1.98%, Comms tools importance 12.87%, Uses VLE communication tools 11.88%, Physical/Online experience 9.90%	Developing strategies for studying across different locations and using different equipment/ computer platforms, use of electronic communication tools to facilitate contact/feedback with tutors and peers for group working, using both online and physical study activities	Students who are part time and studying via Blended learning convey a range of characteristics typical of e-learning but also exhibit behaviours reflecting use of traditional library resources and services, commuting is a particularly important factor for some students. Use of mobile computing is also important for some students	60.39%	Adaptive use of e-learning communications tools, mobile devices and VLE features to engage with peers, tutors and course content. Some students are apprehensive regarding the use of e-learning and their remote study context, some of these behaviours can be considered strategies to overcome this perceived separation from the physical institution and its facilities, perhaps reflecting the transitional phase of e-learning at this time or fundamental anxieties some students face when studying in a blended learning context.

Table 12: Example Substantive Code (Remote Learning Characteristics)

The sorting table "Indicators sorted to create Substantive Codes" (see following table) was used alongside workbook data previously mentioned, such as Descriptive

Code properties. The use of a complementary sorting table and workbook-based approach provided an efficient method to compare, annotate and sort initial Descriptive Codes whilst also being informed by detailed properties and frequency distribution values. The Descriptive Codes shown in the associated sorting table (Sorting Table 1: Indicators sorted to create Substantive Codes) also display their frequency distribution value, indicating how prolific the code was when viewed as a share or weighting against other code occurrence across all interview sessions, the frequency distribution of Control Terms is also visualised in the Substantive Codes workbook (Appendix 10, Table 2):

Indicators sorted to create Substantive Codes

Remote Learning Characteristics	Skills challenges (Skills problems and concerns raised)	Resource Discovery challenges	Resourcing for Study (Equipment, costs and related resourcing problems reported)	Technical Challenges (Technical Problems reported)	Study and Research Approaches	Study and Research Challenges	Personal and Non-study related Challenges
Uses a range of locations for ICT 8.91	IT skills confidence issues 5.94%	Insufficient databases 10.89%	Internet access/cost 1.98%	Compatibility issues 2.97%	High Google use 14.85%	VLE usability/ navigation issues 3.96%	Work related anxieties 2.97%
Commutes 11.88%	Database skills development issues 1.98%	Too many platforms 5.94%	Obtaining software difficult 5.94%	Technical problems 2.97%	Trying to build IT/ study skills 7.92%	Study training /development issues 7.92%	Uses Library PCs for quiet study 6.93%
Mobile device user when travels 2.97%	IT/study development issues 4.95%	E-resource databases usability 8.91%	Digital exam paper issues 0.99%	Printer/scanner technical issues 1.98%	Uses content management skills 3.96%	VLE underused by programme 9.90%	Work linked programme 1.98%
Uses a range of computer systems 1.98%	Referencing support issues 4.95%	Multi platform login issues 4.95%	Insufficient PC availability 1.95%	PCs slow or technical issues 7.92%	Relies on Library PCs 3.96%	Group or peer comms issues 13.86%	Commitment issues 34.65%
Comms tools importance 12.87%	IT skills training access issues 13.86%	WWW search results issues 3.96%	Printing cost or access issues 3.96%	IT support difficulties 9.90%	Relies on VLE for materials 38.61%	Low contact study 99.02%	Feelings of Isolation as a student 4.95%
Uses VLE comms tools 11.88%		Database results issues 1.98%	Library availability issues 3.96%		Reliance on hardcopies 9.90%	Too many documents in VLE	
Physical/Online experience 9.90%		Institutional/Library Web difficulties 3.96	Insufficient printing facilities 2.97%			Digital Comms under-used 6.93%	
		Database full text access issues 4.95%	Insufficient printed texts in Library 0.99%			VLE under-used by students 4.95%	
		Requires multi platform use 30.69%				Library or IT Lab noise 4.95%	

Figure 49: Indicators sorted to create Substantive Codes

vi. Summary of All Substantive Descriptive Codes

The resulting Substantive Codes, aggregated from initial Open Coding of the Memo comments but still largely descriptive (vs. conceptual) are listed below (note - the percentiles shown represent the total frequency distribution of all dependent Memo/Descriptive Codes and is for comparison purposes only). The following explanation of the Substantive Descriptive codes is derived from workbook 2, as outlined in Chapter 3, part 9.

Note, Substantive Descriptive Codes below were assimilated/ grouped from high frequency Memo Descriptive Codes (and commonly occurring Properties) and based on category sorting. The Memo Codes (Indicators) shown below are related to the respective Substantive Code (paraphrased), also shown with frequency distribution of individual indicators. Key properties are shown alongside each Substantive Code, drawn from derived earlier Memo Indicators. A Further Explanation of the Substantive Code is also provided alongside each Substantive Code. The Sum of all supporting Memo indicator frequency distribution values supporting this code is also provided, indicating the sum of all derivative/related Memo Codes to demonstrate the position of the Substantive Code in relation to other Substantive Codes. The figures below demonstrate visually, the relationship between the Substantive Code and earlier, derived Memo Code Indicators:

Study and Research Challenges

Memo Codes (Indicators) related to this Substantive Code: VLE usability/ navigation issues 3.96%, Study training /development issues 7.92%, VLE under-used by programme 9.90%, Group or peer communication issues 13.86%, Low contact study 99.02%, Too many documents in VLE, Digital communication under-used 6.93%, VLE under-used by students 4.95%, Library or IT Lab noise 4.95%

Key Shared Properties: Students often mentioned difficulties using aspects of the VLE such as assessment or group working tools, some students complained regarding lack of contact or feedback from tutors or peers during group work, some students complained of an actual shortfall in the potential use of the VLE and other communication tools, suggesting this lack of engagement was detrimental to their part time, largely off-campus study context

Sum of all supporting Memo indicator frequency distribution values: 151.90%

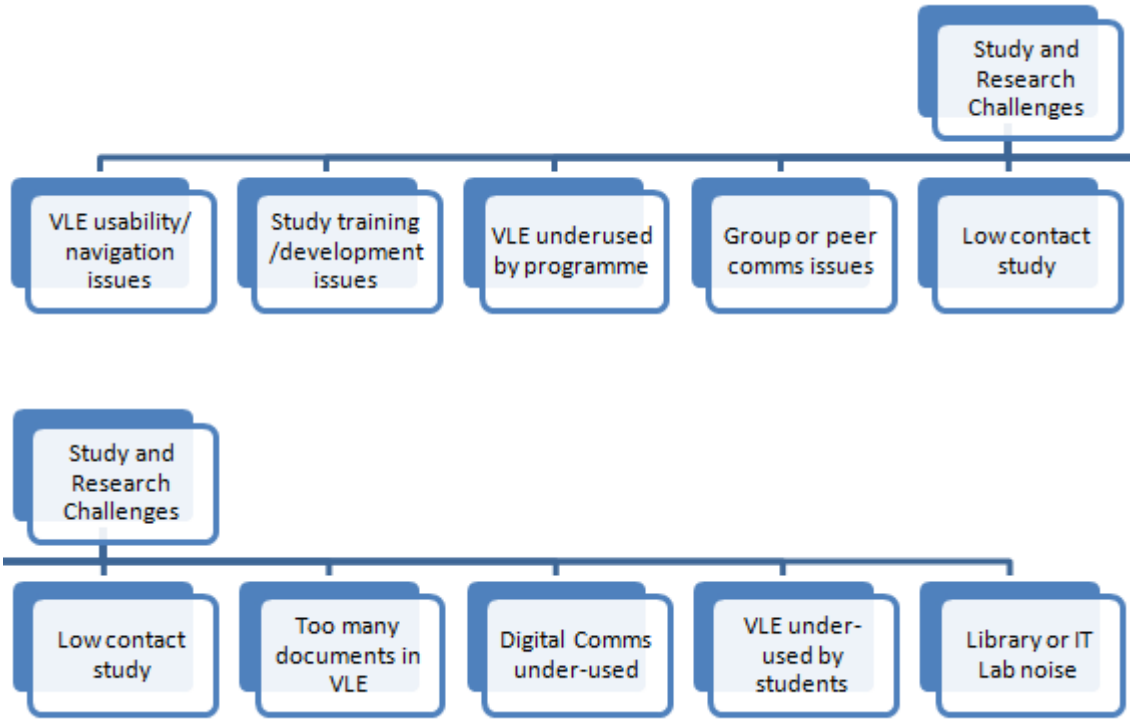


Figure 50: Substantive Code: Study and Research Challenges (in two parts)

Study and Research Approaches

Memo Codes (Indicators) related to this Substantive Code: High Google use 14.85%, Trying to build IT/ study skills 7.92%, Uses content management skills 3.96%, Relies on Library PCs 3.96%, Relies on VLE for materials 38.61%, Reliance on hardcopies 9.90%

Key Shared Properties: Students often reported relying on Google as a primary research tool for literature review or course work, students also often described attempts to access new or unfamiliar platforms such as specialist databases to improve IT and study competencies, many students also indicated a heavy reliance on the VLE as a central portal to course materials, often indicating frustration that materials were either external to the VLE or they were expected to use library resources oncampus or online. Many students linked time constraints and the need to optimise their schedule with the desire to work as far as possible via the VLE

Sum of all supporting Memo indicator frequency distribution values: 79.20%

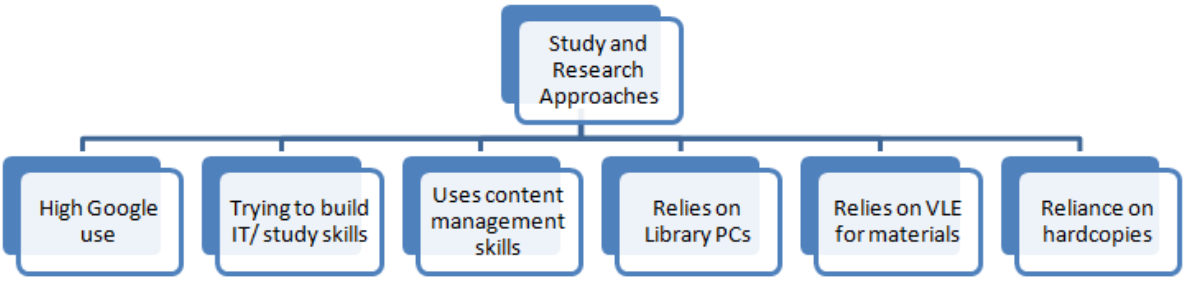


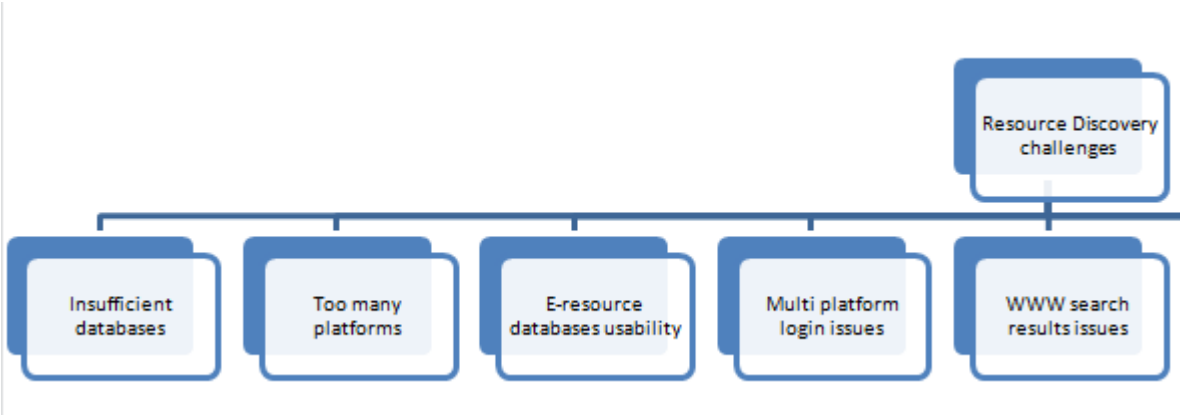
Figure 51: Substantive Code: Study and Research Approaches

Resource Discovery Challenges

Memo Codes (Indicators) related to this Substantive Code: Insufficient databases 10.89%, Too many platforms 5.94%, E-resource databases usability issues 8.91%, Multi platform login issues 4.95%, WWW search results issues 3.96%, Database results issues 1.98%, Institutional/Library Web difficulties 3.96, Database full text access issues 4.95%, Requires multi platform use 30.69%

Key Shared Properties: Students frequently complained regarding the scope and usability of library databases and core systems such as Library Web pages or catalogue, students also drew attention to the need to use many different platforms and use multiple logins such as a separate Athens login for some collections and other unique logins, some students also discussed the need to retain both personal, work and University login credentials citing this as a barrier to efficient study. Students frequently indicated unhappiness with resource discovery options within the University and described use of some formal databases alongside WWW sources and some work related sources

Sum of all supporting Memo indicator frequency distribution values: 76.23%



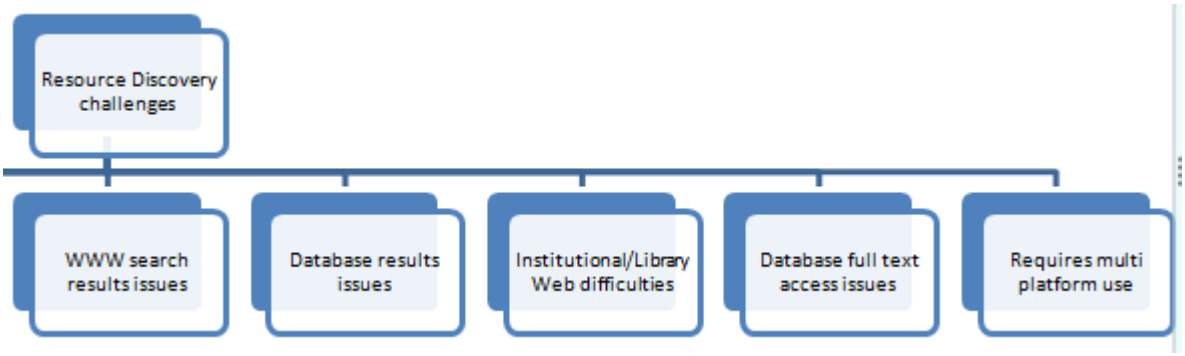


Figure 52: Substantive Code: Resource Discovery Challenges (in 2 parts)

Remote Learning Characteristics

Memo Codes (Indicators) related to this Substantive Code: Uses a range of locations for ICT 8.91%, Commutes 11.88%, Mobile device user when travels 2.97%, Uses a range of computer systems 1.98%, Communications tools importance 12.87%, Uses VLE communication tools 11.88%, Physical/Online experience 9.90%

Key Shared Properties: Developing strategies for studying across different locations and using different equipment/ computer platforms, use of electronic communication tools to facilitate contact/feedback with tutors and peers for group working, using both online and physical study activities

Further Explanation: Students who are part time and studying via Blended learning convey a range of characteristics typical of e-learning but also exhibit behaviours reflecting use of traditional library resources and services. Commuting is a particularly important factor for some students. Use of mobile computing is also important for some students

Sum of all supporting Memo indicator frequency distribution values: 60.39%

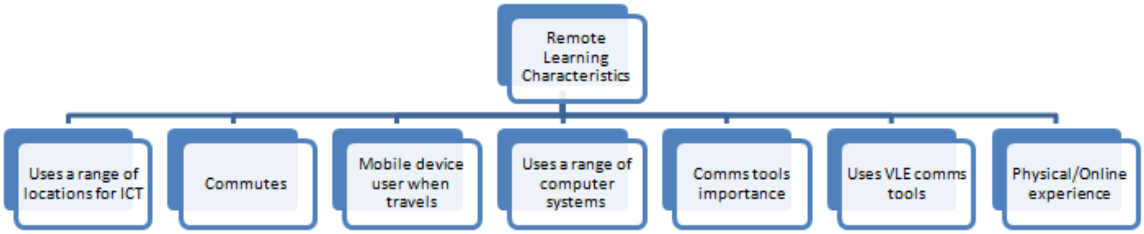


Figure 53: Substantive Code: Remote Learning Characteristics

Personal and Non-study related Challenges

Memo Codes (Indicators) related to this Substantive Code: Work related anxieties 2.97%, Uses Library PCs for quiet study 6.93%, Work linked programme 1.98%, Commitment issues 34.65%, Feelings of Isolation as a student 4.95%

Key Shared Properties: Some students reported anxieties regarding work related links with the programme, some students indicated they were only studying due to work demands or were studying to maintain mandated work related skills or qualifications, these kind of demands added to the pressure felt by some students. Some students indicated a sense of isolation as part time students and disconnect from the wider student population, there was a perception that their kind of student was being facilitated in a less intensive or supported mode than full time students. Commitment issues featured high in many narratives, including work-related, children or other caring commitments.

Sum of all supporting Memo indicator frequency distribution values: 51.48%

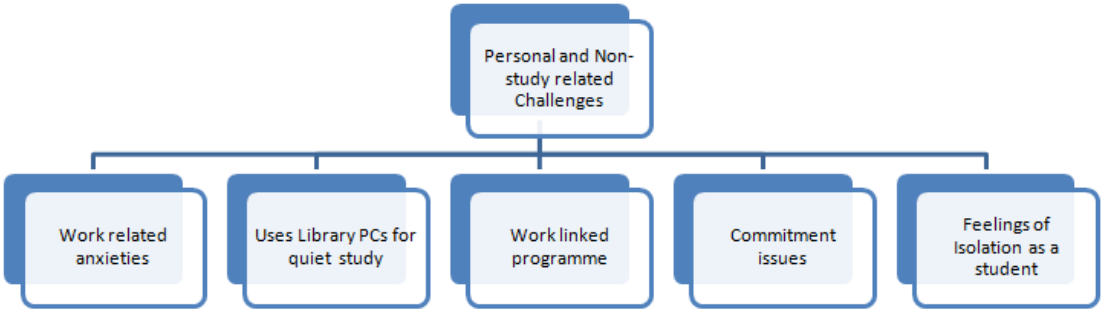


Figure 54: Substantive Code: Personal and Non-Study Related Challenges

Skills Challenges (Skills problems and concerns raised)

Memo Codes (Indicators) related to this Substantive Code: IT skills confidence issues 5.94%, Database skills development issues 1.98%, Referencing support issues 4.95%, IT/study development issues 4.95%, IT skills training access issues 13.86%

Key Shared Properties: Lack of confidence when using more complex or formal systems and platforms, such as certain VLE features or library databases, sense of lacking sufficient skills to fully utilise platforms or computing facilities to study effectively, specific anxieties in areas such as referencing and study methods.

Sum of all supporting Memo indicator frequency distribution values: 31.68%

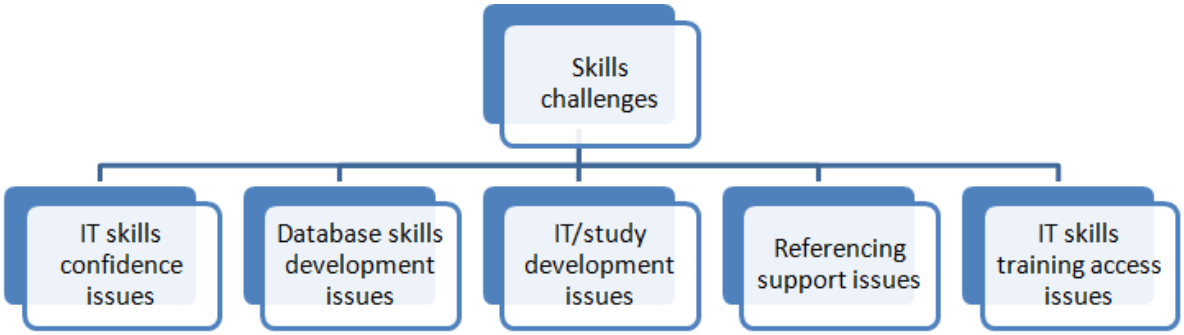


Figure 55: Substantive Code: Skills challenges

Technical Challenges (Technical Problems reported)

Memo Codes (Indicators) related to this Substantive Code: Compatibility issues 2.97%, Technical problems 2.97%, Printer/scanner technical issues 1.98%, PCs slow or technical issues 7.92%, IT support difficulties 9.90%

Key Shared Properties: May have problems regarding personal PC or other peripherals, may have maintenance problems with work PCs, may have maintenance problems when using institutional PCs, technical problems can also include specific features not working properly in the VLE due to computer or VLE errors this could include assessment manager not working

Sum of all supporting Memo indicator frequency distribution values: 25.74%

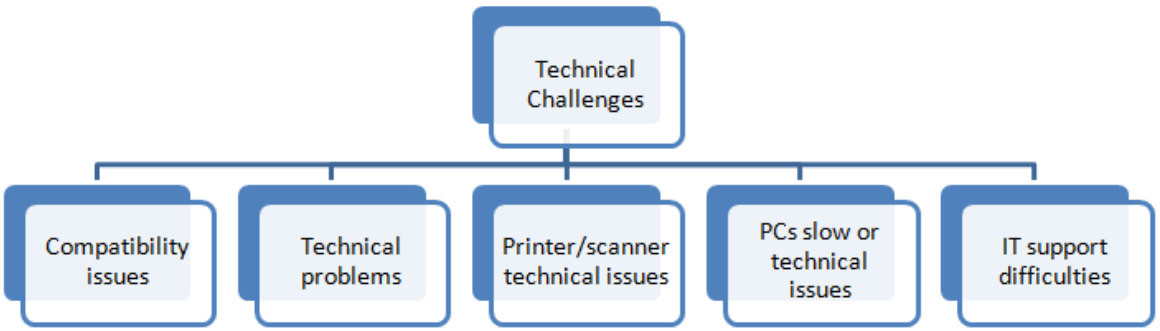


Figure 56: Substantive Code: Technical Challenges

Resourcing for Study (Equipment, costs and related resourcing problems reported)

Memo Codes (Indicators) related to this Substantive Code: Internet access/cost 1.98%, Obtaining software difficult 5.94%, Digital exam paper issues 0.99%, Insufficient PC availability 1.95%, Printing cost or access issues 3.96%, Library availability issues 3.96%, Insufficient printing facilities 2.97%, Insufficient printed texts in Library 0.99%

Key Shared Properties: Many students appeared to print hardcopy versions of course notes, WWW content, presentations and other academic matter rather than attempt to manage digital copies within the computer environment, this indicates both anxieties in the sole reliance on digital media and feelings of assurance in obtaining physical copies. Resource and cost implications were often cited regarding the reliance on printing with some students indicating the increased use of the VLE and digital content had exacerbated the need to print due to increased onus for self study and fewer classes.

Sum of all supporting Memo indicator frequency distribution values: 22.74%

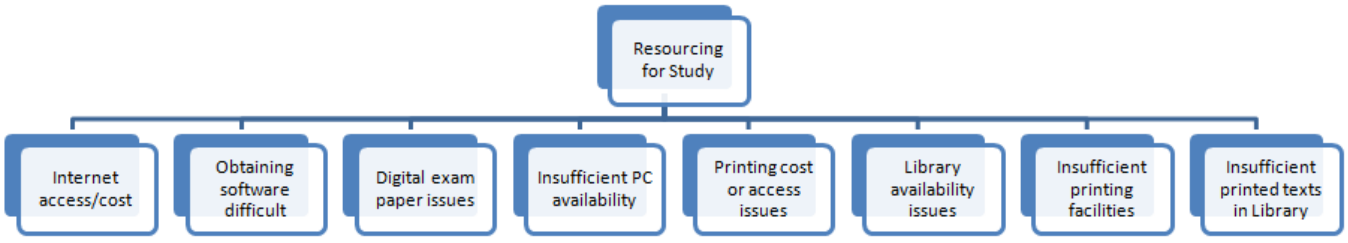


Figure 57: Substantive Code: Resourcing for Study

vii. Cumulative (Aggregated) Theory Bits/ Insights associated with Substantive Descriptive Codes

The Substantive Codes provide a number of early theoretical insights, aggregated from dependent Memo/Descriptive Codes and developed from observations of the data when compiled, including emergent concepts suggested by properties and narrative explanation of the Substantive Code. The following emergent and aggregated Theory Bits were identified in the Substantive Codes worksheet (For the full table of Substantive Codes see Appendix 10, Table 2):

Study and Research Challenges

Cumulative Theory Bits, Insights: Students exhibited a dependence on the VLE and many appeared to value online communication tools to improve and facilitate their studies as part time students, students often appeared to be investing in the VLE in terms of time spent using this platform, developing personal knowledge of the VLE and coordinating group or peer discussions via VLE and other online communication tools (including social networks). Some students felt they had to make up a shortfall in both tutor/peer engagement with the VLE and shortfalls in training or support. In some respects students were attempting to lead the use of the VLE or promote this amongst peer groups to achieve efficient group working and study outcomes.

Study and Research Approaches

Cumulative Theory Bits, Insights: Students exhibited a pattern of attempting to consolidate learning within the VLE, including access to course materials and use of communication tools, this consolidation was motivated by time constraints reflected

in the nature of their predominantly part time, low class contact context and working schedule. Some students used a variety of content management tools and services on the WWW to enable working remotely, across multiple sites or via removable media such as flash drives, achieving a mobile study approach to facilitate their circumstances

Resource Discovery challenges

Cumulative Theory Bits, Insights: Students appeared to be utilising a wide range of personal, work related and University derived sources, including e-resources linked or promoted via the VLE, email and course materials or reading lists, in many cases students described a reluctance to deviate from the VLE to obtain materials but accepted the need to consult wider information sources for effective study, to this extent many students indicated they had used formal Library databases and recommended Web portals although many stated their preference was often to attempt initial location of resources via a basic Google search. These characteristics suggest students are navigating a range of diverse platforms and systems to access information and are engaging with less familiar or more formal platforms to achieve effective study outcomes.

Remote Learning Characteristics

Cumulative Theory Bits, Insights: Adaptive use of e-learning communications tools, mobile devices and VLE features to engage with peers, tutors and course content. Some students are apprehensive regarding the use of e-learning and their remote study context, some of these behaviours can be considered strategies to overcome this perceived separation from the physical institution and its facilities, perhaps

reflecting the transitional phase of e-learning at this time or fundamental anxieties some students face when studying in a blended learning context.

Personal and Non-study related Challenges

Cumulative Theory Bits, Insights: In some cases students attempted to overcome personal commitment constraints by using VLE or other electronic communication tools to keep in touch with tutors or peer remotely, this kind of motivation appeared to channel the student toward the use of core communication tools and toward use of VLE communication features which may not have otherwise had such a large contribution. Students appear to have attempted to virtualise their social experience with peers and tutors to overcome these commitment and personal issues related to remote working and to attend a greater sense of engagement with the wider programme activities and engagement with tutors and peers

Skills challenges (Skills problems and concerns raised)

Cumulative Theory Bits, Insights: Students may use a range of techniques to compensate for poor confidence in specific platforms by resorting to familiar applications or WWW sources, some students resorted to using work derived information sources or government WWW sources due to familiarity, this behaviour exposes a behavioural pattern in avoiding engagement with certain unfamiliar technologies due to skills issues or lack of familiarity. Students also appeared to be avoiding some support services or optional courses available again reflecting this avoidance tendency.

Technical Challenges (Technical Problems reported)

Cumulative Theory Bits, Insights: Students reported problems regarding personal PC or other peripherals they may have experienced maintenance problems with work PCs, or may have maintenance problems when using institutional PCs. Technical problems also included specific features not working properly in the VLE due to computer or VLE errors this included the assessment manager not working properly.

Resourcing for Study (Equipment, costs and related resourcing problems reported)

Cumulative Theory Bits, Insights: Students' anxieties over printing and digital content reveal a study pattern based around physicalisation of e-learning and digital content, perhaps indicating that these students are transitional in terms of skills and attitudes to e-learning approaches.

Part 3: Early Theoretical Codes

i. Emergence of Early Theoretical Codes

During the pilot study, Theory Bits were developed by sorting memo responses to define higher level Open Codes, the analysis of code properties yielded theoretical insights which were also sorted and aligned with associated Open Codes. This sorting process allowed for refinement of codes to suggest higher-level theoretical codes (shown in bold in the pilot sorting table). These were characterised by Interchangability of indices in the form of shared theoretical properties (dependant Theory Bits) and associated descriptive codes and their properties.

A tentative Core Category “Self-Led Multi-Systems Traversing “ was suggested as a higher level theoretical code which demonstrated strong Interchangability of indices; the dependant properties of this tentative Core Category code were compared, tested and explored via a number of processes, such as exploration of associated pilot descriptive codes and emergent theoretical codes at interview and contribution of pilot Theory Bits to the development of Control Terms for sorting the Early Theoretical Codes following the full phase research element. Previous sections describe the processing of pilot data; also see an overview of the pilot research phase in Chapter 3: Research Design, Part 7: Overview of The Practical Research Phases.

The development of Early Theoretical codes was achieved by establishing a table of Theory Bits derived from all data sources, including initial theoretical insights recorded directly at the memo stage, theoretical insight following readings, subsequently translated to Theory Bits, aggregated Theory Bits following Memo sorting via Control Codes (Open Coding) and analysis of subsequent Substantive Codes. The pilot tentative theoretical codes/ theory bits also provided a means to suggest Theory Bits during and following the full phase research element.
All Theory Bits or Insights were then listed in Worksheet 4 Early Theoretical Codes (Appendix 10, Table 5) and subjected to sorting via use of the sorting table template, this involved comparison of Theory Bits and their properties described in the workbook and proposal of higher level Early Theoretical Codes to aggregate and suggest common terms for Interchangability of indices. The following table provides an excerpt from the full sorting table (for the complete table, see Appendix 14, Sorting Table 2):

Theory Bit (aggregated Control Terms) Sorted into Early Theoretical Codes

Self-Management of Study Regime and Programme	Exploiting Facilities and Services	Resolving and Supplementing ICT Problems	Engaging with and Negotiating Online Communications	Acquiring and Supplementing Study Skills	Resolving and Supplementing Information Literacy for Effective Research	Engaging with and Negotiating Digital Platforms	Physicalisation of Virtual Learning	Virtualisation of Learning to accommodate Remote Study	Developing Confidence in Technologies and Low Contact Study
Prioritising tasks, aims and objectives	Exploiting oncampus and online services	Overcoming & negotiating IT problems	Negotiating diverse communication tools (VLE, messaging, email, social	Self-development of study skills	Assimilating prior online resource behaviours with current facilities	VLE, Library Platform or WWW page navigating	Physicalisation of digital or online documents	Mobile/ overseas study via VLE, email, synchronous tools etc.	Overcoming confidence issues for low contact context
Managing/ coordinating group work	Skilling and exploiting IT facilities	Overcoming Library/Lab equipment issues via personal/mobile devices	Reconciling diverse email platforms to ensure effective communication	Overcoming study confidence issues	Referencing skilling to avoid plagiarism and grade detriment	Overcoming confidence issues using the VLE	Reliance on VLE for prioritised/optimised study routine	Using the VLE to facilitate core programmes information, course requirements.	Dealing with anxieties in online learning
Remote internet-based studying	Exploiting/skilling via Google Scholar to overcome database issues	Overcoming general confidence issues using ICT	Resolving VLE communications engagement with tutors or peers	Skilling in information literacy, e-resource/WWW credentialising	Skilling with information sources to enhance research	Overcoming WWW site navigation/interface issues	Reliance on facilities for study space, quiet etc.	Asynchronous tool use for time/schedule study	Overcoming confidence issues for group work via online

Figure 58: Theory Bit (Aggregated Control Terms) Sorted into Early Theoretical Codes

The following worksheet (Excel Worksheet 4: Early Theoretical Codes) illustrates the emergence of Theory Bits from memo-derived insight and application of initial control terms to aggregate or refine diverse Theory Bits. The Excel Worksheet has two elements or sub-tables; the first table lists all Theory Bits and maps these alongside Early Theoretical Codes (expressed as Control Terms in the worksheet). There were approximately 180 Theory Bits/ Insights derived from the data (Theory Bits and Control Term based Theory Bits are listed in Appendix 12, Index 1):

Sample Informal Theory Bits and Insights listed from Memo Data sheet, Substantive Descriptive Code sheet and Theoretical Sensitivity sheet	**Sample Theory Bit/ Insight (refined as Control Term)**
Prioritising tasks and objectives to achieve wider aims	Prioritising tasks, aims and objectives

Using a variety of online and oncampus services and tools to obtain a more holistic range of sources and services	Exploiting oncampus and online services
Overcoming lack of computing facilities at home by exploring and developing skills in use of institutional PCs	Skilling and exploiting IT facilities
Overcoming IT issues such as downtime	Overcoming & negotiating IT problems
Overcoming perception that specialist databases are not sufficiently available, Google provides an alternative to locate resources	Augmenting database limitations via Google
Overcoming group working challenges such as logistics and communications to achieve group project outcome	Managing/ coordinating group work
Overcoming proliferation of course materials and documentation in VLE, presenting challenges for management of documentation	Managing high volumes of course material
Using hardcopies to store, view and manage information sources for development of coursework	Physicalisation of digital or online documents
Overcoming expectations for provision of e-resource databases from previous experience	Assimilating prior online resource behaviours with current facilities
Overcoming database navigation problems	VLE, Library Platform or WWW page navigating
Overcoming referencing and plagiarism issues by seeking to develop referencing skills	Referencing skilling to avoid plagiarism and grade detriment

Table 13: Tables used in Worksheet 4 Demonstrating Informal Theory Bits and

Insights listed from the Memo Data sheet and Sample Theory Bit/ Insight (refined as Control Terms)

ii. Summary of all Early Theoretical Codes

The following pages outline all Early Theoretical Codes followed by dependant properties (Theory Bits/ Theoretical Insight) which had been derived from sorting; there were a total of 20 Early Theoretical Codes. Figures also shown below illustrate the relationship between Early Theoretical Codes (see Appendix 10, Table 4) and

dependant Theory Bits/ Theoretical insight derived from Memo Indicators and early descriptive codes (sorted into Control Terms):

Self-Management of Study Regime and Programme

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Prioritising tasks, aims and objectives; Managing/ coordinating group work; Remote internet-based studying; Management of family life to facilitate study; Time management for effective study; Flexible locating to overcome opening/facility limitations; Facilitating lifelong learning via studies; Facilitating career development via academic skills progression; Investing resources, time and effort to facilitate study via VLE; Taking increased responsibility/ motivation for self-led study due to low class contact; Dealing with varying levels of expectancy fulfilment and adopting consequent coping behaviours.

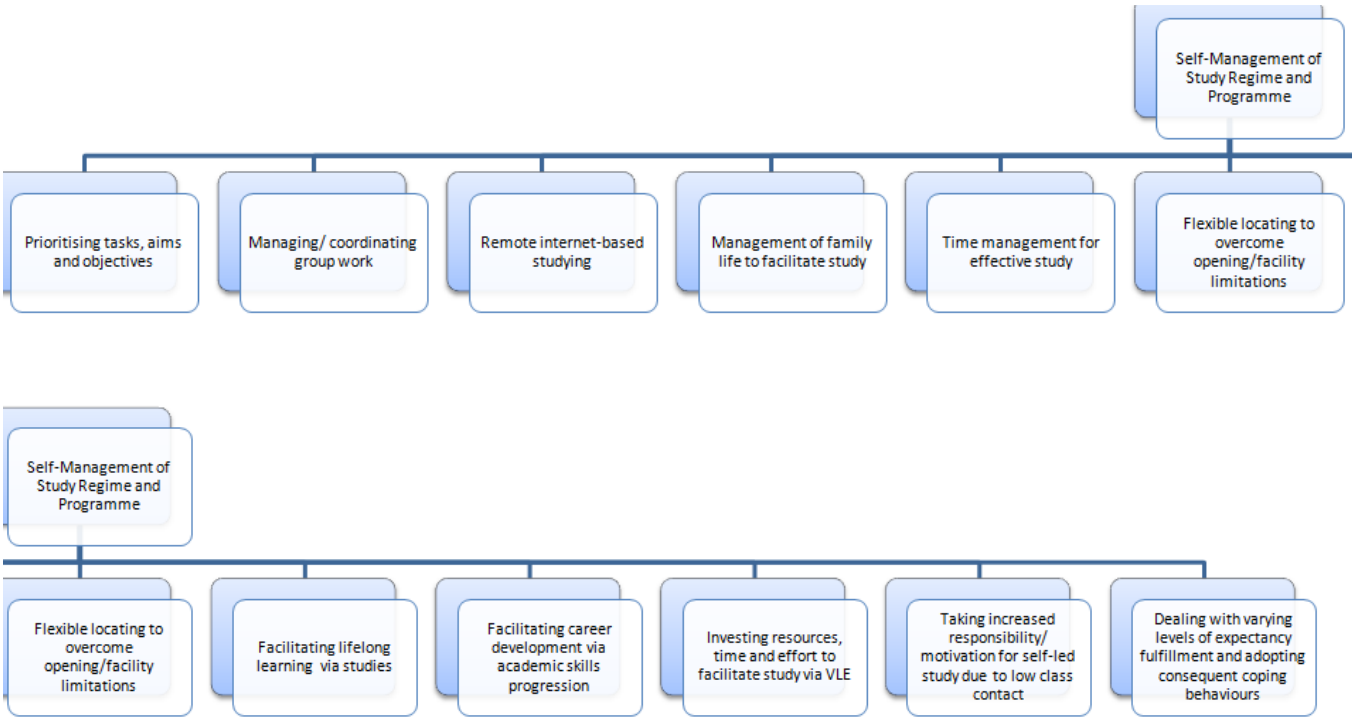


Figure 59: Early Theoretical Code: Self-Management of Study Regime and Programme (in two parts)

Exploiting Facilities and Services

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Exploiting oncampus and online services; Skilling and exploiting IT facilities; Exploiting/skilling via Google Scholar to overcome database issues; Exploitation of VLE as supplement to class attendance issues; Exploiting oncampus computing/software facilities; Maximising/ optimising online tools/VLE in mixed physical/online-dependent context; Exploitation of VLE as supplement to class attendance issues.

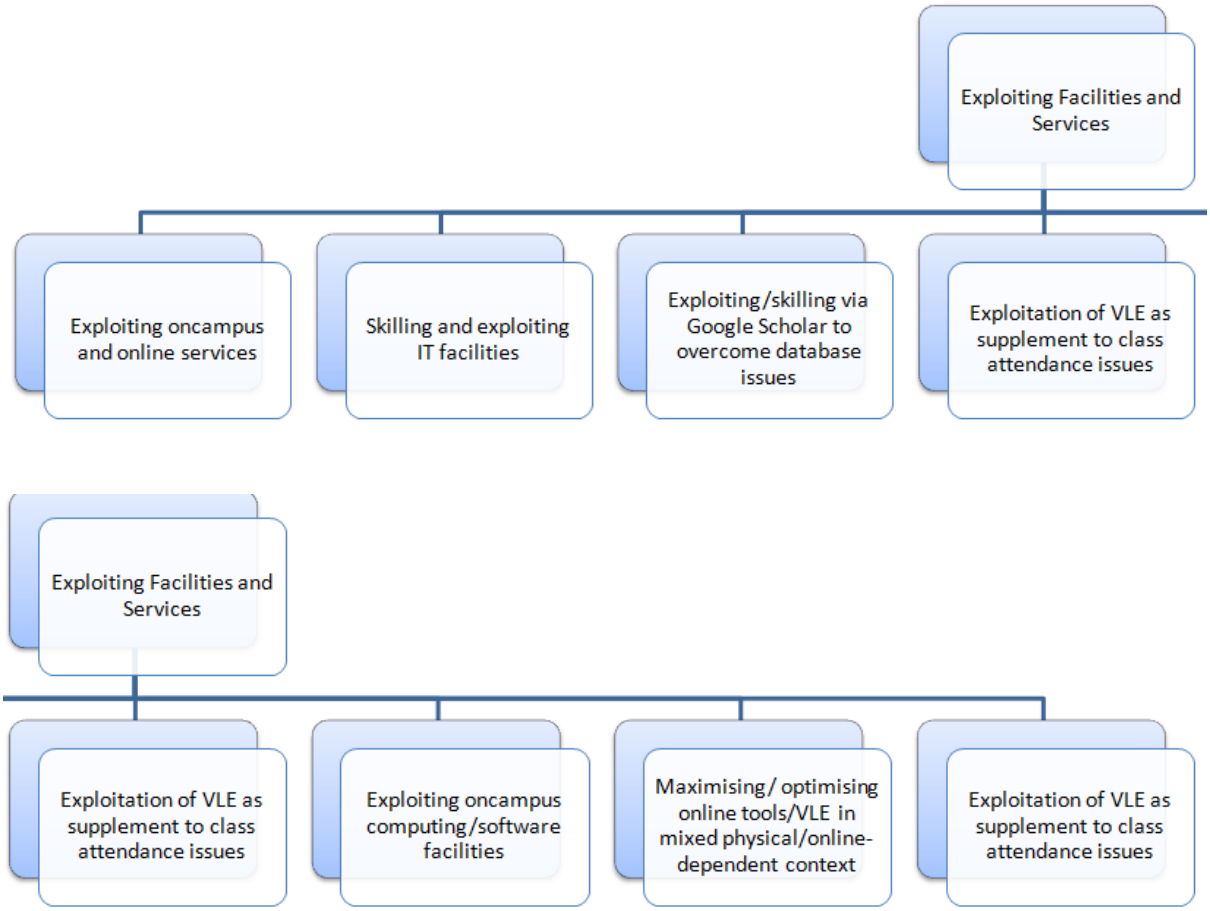


Figure 60: Early Theoretical Code: Exploiting Facilities and Services (in two parts)

Resolving and Supplementing ICT Problems

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Overcoming & negotiating IT problems; Overcoming Library/Lab equipment issues via personal/mobile devices; Overcoming general confidence issues using ICT; Overcoming diverse systems and compatibility problems; Skilling in general IT skills to improve online study effectiveness.

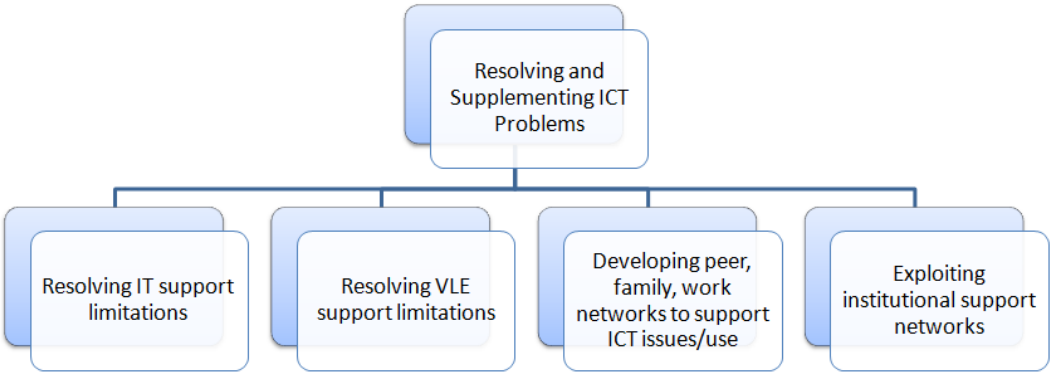


Figure 61: Early Theoretical Code: Resolving and Supplementing ICT Problems

Engaging with and Negotiating Online Communications

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Negotiating diverse communication tools (VLE, messaging, email, social networks); Reconciling diverse email platforms to ensure effective communication; Resolving VLE communications engagement with tutors or peers; Overcoming low engagement

of peers in use of communication tools; Resolving/negotiating low tutor VLE interaction.

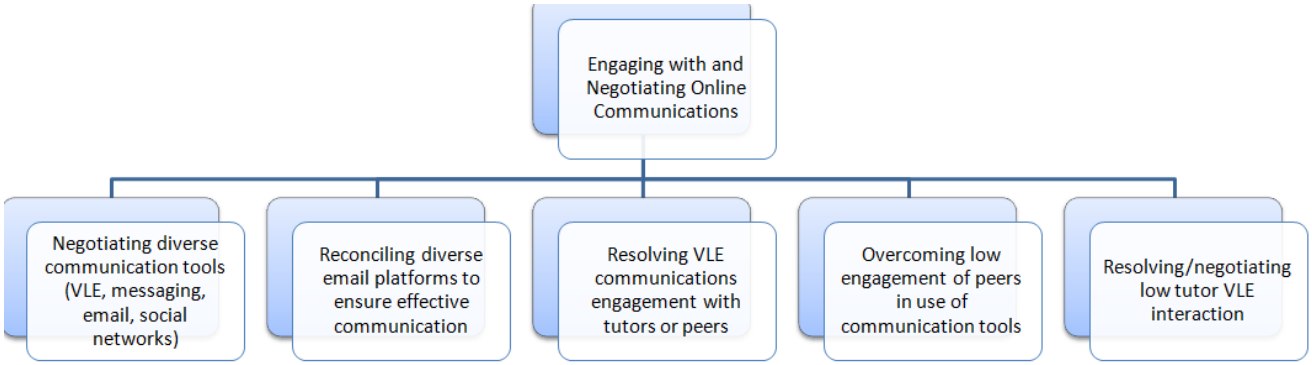


Figure 62: Early Theoretical Code: Engaging with and Negotiating Online Communications

Acquiring and Supplementing Study Skills

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Self-development of study skills; Overcoming study confidence issues; Skilling in information literacy, e-resource/WWW credentialising for study ; Rebuilding academic skills; Lone & self led studying at a distance from peers/tutors; On-demand self-led learning due to time constraints attending training; Overcoming/skilling in study competencies to overcome training gaps; Self-regulated development of learning skills via diverse research/assimilation and evaluation.

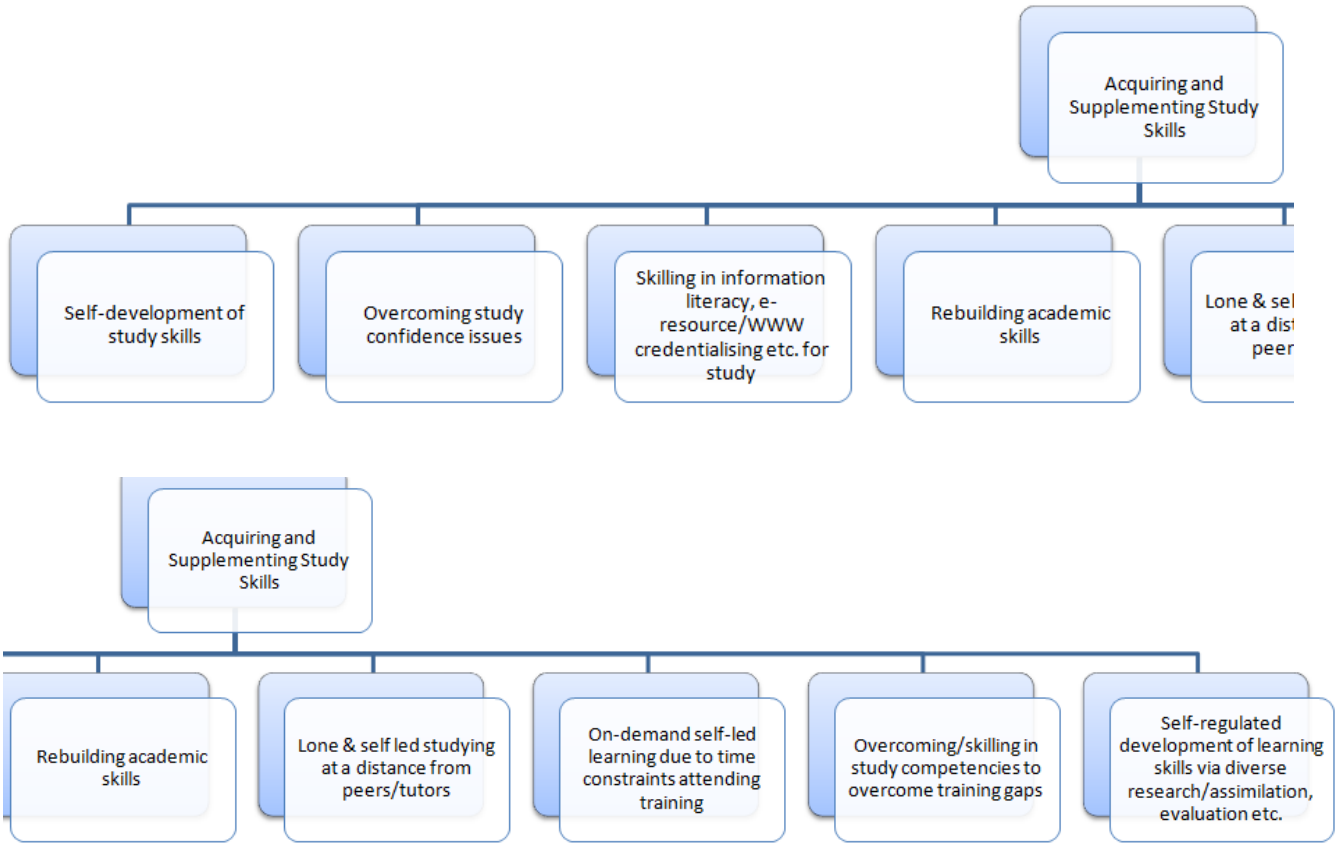


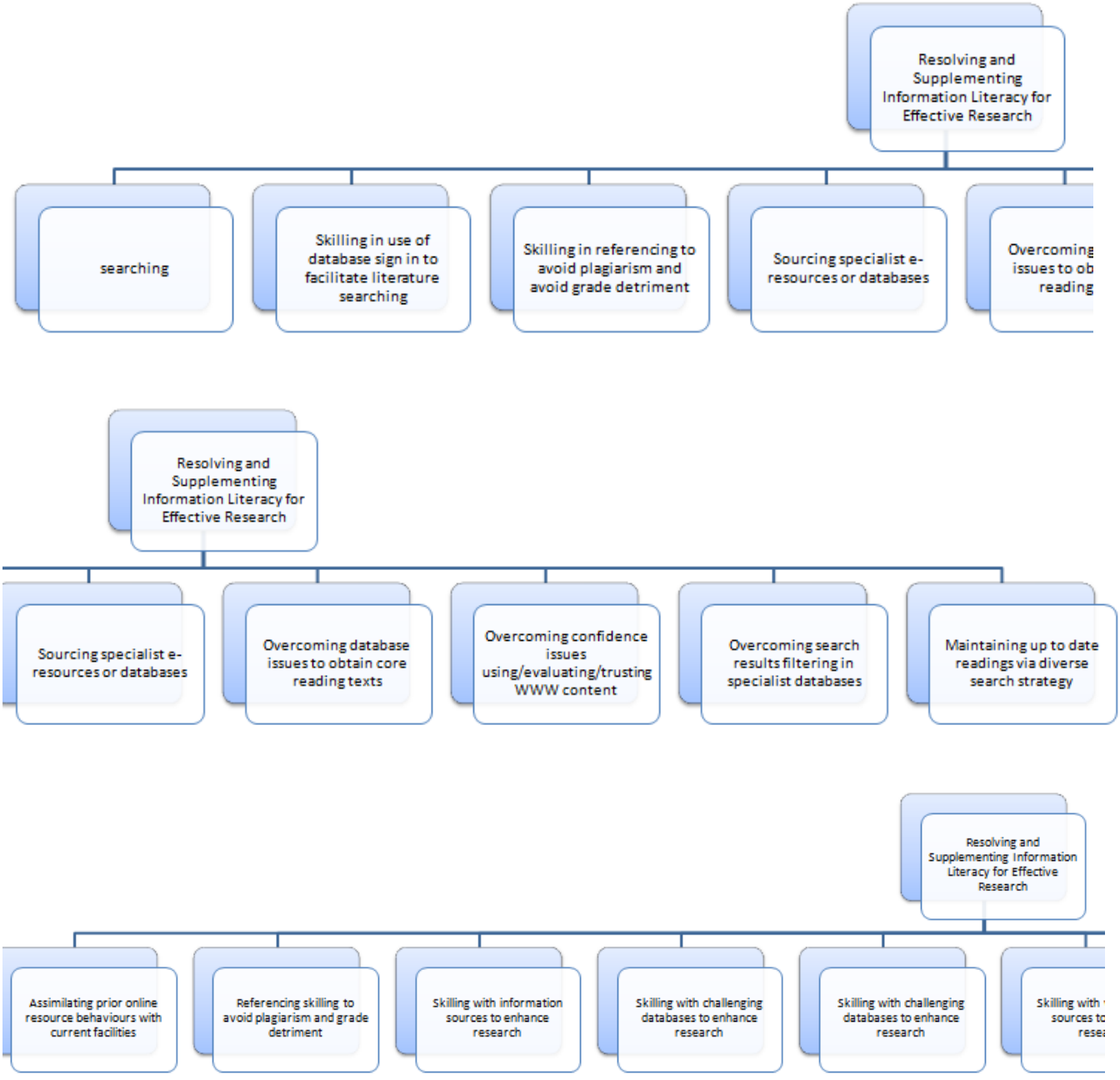
Figure 63: Early Theoretical Code: Acquiring and Supplementing Study Skills (in two parts)

Resolving and Supplementing Information Literacy for Effective Research

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Assimilating prior online resource behaviours with current facilities; Referencing skilling to avoid plagiarism and grade detriment; Skilling with information sources to enhance research; Skilling with challenging databases to enhance research; Skilling with wider online sources to enhance research; Skilling in use of database sign in to facilitate literature searching; Skilling in referencing to avoid plagiarism and avoid grade detriment; Sourcing specialist e-resources or databases; Overcoming database issues to obtain core reading texts; Overcoming confidence issues

using/evaluating/trusting WWW content; Overcoming search results filtering in specialist databases; Maintaining up to date readings via diverse search strategy.



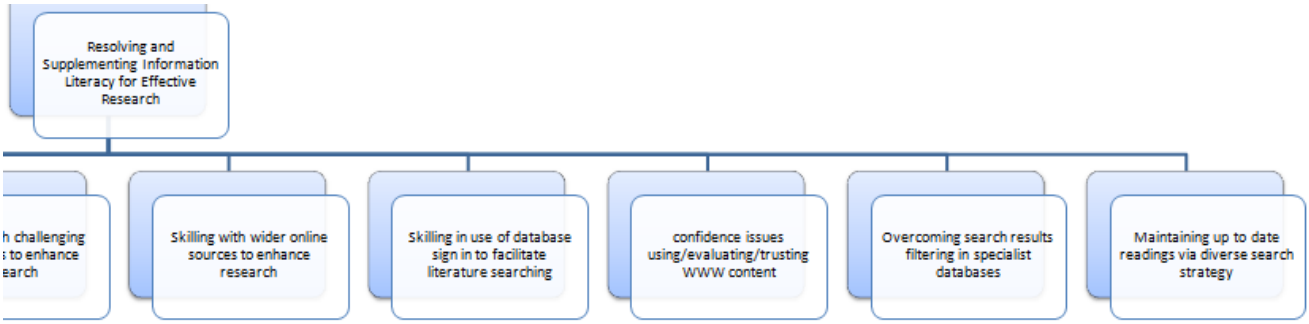
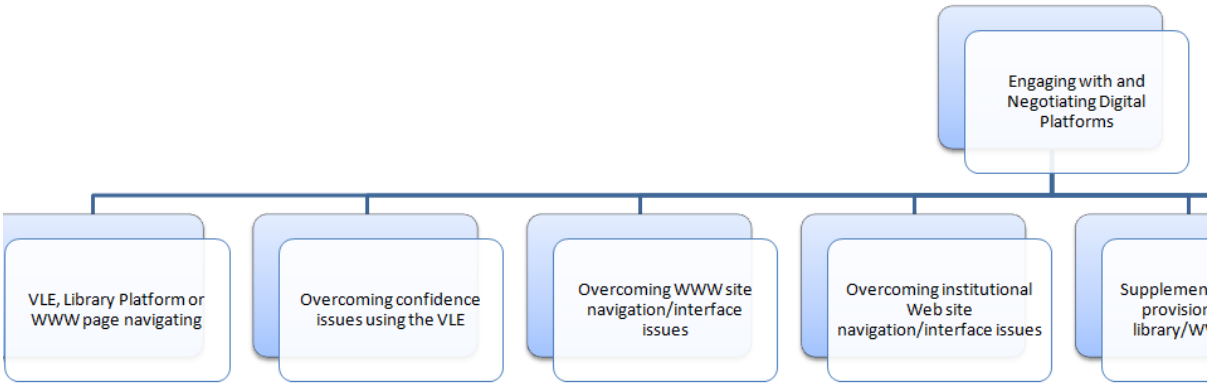


Figure 64: Early Theoretical Code: Resolving and Supplementing Information Literacy for Effective Research (in four parts)

Engaging with and Negotiating Digital Platforms

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

VLE, Library Platform or WWW page navigating; Overcoming confidence issues using the VLE; Overcoming WWW site navigation/interface issues; Overcoming institutional Web site navigation/interface issues; Supplementing core VLE provision via wider library/WWW portals; Self-navigating/resolving diverse sources/databases unavailable directly in VLE; Overcoming challenges accessing range of database/platforms/WWW sources; Integrating and assimilating University platforms and sources into existing practices.



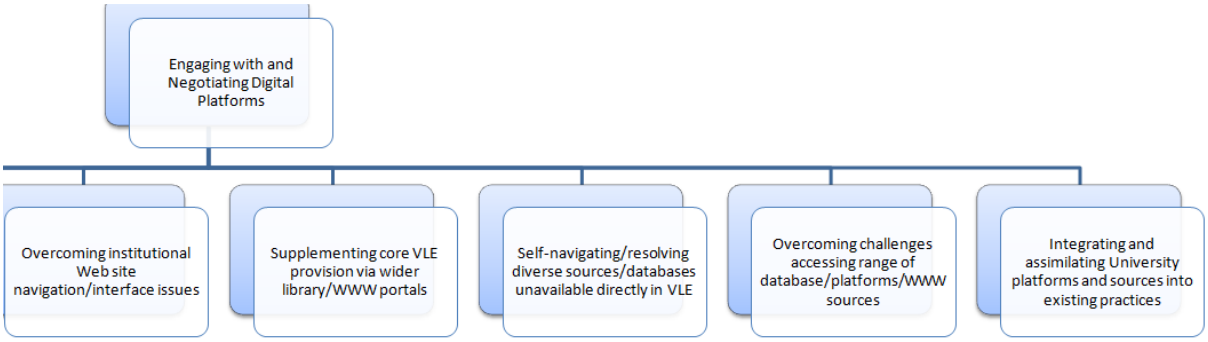


Figure 65: Early Theoretical Code: Engaging with and Negotiating Digital Platforms (in two parts)

Physicalisation of Virtual Learning

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Physicalisation of digital or online documents; Reliance on VLE for prioritised/optimised study routine; Reliance on facilities for study space/ quiet; VLE/online tools avoidance via reliance on core handbook or selected print materials; Avoidance of unfamiliar technologies and related training, utilising familiar technologies.

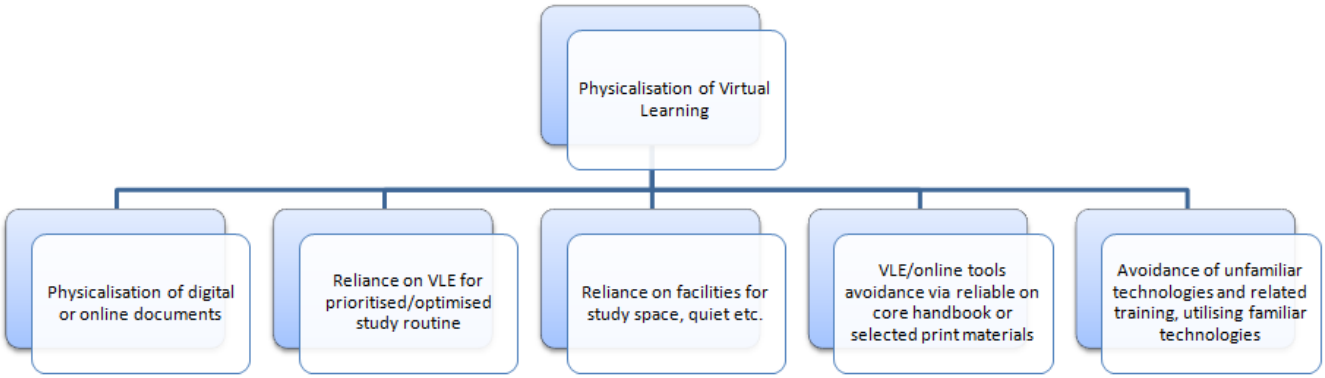
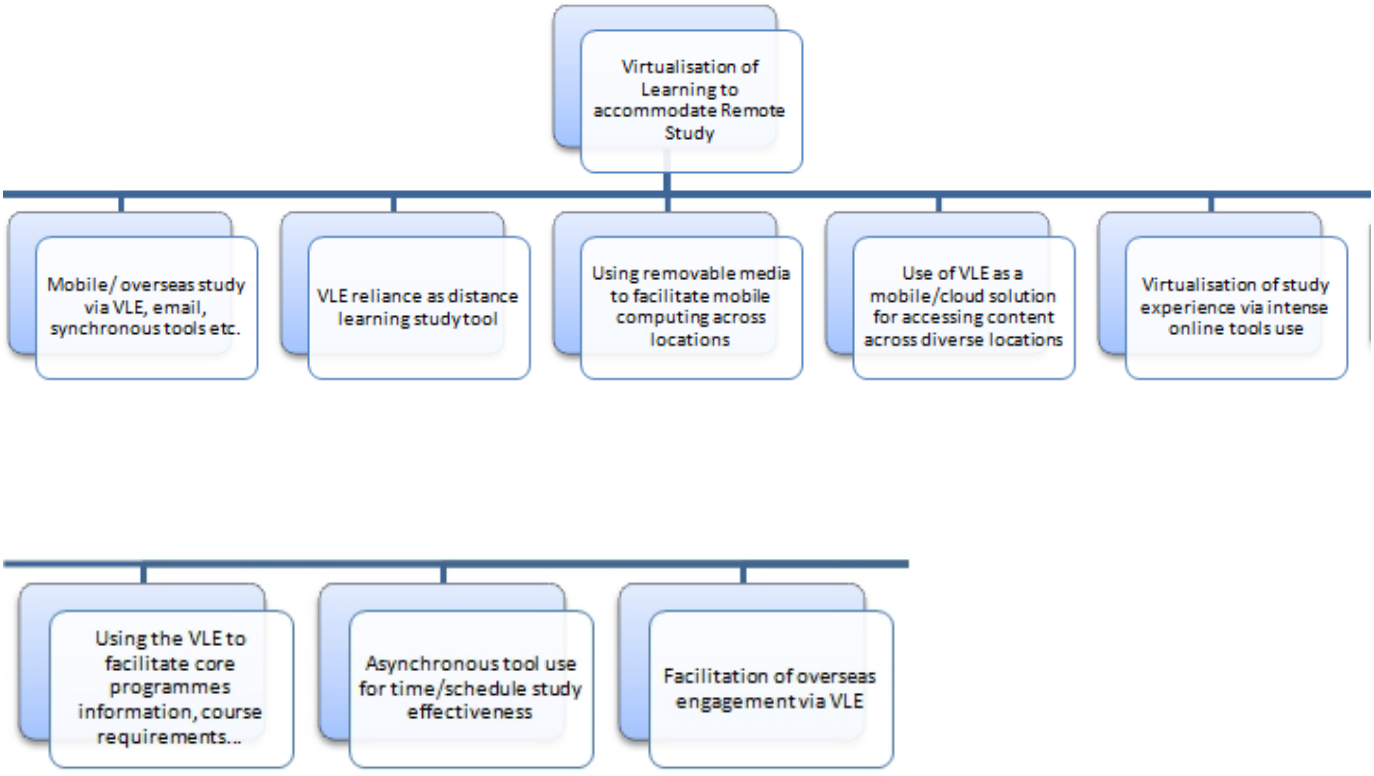


Figure 66: Early Theoretical Code: Physicalisation of Virtual Learning

Virtualisation of Learning to accommodate Remote Study

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Mobile/ overseas study via VLE, email and synchronous tools; Using the VLE to facilitate core programmes information, course requirements...; Asynchronous tool use for time/schedule study effectiveness; Facilitation of overseas engagement via VLE; VLE reliance as distance learning study tool; Using removable media to facilitate mobile computing across locations; Use of VLE as a mobile/cloud solution for accessing content across diverse locations; Virtualisation of study experience via intense online tools use; Choosing to study in part time context to accommodate personal/work commitments ; Ubiquitous learning via range of devices & locations to accommodate lifestyle ; Distributed Learning via multiple e-learning formats, tools, media.; Accessing support, training materials, video just in time to need/activity.



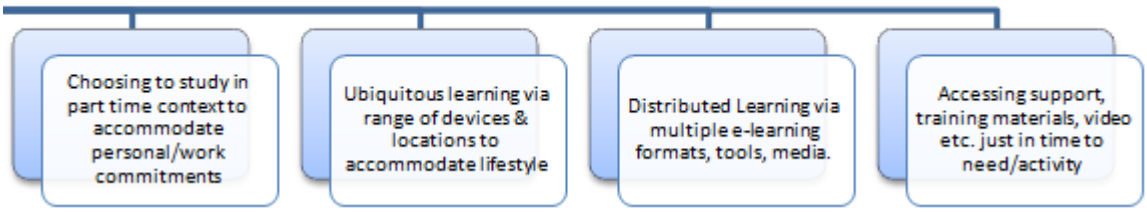


Figure 67: Early Theoretical Code: Virtualisation of Learning to accommodate Remote Study (in three parts)

Learning Resources Capital Acquisition

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Seeking autonomy to access software installed in diverse locations; Overcoming deficit of specialist software applications.

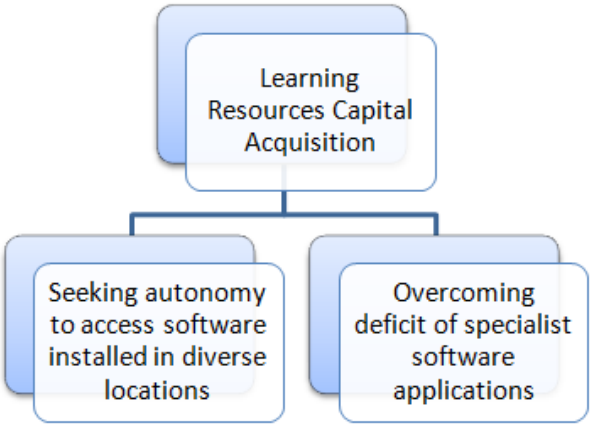


Figure 68: Early Theoretical Code: Learning Resources Capital Acquisition

Organisation of Learning Assets

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Digital document/ excerpt and notes management for effective file handling; WWW/

E-resource sorting, labelling and storing for efficient media retrieval; Sorting and labelling digital assets using folders; Selection and refinement of learning resources to avoid information overload via adoption of key resources such as the VLE.

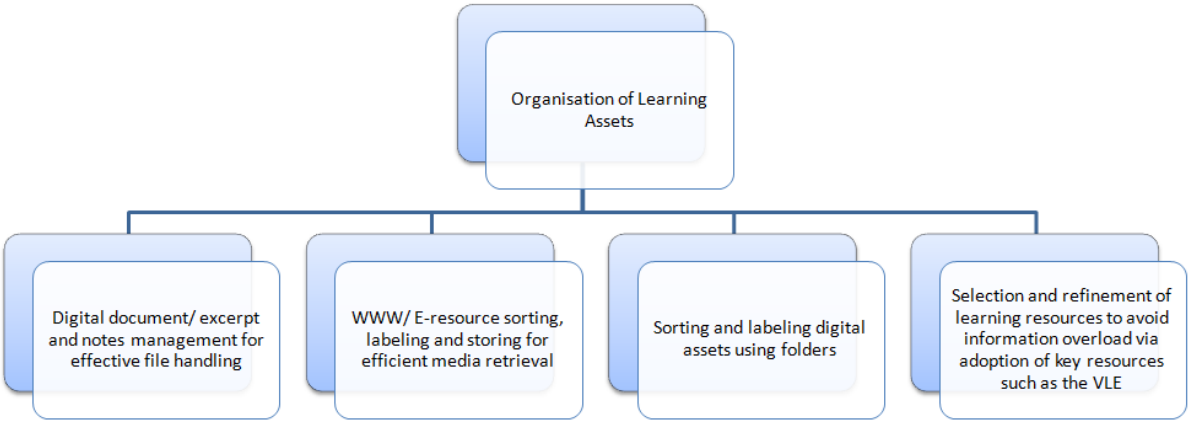


Figure 69: Early Theoretical Code: Organisation of Learning Assets

Supplementing and Innovating Literature Searching Approaches

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Augmenting library/database usability via Google; Augmenting database limitations via Google; Reliance on VLE as intermediary for e-resources; Resolving full text e-resource problems via Google/Scholar; Overcoming/supplementing limited database coverage; Resolving WWW e-texts in the absence of print/digital copies; Use of a range of library/online providers for sourcing materials.

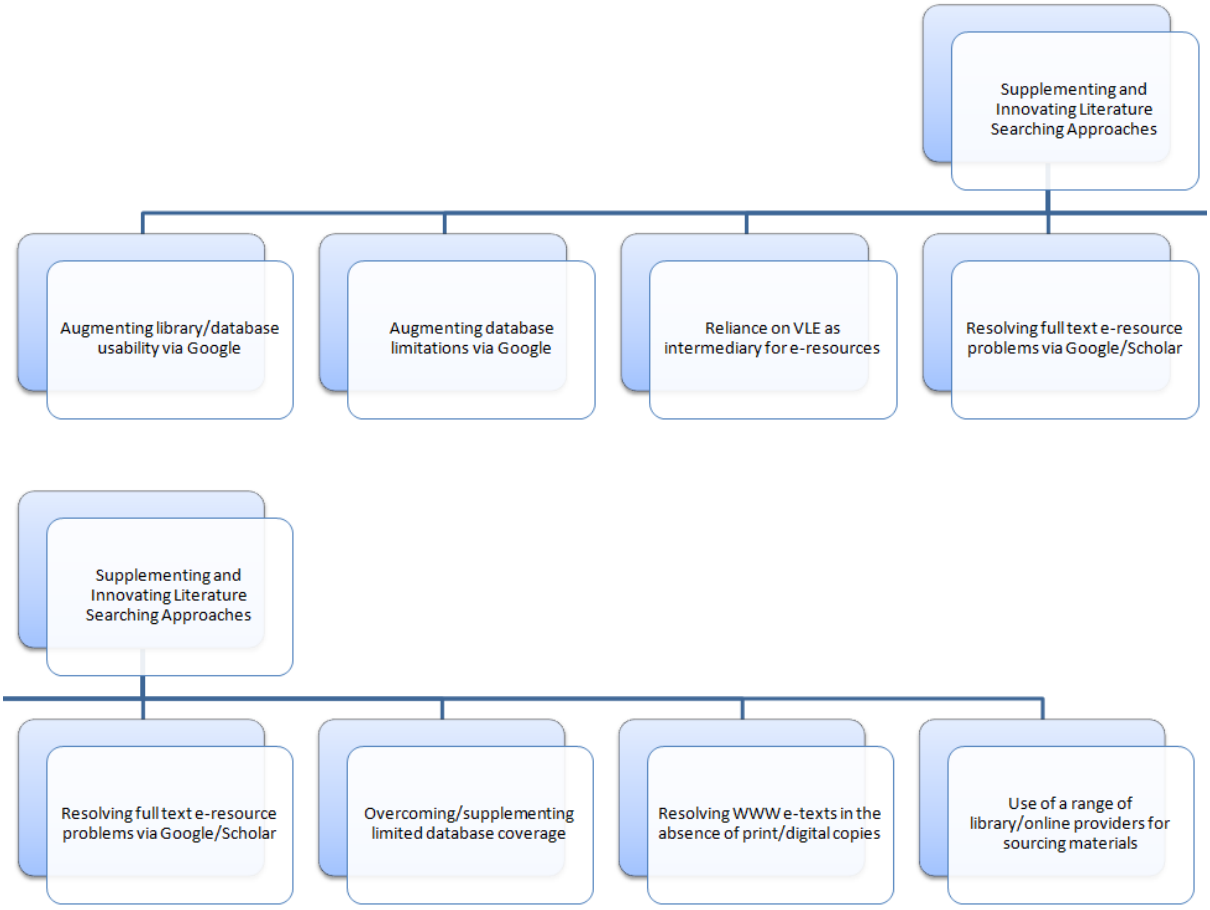


Figure 70: Early Theoretical Code: Supplementing and Innovating Literature Searching Approaches (in two parts)

Virtualisation and Engagement for Online Feedback and Assessment

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Networking via available communication tools to enhance peer/tutor interaction; Engaging/skilling with VLE communications tools for tutor liaison; Assessment/feedback and reflection via VLE, email; Active 'e-moderating' participation with tutor via discussion boards, feedback and other tools; Synchronous debate and collaboration between tutor/students e.g. via virtual classroom tool.

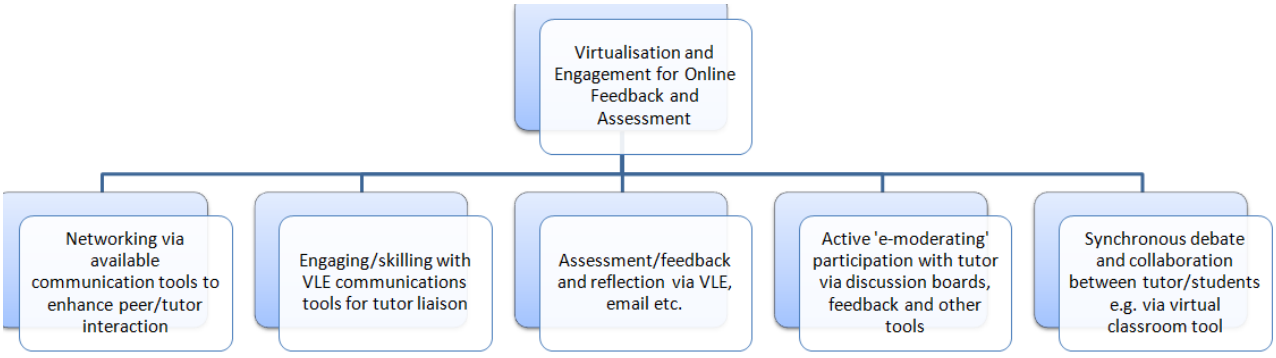
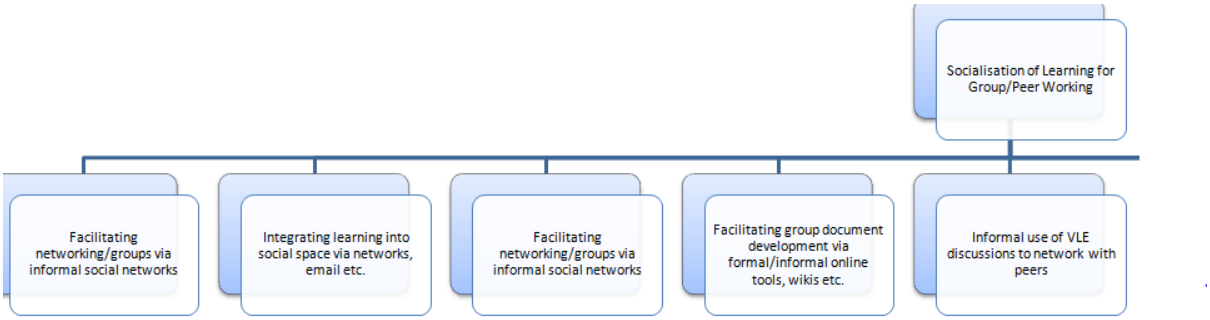


Figure 71: Early Theoretical Code: Virtualisation and Engagement for Online Feedback and Assessment

Socialisation of Learning for Group/Peer Working

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Facilitating networking/groups via informal social networks; Integrating learning into social space via networks, email; Facilitating group document development via formal/informal online tools, wikis; Informal use of VLE discussions to network with peers; Extending VLE via informal resource sharing and communication via social media, cloud computing for group work; Sharing knowledge and group information via VLE tools; Using informal synchronous communication such as Skype for group work and socialisation; Applying informal networks and socialisation with peers/tutors to embed learning in these contexts.



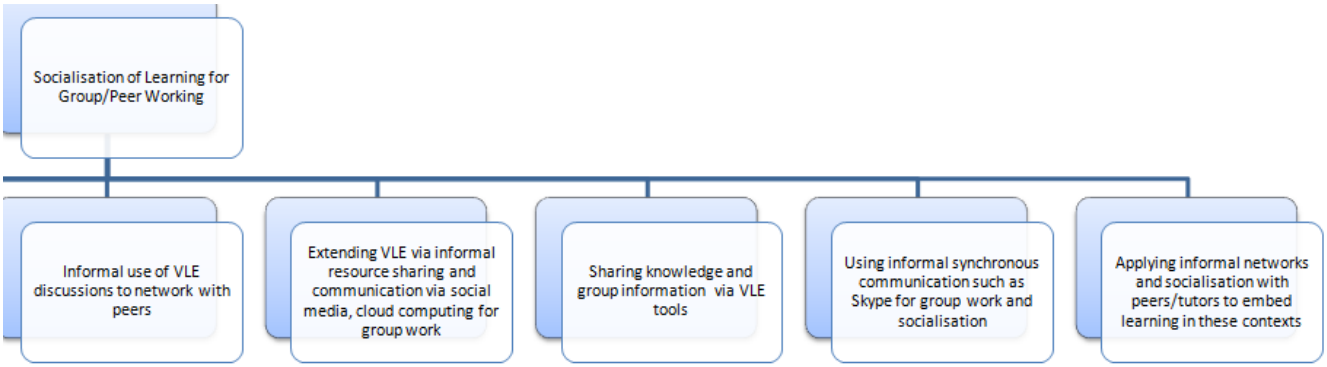


Figure 72: Early Theoretical Code: Socialisation of Learning for Group/Peer Working (in two parts)

Engaging with and Negotiating Remote Group Working

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Engaging/skilling with VLE communications tools for group projects; Remote engagement with group projects via VLE tools; Resolving VLE communications tools problems for group work; Balancing/prioritising workload with group networking demands; Overcoming low engagement of peers in use of communication tools.

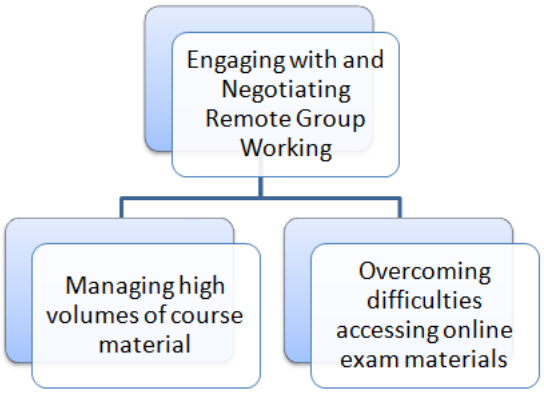


Figure 73: Early Theoretical Code: Engaging with and Negotiating Remote Group Working

Resolving and Networking for Acquisition of ICT Support

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Resolving IT support limitations; Resolving VLE support limitations; Developing peer, family, work networks to support ICT issues/use; Exploiting institutional support networks.

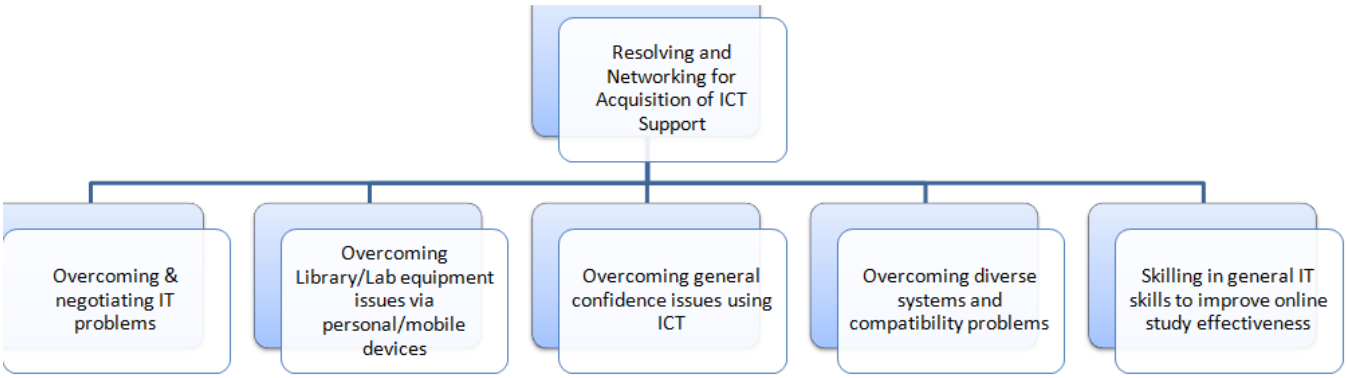


Figure 74: Early Theoretical Code: Resolving and Networking for Acquisition of ICT Support

Engaging with and Negotiating VLE and course content

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Managing high volumes of course material; Overcoming difficulties accessing online exam materials.

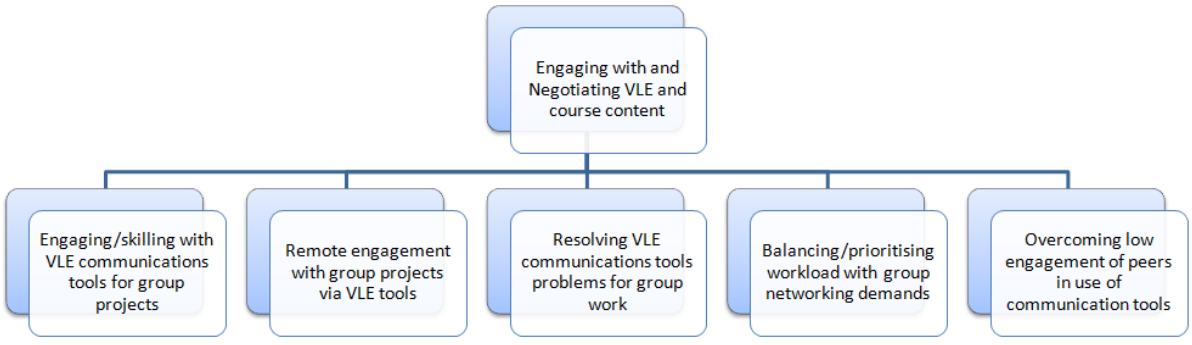


Figure 75: Early Theoretical Code: Engaging with and Negotiating VLE and course content

Managing and Negotiating Work-Study Relationships

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Integrating work and study context to develop lifelong learning; Managing workplace demands for study participation; Managing workplace sponsored study requirements; Anxieties related to work related fee resourcing; Managing access to study balancing work commitments.

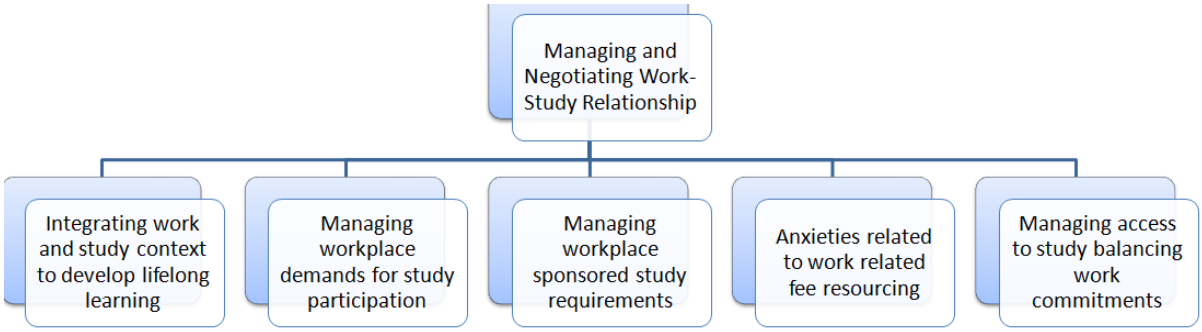


Figure 76: Early Theoretical Code: Managing and Negotiating Work-Study Relationships

Resolving and Negotiating WWW usage issues

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Skilling/ negotiating WWW search challenges; WWW evaluation strategies for authoritative use of sources; WWW bookmarking to resolve e-resources; Overcoming WWW authority issues via Library links/platforms; Negotiation of diverse

WWW sources via favourites or link sharing platforms.

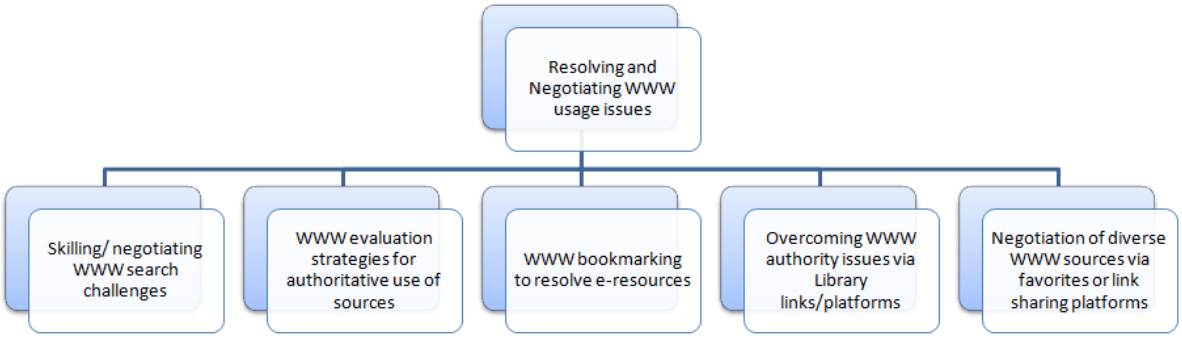


Figure 77: Early Theoretical Code: Resolving and Negotiating WWW usage issues

Developing Confidence in Technologies and Low Contact Study

Theory Bits/Insight expressed as Properties of Early Theoretical Code:

Overcoming confidence issues for low contact context; Dealing with anxieties in online learning; Overcoming confidence issues for group work via online tools.

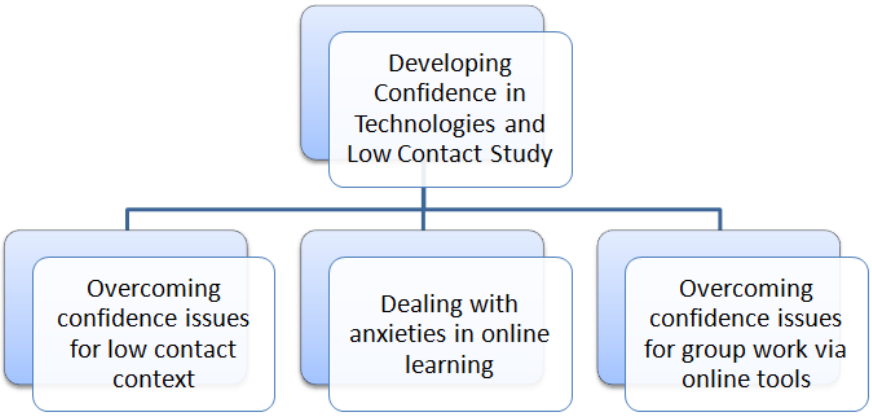


Figure 78: Early Theoretical Code: Developing Confidence in Technologies and Low Contact Study

iii. Theoretical Sensitivity – contributions from the literature to Theoretical Codes

The uses of the Grounded Theory approach to reading materials and contribution of literature to practical research has been discussed elsewhere in this thesis, e.g. Chapter 3: Research Design, Part 7: Overview of The Practical Research Phases. The literature provided insights which were often annotated and used in the form of data for contribution to the development of Theory Bit Control Terms. These included readings on challenges and coping strategies for online or blended-learning based students, theories of information systems deployment in a social context for reduced technological distraction, such as Calm Computing (Fiaidhi, 2011) or theories of experiential learning such as social learning via a blended class and online study approach (Langley, 2007). Many of these theories have been discussed elsewhere in greater detail. The processing of theoretical sensitivity-derived insight was achieved systematically by translating key insights into Theory Bits for use alongside other emerging theory in Worksheet 4 Early Theoretical Codes (shown fully in Appendix 10, Table 5). The following table provides an overview of some key theories or studies which contributed to the development of early theoretical codes:

Theory Bits derived from Literature	Explanation/ Citation	Full Reference
Blended learning	"Online learning has its drawbacks. One of the main disadvantages is the lack of social interaction which is taken as given in conventional settings. This creates a special need to motivate the less independent student..." (Heinze and Proctor, 2004, p.1).	Heinze, A. and Procter, C. (2004) 'Reflections on the use of blended learning', Education in a Changing Environment 13th-14th September 2004, University of Salford, pp.1-12.
Low contact motivations	"The climate in HE is rapidly changing, with growing financial challenges for students and increasingly market-driven skills demands; these influences, coupled with recent impetus for widening participation and increased co-operation with industry, have seen the emergence of a new user base within HE... " (Catherall, 2005, p.75).	Catherall, P. (2005) *Delivering E-Learning for information services in higher education*. Elsevier.
Use of synchronous communication tools to achieve more dynamic group communication e.g. Skype, Microsoft Messenger/ Live tools.	"By removing the barriers of time and place, instructors can create and sustain student learning communities supported by interactive communication tools grounded in asynchronous learning models. The instructor's role moves to that of a facilitator who seeks to stimulate interactions between students and between students and the instructor, in the pursuit of improved learning and knowledge base construction." (Wilson, 2004, p.94).	Wilson, G. A. (2004) *The impacts of synchronous learning activities upon online learners* (Dissertation), Royal Roads University.
Use of asynchronous communication tools such as discussion boards or file sharing for group and peer interactions to overcome low contact context.	"By removing the barriers of time and place, instructors can create and sustain student learning communities supported by interactive communication tools grounded in asynchronous learning models. The instructor's role moves to that of a facilitator who seeks to stimulate interactions between students and between students and the instructor..." (Kochtanek and Hein, 2000, p.280).	Kochtanek, T. R. and Hein, K. K. (2000) 'Creating and nurturing distributed asynchronous learning environments', *Online Information Review*, 24 (4), p.280.
Ubiquitous learning styles - using a variety of devices and design options to facilitate 24/7 on-demand learning, accommodating the students' own time schedule and commitments.	"Ubiquitous learning. This term is often used to describe the relationship between students, tutors and electronic systems in a variety of contexts such as the university, home, workplace, local library or via mobile devices such as an Internet-enabled mobile phone..." (Catherall, 2005, p.16).	Catherall, P. (2005). *Delivering E-Learning for information services in higher education*. Elsevier.
E-Moderating	"Gilly Salmon's e-moderating model (Salmon, 2000)… …describes a five-stage process, engaging the student with online communication technology. It is based on a principle that there are certain things that have to exist in order to achieve the effective operation of learning via technology." (Heinze and Proctor, 2004, p.2).	Heinze, A. and Procter, C. (2004) 'Reflections on the use of blended learning', Education in a Changing Environment 13th-14th September 2004, University of Salford, pp.2-12 Salmon, G. (2004) *E-moderating : the key to teaching and learning online*. 2nd ed. London:

		RoutledgeFalmer.
Collaborative Learning	"In addition to pushing traditional lectures out of college classrooms, information technology is pushing the limits of online human communication and collaboration, opening new frontiers for collaborative learning. It is currently possible to conduct a virtual class meeting on the Web, wherein students not only see the slides and other materials as the instructor moves through them but can actually take control of the presentation..." (Graetz and Goliber, 2002, p.18).	Graetz, K. A., and Goliber, M. J. (2002) 'Designing Collaborative Learning Places: Psychological Foundations and New Frontiers', *New Directions For Teaching & Learning*, 92, pp.13-22.
Distributed Learning	"The research rationale was based on a perspective that is relatively new in education; this involves the idea of 'distributed learning', or that knowledge is 'distributed' and shared across contexts, tools, persons and resources. It is very different from more traditional views that see knowledge as existing in isolation and out of context..." (Logan, 2004, p.3).	Logan, C., Allan, S., Kurien, A. and Flint, D. (2004) *Distributed e-learning in art, design, media: An investigation into current practice*, (Commissioned Report), Higher Education Academy Art, Design and Media Subject Area, pp.1-70.
Self Regulated Learning	"This approach is grounded in constructivist theory. It presumes that students who are active and take control of their own learning at any age level or in any learning situation perform better and achieve better results. The students who already use these tactics must nurture them. Those students who do not have the skills must develop them to be more successful." (Wilson, 1997, p.1).	Wilson, Jay. 'Self regulated learners and distance education theory' , University of Saskatchewan, pp.1-8.
Self-Managed Learning	"One of the defining characteristics of higher education is the expectation that undergraduates will exercise some responsibility for the management of their learning. In the UK and elsewhere student self-managed learning has become more salient due to resource constraints and the increasing emphasis on equipping students with what they need to become lifelong learners..." (Ottewill, 2002, p.12).	Ottewill, R. (2002) 'Student self-managed learning–cause for concern?'. *On the Horizon*, 10 (1), pp.12-16.
Demand-Led Learning (Learning On Demand)	"According to the authors, LOD reduces knowledge acquisition time, cuts travel costs for both students and teachers, lowers off-the-job related expenses, reduces classroom overheads and lowers materials expenses. Through LOD higher-quality learning improves organizational performance and increases employees' breadth of knowledge..." (Trondsen and Vickery, 1997, p.169).	Trondsen, E., and Vickery, K. (1997) 'Learning on demand'. *Journal of Knowledge Management*,1 (3), pp.169-180.
Mobile Learning	"Looking at mobile learning in a wider context, we have to recognise that mobile, personal, and wireless devices are now radically transforming societal notions of discourse and knowledge, and are responsible for new forms of art, employment, language, commerce, deprivation, and crime, as well as learning. With increased popular access to information and knowledge anywhere..." (Traxler, 2007).	Traxler, J. (2007) 'Defining, Discussing and Evaluating Mobile Learning: The moving finger writes and having writ...', *The International Review of Research in Open and Distance Learning*, 8(2).

Social Learning	"A blended learning strategy can lead to increased social interaction and social learning, more so than with an e-learning only approach. As social learning theory shows those who share similar interests interact in a way that leads to the sharing of both tacit skills and tacit knowledge." (Langley, 2007, p.173).	Langley, A. (2007) 'Experiential learning, e-learning and social learning: The EES approach to developing blended learning', The University of Northampton, pp.171-186.
Gratification Theory	"The 'Uses and Gratification Expectancy' concept is used to define students' 'beliefs and evaluations' of elearning resources. This concept proposes that e-learning resources possess attributes that are likely to satisfy students' learning needs, learning styles, values, motivations, interests, intentions and epistemological curiosity." (Mondi, Woods and Rafi, 2007, p.436).	Mondi, M., Woods, P. and Rafi, A. (2007) 'Students' uses and gratification expectancy conceptual framework in relation to E-learning resources'. *Asia Pacific Education Review*, 8 (3), pp.435-449.
Calm Computing	"Calm computing aims to reduce the "excitement" of information overload by letting the learner select what information is at the center of their attention and what information need to be at the peripheral. The objective of calm computing as a new delivery of education is to move e-learning and ubiquitous learning a step further from learning at anytime anywhere to be at the right time and right place with right learning resources and right learning functionalities and collaborative peers." (Fiaidhi, 2011, p.9).	Fiaidhi, J. (2011) 'Towards developing installable e-learning objects utilizing the emerging technologies in calm computing and ubiquitous learning', *International Journal of u-and e-Service, Science and Technology*, 4 (1), pp.1-12.

Table 14: Key Theories which Contributed to the Development of Early Theoretical Codes

Part 4: Developed Theoretical Codes

Whilst earlier development of Theoretical Codes and Open Coding had been subject to greater testing and verification directly at the point of interview with participant groups, it can be seen that a rather more deductive-dependant approach was taken to refined codes further based around Interchangability of indices, however some emergent codes were subjected to verification and further exploration via theoretical

sampling via inclusion of emergent theoretical codes/Theory Bits in opening discussion with interview participants. The Developed Theoretical Codes stage represented an attempt to refine the 20 Early Theoretical Codes into more refined, aggregate forms; this was mainly achieved by comparison of common properties and dependant variables and use of the sorting template. The subsequent 8 Developed Theoretical Codes can be visualised in Worksheet 5: Developed Theoretical Codes, alongside dependent variables/properties drawn from Early Theoretical codes and a narrative description of these codes.

i. Summary of all Developed Theoretical Codes

Note – the Developed Theoretical Codes outlined below were assimilated/ derived from Low Level Theoretical Codes (and commonly occurring Properties) following category sorting; the codes are shown in context to Early Theoretical Codes. The accompanying figures illustrate the relationship between Developed Theoretical Codes and dependant Early Theoretical Codes:

Multi-tasking Commitments

Early Theoretical Codes expressed as Properties of Developed Theoretical Code:
Self-Management of Study Regime and Programme; Managing and Negotiating Work-Study Relationships.

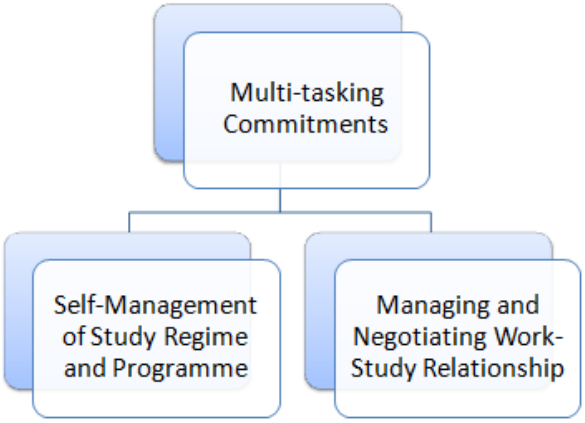


Figure 79: Relationship of Early Theoretical Categories to Developed Category: Multi-tasking Commitments

Self-Regulated Engagement

Early Theoretical Codes expressed as Properties of Developed Theoretical Code: Acquiring and Supplementing Study Skills; Developing Confidence in Technologies and Low Contact Study; Resolving and Supplementing Information Literacy for Effective Research; Resolving and Supplementing ICT Problems.

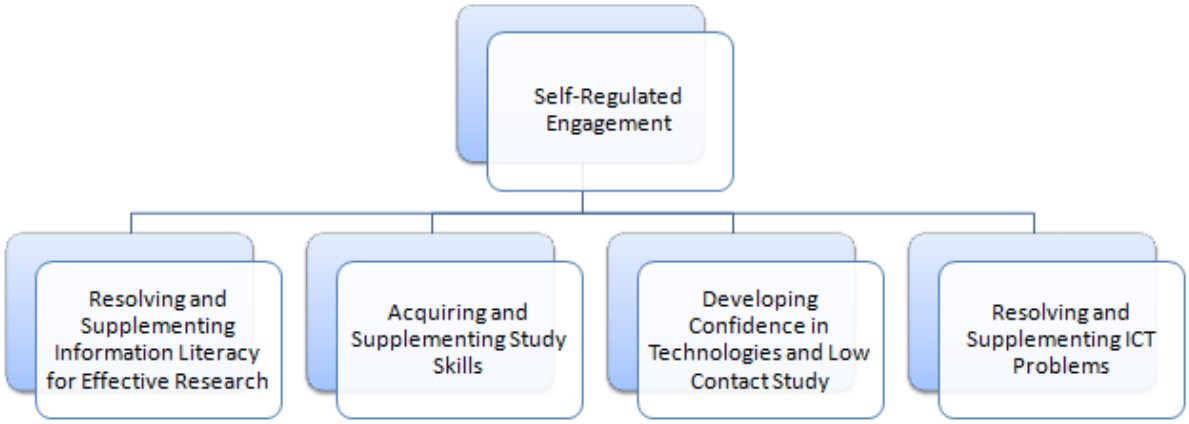


Figure 80: Relationship of Early Theoretical Categories to Developed Category: Self-Regulated Engagement

Transitional Physicalisation of Online Learning

Early Theoretical Codes expressed as Properties of Developed Theoretical Code:

Physicalisation of Virtual Learning; Learning Resources Capital Acquisition.

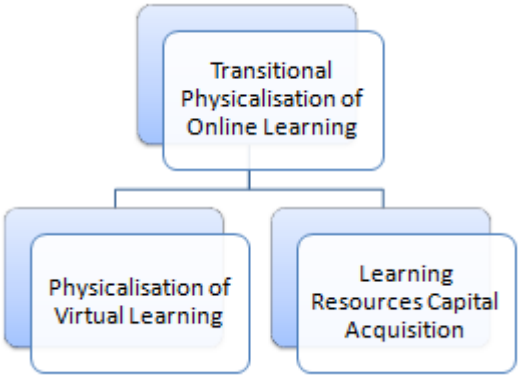


Figure 81: Relationship of Early Theoretical Categories to Developed Category: Transitional Physicalisation of Online Learning

Network Building/ Engaging

Early Theoretical Codes expressed as Properties of Developed Theoretical Code:

Engaging with and Negotiating Remote Group Working; Resolving and Networking for Acquisition of ICT Support.

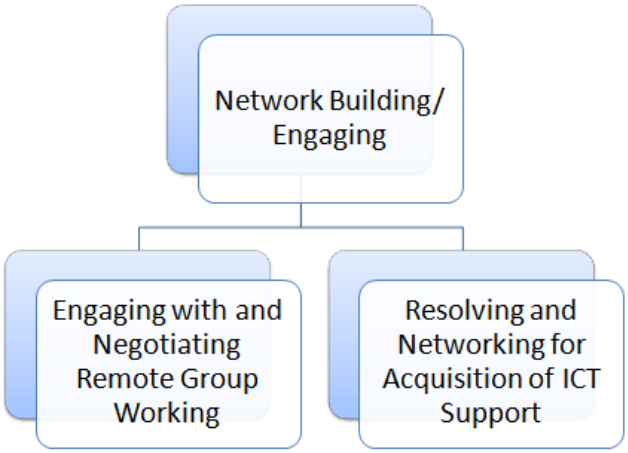


Figure 82: Relationship of Early Theoretical Categories to Developed Category: Network Building/ Engaging

Adaptive Virtualisation of Learning

Early Theoretical Codes expressed as Properties of Developed Theoretical Code:

Virtualisation and Engagement for Online Feedback and Assessment; Virtualisation of Learning to accommodate Remote Study ; Engaging with and Negotiating Online Communications.

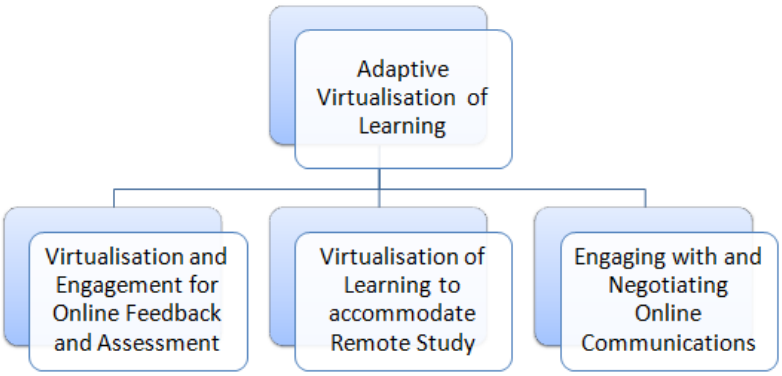


Figure 83: Relationship of Early Theoretical Categories to Developed Category: Adaptive Virtualisation of Learning

Socialisation of Learning

Early Theoretical Codes expressed as Properties of Developed Theoretical Code:

Socialisation of Learning for Group/Peer Working.

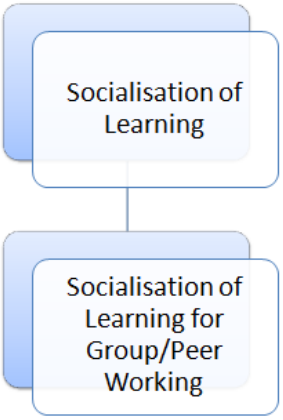


Figure 84: Relationship of Early Theoretical Categories to Developed Category: Socialisation of Learning

On-Demand Exploitation/ Improvisation

Early Theoretical Codes expressed as Properties of Developed Theoretical Code: Supplementing and Innovating Literature Searching Approaches; Exploiting Facilities and Services.

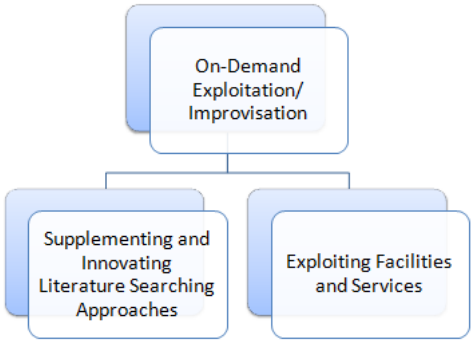


Figure 85: Relationship of Early Theoretical Categories to Developed Category: On-Demand Exploitation/ Improvisation

Navigating diverse platforms, equipment, locations

Early Theoretical Codes expressed as Properties of Developed Theoretical Code: Engaging with and Negotiating Digital Platforms; Engaging with and Negotiating VLE and course content; Resolving and Negotiating WWW usage issues; Organisation of Learning Assets.

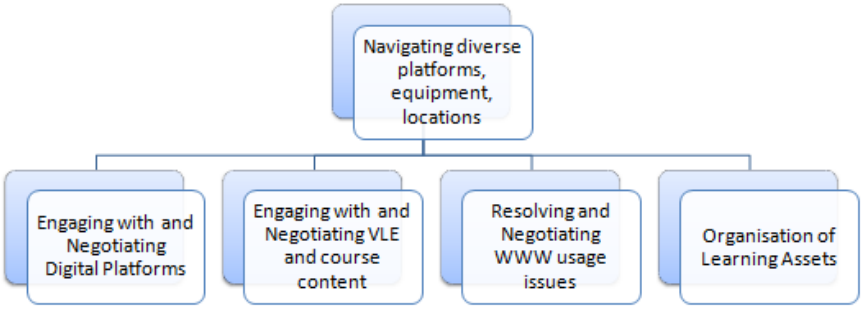


Figure 86: Relationship of Early Theoretical Categories to Developed Category: Navigating diverse platforms, equipment, locations

ii. Emergence of High Level Theoretical Codes

Similarly, these codes were subject to sorting and comparison of variables/ dependant codes to suggest a further level of theoretical code, namely three High Level Theoretical Codes (sorted and codified in the sorting table: Developed Theoretical Codes Sorted into High Level Theoretical Codes with Core Category), the process of sorting is illustrated in the sorting table, demonstrating the grouping of high level theoretical codes and their properties into refined, higher level codes. It should be noted that some High Level Theoretical Codes are retained directly from the body of Developed Theoretical Codes, illustrating a history of comparison and verification:

High Level Theoretical Code assimilated/ grouped derived from Developed Theoretical Codes (and commonly occurring Properties) following category sorting	**Developed Theoretical Codes related to this Indicator refined as Control Terms using comma separated list**
Transitional Physicalisation of Online Learning	Transitional Physicalisation of Online Learning
Motivational adaption and improvisation via Online Learning	Self-Regulated Engagement; Network Building/ Engaging; Socialisation of Learning; Multi-tasking Commitments; Adaptive Virtualisation of Learning; On-Demand Exploitation/ Improvisation
Navigating diverse platforms, equipment, locations	Navigating diverse platforms, equipment, locations

Table 15: Summary of the High Level Theoretical Codes - Derived from Worksheet 6 - High Level Theoretical Codes (Categories)

iii. Common Properties of the High Level Theoretical Codes

Whilst the next part of the thesis will discuss the development of the Core Category in greater detail, it can be seen that the Core Category could be developed by analysis of common properties existing across all High Level and Developed Theoretical Codes; these 5 properties or variables can be summarised as:

- Motivational Learning.
- Adaptive Virtualisation of Learning (reflecting codes such as Transitional Physicalisation of Online Learning and Motivational adaption and improvisation via Online Learning as shown in the above High Level Theoretical Codes table).
- Self-regulated/managed learning context.
- On-Demand Exploitation/ Improvisation (of systems, resources).
- Navigating platforms, equipment.

The above properties correspond directly to the Developed Theoretical Codes and their properties, with the Motivational Learning property reflecting several related codes, including self-management of study, network building, socialisation of learning and others as illustrated in the above table, these properties can be shown to inter-relate, i.e. are reflected in all the Developed Theoretical Codes, this is illustrated in the sorting table: Developed Theoretical Codes Sorted into High Level Theoretical Codes with Core Category (shown in following pages).

In the following venn diagram visualisation, we can see all five properties concur with the Developed Theoretical Category “On-Demand Exploitation/ Improvisation”, the lower level theoretical category corresponding to the same name reflects properties

local to that category, however the higher level category reflects all properties deriving from all codes comprising this category:

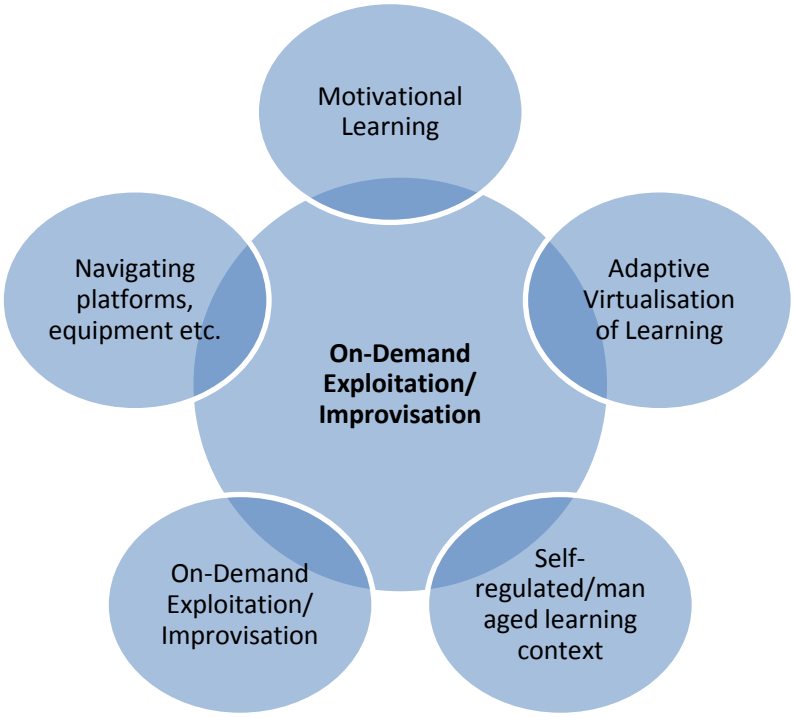


Figure 87: Key Properties within the Developed Theoretical Category ‘On-Demand Exploitation/ Improvisation’

In another example of a Developed Code “Physicalisation of Online Learning”, we can see these five frequently occurring variables occur only three times, however these properties still reflect a high level of Interchangability:

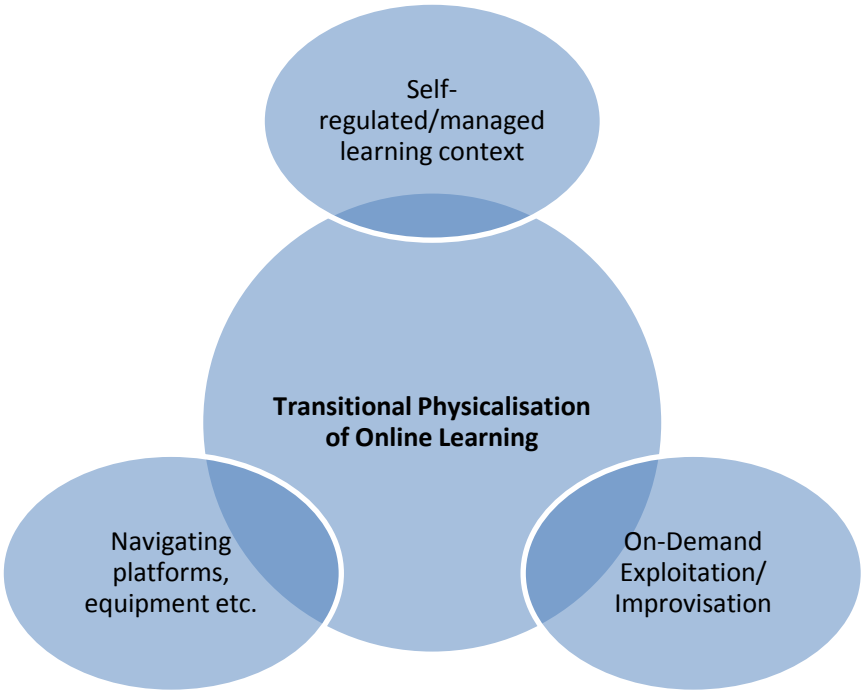


Figure 88: Developed Code 'Physicalisation of Online Learning' Demonstrating Frequently Occurring Variables

In another example, all 5 properties occur again for the code “Network Building/ Engaging”:

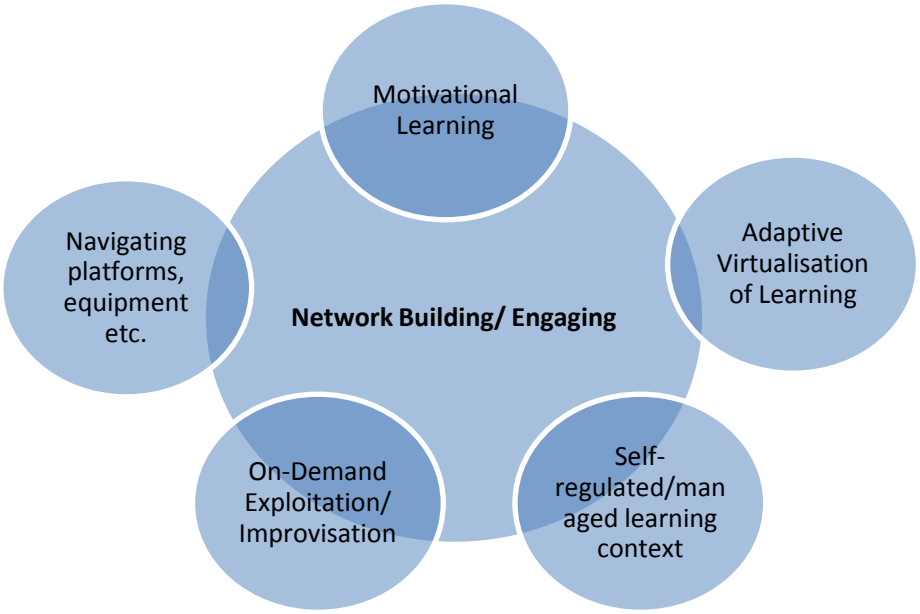


Figure 89: Developed Code 'Network Building/ Engaging' Demonstrating Frequently Occurring Variables

The common properties shown to exist across higher-level (Developed / High Level) Theoretical codes can be illustrated as follows:

- High Level Category: Transitional Physicalisation of Online Learning
    - Developed Category: Transitional Physicalisation of Online Learning
        - Property: Self-regulated/managed learning context
        - Property: On-Demand Exploitation/ Improvisation
        - Property: Navigating platforms, equipment.
- High Level Category: Navigating diverse platforms, equipment, locations
    - Developed Category: Navigating diverse platforms, equipment, locations
        - Property: Adaptive Virtualisation of Learning
        - Property: Self-regulated/managed learning context
        - Property: On-Demand Exploitation/ Improvisation
        - Property: Navigating platforms, equipment.
- High Level Category: Motivational adaption and improvisation via Online Learning
    - Developed Category: Self-Regulated Engagement
        - Property: Motivational Learning
        - Property: Adaptive Virtualisation of Learning
        - Property: Self-regulated/managed learning context
        - Property: On-Demand Exploitation/ Improvisation

        - Property: Navigating platforms, equipment.
    - Developed Category: Network Building/ Engaging
        - Property: Motivational Learning
        - Property: Adaptive Virtualisation of Learning
        - Property: Self-regulated/managed learning context
        - Property: On-Demand Exploitation/ Improvisation
        - Property: Navigating platforms, equipment.
    - Developed Category: Socialisation of Learning
        - Property: Motivational Learning
        - Property: Adaptive Virtualisation of Learning
        - Property: Self-regulated/managed learning context
        - Property: On-Demand Exploitation/ Improvisation
        - Property: Navigating platforms, equipment.
    - Developed Category: Multi-tasking Commitments
        - Property: Motivational Learning
        - Property: Adaptive Virtualisation of Learning
        - Property: Self-regulated/managed learning context
        - Property: On-Demand Exploitation/ Improvisation
        - Property: Navigating platforms, equipment.
    - Developed Category: Adaptive Virtualisation of Learning
        - Property: Motivational Learning
        - Property: Adaptive Virtualisation of Learning
        - Property: Self-regulated/managed learning context
        - Property: On-Demand Exploitation/ Improvisation
        - Property: Navigating platforms, equipment.

- Developed Category: On-Demand Exploitation/ Improvisation
  - Property: Motivational Learning
  - Property: Adaptive Virtualisation of Learning
  - Property: Self-regulated/managed learning context
  - Property: On-Demand Exploitation/ Improvisation
  - Navigating platforms, equipment.

As can be seen in this hierarchy, there was a high Interchangability of indices when considering High Level Theoretical Codes according to dependant Developed Level Code variables using the five variables identified across these codes. These variables could then be assessed to suggest a higher level code comprising the Core Category; this was achieved using a narrative description of the proposed category, with narrative components reflecting the greatest range of High Level Theoretical Code dependent variables.

Part 5: Visual Structure of the Emergent Theory

There are 157Theoretical Codes (excluding the Core Category, expressing Theory Bits as refined Control Terms). A full overview of the entire array of 159 theoretical codes as a hierarchy is shown in Appendix 15.

The figure below illustrates the structural relationship of the Core Category, ‘Improvised Learning’ to High and Developed Level Theoretical Codes. A visualisation including Early Theoretical Codes is also shown in Appendix 16:

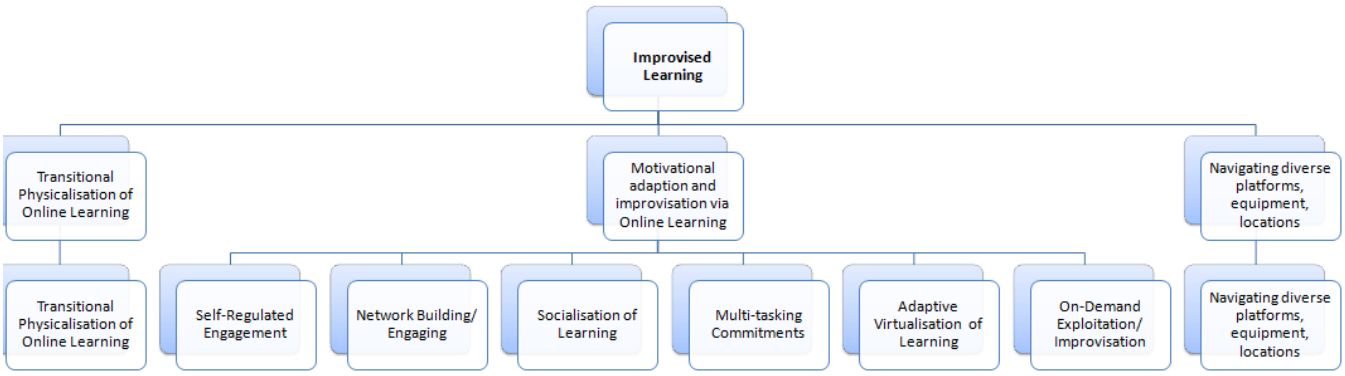


Figure 90: Hierarchy of Core, High Level and Developed (Theoretical) Categories

The following figure illustrates a further visual hierarchy demonstrating the structural relationship of the Core Category, 'Improvised Learning' to all levels of Theoretical Code, with Theory Bits shown using their refined Control Terms:

Key to theoretical codes shown in the hierarchy:

High Level Theoretical Code [Red]
Developed Theoretical Codes [Purple]
Early Theoretical Code [Blue]
Theory Bit [Green] refined as Control Terms

Transitional Physicalisation of Online Learning

Transitional Physicalisation of Online Learning

Physicalisation of Virtual Learning

- **Physicalisation of digital or online documents**
- **Reliance on VLE for prioritised/optimised study routine**

- Reliance on facilities for study space/ quiet.
- VLE/online tools avoidance via reliance on core handbook or selected print materials
- Avoidance of unfamiliar technologies and related training, utilising familiar technologies

Learning Resources Capital Acquisition

- Seeking autonomy to access software installed in diverse locations
- Overcoming deficit of specialist software applications

Motivational adaption and improvisation via Online Learning

Self-Regulated Engagement

Resolving and Supplementing Information Literacy for Effective Research

- Assimilating prior online resource behaviours with current facilities
- Skilling with information sources to enhance research
- Skilling with challenging databases to enhance research
- Skilling with challenging databases to enhance research
- Skilling with wider online sources to enhance research
- Skilling in use of database sign in to facilitate literature searching
- Skilling in referencing to avoid plagiarism and avoid grade detriment
- Sourcing specialist e-resources or databases

- Overcoming database issues to obtain core reading texts
- Overcoming confidence issues using/evaluating/trusting WWW content
- Overcoming search results filtering in specialist databases
- Maintaining up to date readings via diverse search strategy

Acquiring and Supplementing Study Skills

- Self-development of study skills
- Overcoming study confidence issues
- Skilling in information literacy, e-resource/WWW credentialising for study
- Rebuilding academic skills
- Lone & self led studying at a distance from peers/tutors
- On-demand self-led learning due to time constraints attending training
- Overcoming/skilling in study competencies to overcome training gaps
- Self-regulated development of learning skills via diverse research/assimilation, evaluation.

Developing Confidence in Technologies and Low Contact Study

- Overcoming confidence issues for low contact context
- Dealing with anxieties in online learning
- Overcoming confidence issues for group work via online tools

Resolving and Supplementing ICT Problems

- Resolving IT support limitations

- Resolving VLE support limitations
- Developing peer, family, work networks to support ICT issues/use
- Exploiting institutional support networks

Network Building/ Engaging

Engaging with and Negotiating Remote Group Working

- Managing high volumes of course material
- Overcoming difficulties accessing online exam materials

Resolving and Networking for Acquisition of ICT Support

- Overcoming & negotiating IT problems
- Overcoming Library/Lab equipment issues via personal/mobile devices
- Overcoming general confidence issues using ICT
- Overcoming diverse systems and compatibility problems
- Skilling in general IT skills to improve online study effectiveness

Socialisation of Learning

Socialisation of Learning for Group/Peer Working

- Facilitating networking/groups via informal social networks
- Integrating learning into social space via networks, email.
- Facilitating group document development via formal/informal online tools, wikis.

- Informal use of VLE discussions to network with peers
- Extending VLE via informal resource sharing and communication via social media, cloud computing for group work
- Sharing knowledge and group information via VLE tools
- Using informal synchronous communication such as Skype for group work and socialisation
- Applying informal networks and socialisation with peers/tutors to embed learning in these contexts

Multi-tasking Commitments

Self-Management of Study Regime and Programme

- Prioritising tasks, aims and objectives
- Managing/ coordinating group work
- Remote internet-based studying
- Management of family life to facilitate study
- Time management for effective study
- Flexible locating to overcome opening/facility limitations
- Facilitating lifelong learning via studies
- Facilitating career development via academic skills progression
- Investing resources, time and effort to facilitate study via VLE
- Taking increased responsibility/ motivation for self-led study due to low class contact

- Dealing with varying levels of expectancy fulfilment and adopting consequent coping behaviours

Managing and Negotiating Work-Study Relationships

- Integrating work and study context to develop lifelong learning
- Managing workplace demands for study participation
- Managing workplace sponsored study requirements
- Anxieties related to work related fee resourcing
- Managing access to study balancing work commitments

Adaptive Virtualisation of Learning

Virtualisation and Engagement for Online Feedback and Assessment

- Networking via available communication tools to enhance peer/tutor interaction
- Engaging/skilling with VLE communications tools for tutor liaison
- Assessment/feedback and reflection via VLE, email.
- Active 'e-moderating' participation with tutor via discussion boards, feedback and other tools
- Synchronous debate and collaboration between tutor/students e.g. via virtual classroom tool

Virtualisation of Learning to accommodate Remote Study

- Mobile/ overseas study via VLE, email, synchronous tools.

- **Using the VLE to facilitate core programmes information, course requirements...**
- **Asynchronous tool use for time/schedule study effectiveness**
- **Facilitation of overseas engagement via VLE**
- **Mobile/ overseas study via VLE, email, synchronous tools.**
- **VLE reliance as distance learning study tool**
- **Using removable media to facilitate mobile computing across locations**
- **Use of VLE as a mobile/cloud solution for accessing content across diverse locations**
- **Virtualisation of study experience via intense online tools use**
- **Choosing to study in part time context to accommodate personal/work commitments**
- **Ubiquitous learning via range of devices & locations to accommodate lifestyle**
- **Distributed Learning via multiple e-learning formats, tools, media.**
- **Accessing support, training materials, video just in time to need/activity**

Engaging with and Negotiating Online Communications

- **Negotiating diverse communication tools (VLE, messaging, email, social networks)**
- **Reconciling diverse email platforms to ensure effective communication**
- **Resolving VLE communications engagement with tutors or peers**
- **Overcoming low engagement of peers in use of communication tools**
- **Resolving/negotiating low tutor VLE interaction**

On-Demand Exploitation/ Improvisation

Supplementing and Innovating Literature Searching Approaches

- Augmenting library/database usability via Google
- Augmenting database limitations via Google
- Reliance on VLE as intermediary for e-resources
- Resolving full text e-resource problems via Google/Scholar
- Overcoming/supplementing limited database coverage
- Resolving WWW e-texts in the absence of print/digital copies
- Use of a range of library/online providers for sourcing materials

Exploiting Facilities and Services

- Exploiting oncampus and online services
- Skilling and exploiting IT facilities
- Exploiting/skilling via Google Scholar to overcome database issues
- Exploitation of VLE as supplement to class attendance issues
- Exploiting oncampus computing/software facilities
- Maximising/ optimising online tools/VLE in mixed physical/online-dependent context
- Exploitation of VLE as supplement to class attendance issues

Navigating diverse platforms, equipment, locations

Navigating diverse platforms, equipment, locations

Engaging with and Negotiating Digital Platforms

- VLE, Library Platform or WWW page navigating
- Overcoming confidence issues using the VLE
- Overcoming WWW site navigation/interface issues
- Overcoming institutional Web site navigation/interface issues
- Supplementing core VLE provision via wider library/WWW portals
- Self-navigating/resolving diverse sources/databases unavailable directly in VLE
- Overcoming challenges accessing range of database/platforms/WWW sources
- Integrating and assimilating University platforms and sources into existing practices

Engaging with and Negotiating VLE and course content

- Engaging/skilling with VLE communications tools for group projects
- Remote engagement with group projects via VLE tools
- Resolving VLE communications tools problems for group work
- Balancing/prioritising workload with group networking demands

- **Overcoming low engagement of peers in use of communication tools**

Resolving and Negotiating WWW usage issues

- **Skilling/ negotiating WWW search challenges**
- **WWW evaluation strategies for authoritative use of sources**
- **WWW bookmarking to resolve e-resources**
- **Overcoming WWW authority issues via Library links/platforms**
- **Negotiation of diverse WWW sources via favourites or link sharing platforms**

Organisation of Learning Assets

- **Digital document/ excerpt and notes management for effective file handling**
- **WWW/ E-resource sorting, labelling and storing for efficient media retrieval**
- **Sorting and labelling digital assets using folders**
- **Selection and refinement of learning resources to avoid information overload via adoption of key resources such as the VLE**

Figure 91: Full Hierarchy Demonstrating Structural Relationship of Component Theoretical Codes/ Insight

Part 6: Note on Derivation of Theory via Inductive Data Analysis

It can be demonstrated that the approach taken for generation of theoretical codes was based on an inductive approach, reflecting the ontological framework for Grounded Theory via definition of a continuum of coding levels or hierarchies via short indicators and coding labels. This inductive approach is seen in the development of the early codes via application of Indicators (Control Terms in the Excel workbook for the purposes of filtering and sorting within the workbook). In an example of early generation of descriptive codes, found in worksheet 1 (Memo Data), we can see 35 memo comments referring to an indicator/Control Term defined as “Commitment issues”, this could be paraphrased in terms of “Childcare, elderly care, work commitments, travel commitments, personal responsibilities”. Example memo comments from which this indicator was derived included examples such as:

> “Time consuming nature of study, juggling personal commitments.
>
> “Primary issue expressed was managing busy family life/ children with study.”
>
> “Family life issues, also works part time.”

The indicator “Commitment issues” can be seen to have contributed to a Substantive Code, “Personal and Non-study related Challenges”, summarised as students reporting anxieties regarding work related links with the programme, studying due to work demands or isolation during part time study and a perception of having less support than full time students. Thus, the developmental progression of coding can

be seen to reflect an inductive approach based directly on participant responses, also contributing to early theoretical codes, such as:

- Overcoming personal family commitments, disruption by using institutional facilities (Refined as Control Term: ‘Reliance on facilities for study space/ quiet’).
- In some cases students attempted to overcome personal commitment constraints by using VLE or other electronic communication tools to keep in touch with tutors or peer remotely, this kind of motivation appeared to channel the student toward the use of core communication tools and toward use of VLE communication features which may not have otherwise had such a large contribution. Students appear to have attempted to virtualise their social experience with peers and tutors to overcome these commitment and personal issues related to remote working and to attend a greater sense of engagement with the wider programme activities and engagement with tutors and peers (Refined as Control Term: ‘Virtualisation of study experience via intense online tools use’).
- Ubiquitous learning style - using a variety of devices and design options to facilitate 24/7 on-demand learning, accommodating the students' own time schedule and commitments (Refined as Control Term: ‘Ubiquitous learning via range of devices & locations to accommodate lifestyle’).

Part 7: The Emergent Core Category

The Core Category was summarised as ‘Improvised Learning’ with key variables represented by: ‘Transitional Physicalisation of Online Learning’; ‘Motivational adaption and improvisation via Online Learning’; ‘Navigating diverse platforms, equipment, locations’ (for a further detailed explanation of this proposed Core Category, see Chapter 3: Research Design, Part 8: The Pilot Study: A Theory of Self-Led Multi-Systems Traversing).

Given the lower volume of emergent high level categories, the sorting tables for middle-level Theoretical Codes were eventually merged within a single sorting table, providing an efficient means of visualising all resulting High Level Theoretical Codes. This table demonstrates the Interchangability of indices (properties/variables) of Developed and High Level Theoretical Codes.

The following sorting table was adapted somewhat from the basic template, allowing for visual representation of all dependent Developed and High Level Theoretical Codes for a proposed Core Category. In the first column we can see a colour coded (blue) representation indicating the contribution of the High Level Category: “Transitional Physicalisation of Online Learning”, under this category we can see all dependant categories, comprising one Developed Theoretical Code: “Transitional Physicalisation of Online Learning”; opposite this code we have its common Properties with other Developed Theoretical Codes, including: *Self-regulated/managed learning context, On-Demand Exploitation/ Improvisation, Navigating platforms/ equipment.* In the third column we have the next High Level Category: ‘Motivational adaption and improvisation via Online Learning’, with six dependent Developed Theoretical Categories shown below and their common

properties occurring opposite each code. Similarly, in the fifth column we have the High Level Theoretical Code: Navigating diverse platforms, equipment, locations with only one dependent Developed Theoretical Code and its properties shown opposite. In a detached area at the top of the document we have the Core Category: 'Improvised Learning' illustrating all the commonly occurring variables evident in most other High Level Theoretical codes via their dependants.

It should be noted that two Developed Theoretical Codes: #Transitional Physicalisation of Online Learning' and 'Navigating diverse platforms, equipment, locations' were retained unchanged as High Level Theoretical Codes and all other Developed Theoretical Codes excepting these two codes were aggregated with 'Motivational adaption and improvisation via Online Learning':

Developed Theoretical Codes Sorted into High Level Codes with Core Category

Core Category: Improvised Learning			*Common Properties drawn from High Level Categories:* Motivational Learning; Adaptive Virtualisation of Learning; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; Navigating platforms, equipment etc.		
High Level Category: Transitional Physicalisation of Online Learning	*Common Properties drawn from High Level Categories:*	High Level Category: Motivational adaption and improvisation via Online Learning	*Common Properties drawn from High Level Categories:*	High Level Category: Navigating diverse platforms, equipment, locations	*Common Properties drawn from High Level Categories:*
Developed Category: Transitional Physicalisation of Online Learning	Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**	**Developed Category:** Self-Regulated Engagement	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**	**Developed Category:** Navigating diverse platforms, equipment, locations	**Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**
		Developed Category: Network Building/ Engaging	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		
		Developed Category: Socialisation of Learning	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		
		Developed Category: Multi-tasking Commitments	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		
		Developed Category: Adaptive Virtualisation of Learning	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		
		Developed Category: On-Demand Exploitation/ Improvisation	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		

Figure 92: Sorting Table Displaying Core Category, High Level and Developed Level Theoretical Codes

The resulting Core Category can be seen to demonstrate a high level of interchangability of indices with all High Level Theoretical Codes and the dependant codes/properties, however the Core Category particularly emphasises the properties of the High Level Category ‘Motivational adaption and improvisation via Online Learning’, including emphasis on concepts such as adaption, virtualisation, self-regulation, building networks, achieving learning via socialisation, multi-tasking to overcome time and other constraints and exploiting and improvising the use of

resources. The following chapter (4b) will further explore the properties of the Core Category, ‘Improvised Learning’. A discussion of the Core Category in relation to the literature is presented in Chapter 5: Discussion in Relation To the Literature.

Part 8: Concluding Statement

This chapter has outlined emergent descriptive and theoretical codes or categories arising from the data and via the processes of Grounded Theory. It is possible to demonstrate Developed Theoretical Codes such as ‘Transitional Physicalisation of Online Learning’, where students engage in behaviours to engage with peers and their environment to manage their learning experience in a more direct and physical format, involving improvisation and exploitation of services, educators, support staff and other infrastructure available to facilitate these needs; another Developed Theoretical Code includes ‘Navigating diverse platforms, equipment, locations’, involving students’ engaging with and negotiating digital platforms, engaging with and negotiating the VLE and course content and using the World Wide Web effectively. This chapter has illustrated the inter-dependence of key properties or commonly occurring early or developed theoretical codes across High Level Theoretical Codes, for instance, the Early Theoretical Code, ‘Self regulated learning’ can be found as a property of Developed Categories such as ‘Self-Regulated Engagement’, ‘Network Building/ Engaging’, ‘Socialisation of Learning’ and ‘Multi-tasking Commitments’. The following chapter will further illustrate the inter-changeability of dependent codes/properties across the emergent Core Category.

CHAPTER 4 (b): EXPLANATION OF THE THEORY OF IMPROVISED LEARNING

Part 1: Introductory Statement

This chapter provides an overview of significant theoretical codes and their properties derived from Early, Developed and High Level Theoretical Codes and rationale for retention of key theoretical indicators or ontological terms present in the highest level theoretical codes. The chapter will explore the development and contribution of the Descriptive Codes and Theoretical Codes in the emergent Core Category of 'Improvised Learning' - offering a unified category or code expressing the primary concern and behavioural patterns expressed in participant data, focused around behaviours of innovation, adaptation, exploitation and related coping or improvisational activities to facilitate low contact study via a range of assets, stakeholders, systems and other facilities and approaches.

i. Summary of the Theory of 'Improvised Learning'

This research project comprises an original Grounded Theory of 'Improvised Learning' demonstrating the most prevalent challenges, strategies and behaviours of students undertaking Higher Education programmes in a campus-based, low-contact teaching context via blended learning.

The resultant theory reflects a desire to address the conditions, challenges and support needs of an increasingly prolific trend toward part time or low contact study facilitated by emergent learning technologies such as the VLE (Virtual Learning

Environment) in a distributed i.e. multi-platform, multi-location and multi-context learning environment. Key aspects of the methodology included an emphasis on observable and verifiable (i.e. induction-based) conceptualisation of theory from descriptive participant indicators and the continuous comparison of data for the emergence of theoretical categories or codes.

Three resultant High Level Theoretical Codes were identified. ‘Transitional Physicalisation of online Learning’ reflected behaviours related to transitional or tentative engagement in learning technologies, strategies to control or reduce virtual learning experiences such as reliance on print resources or printing digital learning materials, reliance on the VLE as a sole channel or source for learning activities or resources and strategies to control or avoid unfamiliar systems, platforms or applications. Another High Level Theoretical Code, ‘Motivational adaptation and Improvisation via Online Learning’ reflected motivational behaviours with strategies for managing diverse personal, work-related and study-related commitments; this perspective comprised the widest range of dependent Theoretical Codes, including behaviours related to resolving and supplementing information literacy skills and resources, self-led development of study and research skills, behaviours related to engagement with peer, tutor and external networks for support and training needs and behaviours related to facilitation of group working and collaborative activities, also behaviours related to management of diverse commitments and self-management of personal development, behaviours related to self-led virtualisation of learning activities and processes to ensure remote access to study, collaboration and tutor engagement and behaviours related to on-demand strategies to fulfil learning, resourcing, collaboration and related needs.

The final High Level Theoretical Code, ‘Navigating diverse platforms, equipment/ locations’ reflected behaviours related to self-led management for access to diverse systems, platforms and resources encountered via the VLE, Library databases, Web based sources and other physical locations/facilities.

These codes reflected common properties, including self-regulated/ managed learning, on-demand exploitation and improvisation, motivational learning and adaptive virtualisation of learning.

The emergent ‘Core Category’ - reflecting all dependant codes or variables (reflecting the Grounded Theory concept of interchangability) was defined as ‘Improvised Learning’, explaining conceptually how students employ self-led strategies and skills to engage with disparate systems, environments and resources via extending, adapting, exploiting and innovating to ensure effective study within the blended learning context and when studying remotely, including collaborative study and remote engagement with tutors for assessment, feedback and support. The theoretical perspectives presented in the Core Category, ‘Improvised Learning’ reflected a high level of self-led or self-regulated behaviours, with significant facilitation of study by students directly, via extended or adaptive use of institutional and non-institutional systems, platforms and resources and for self-regulated engagement with peers for collaboration, networking and group study. These behaviours present a perspective of blended learning characterised by significant self-led behaviours, expectancy and motivation for extending, supplementing, adapting, innovating and related strategies to enhance, support, develop or otherwise achieve required study, research and related objectives. Collectively, these behaviours have been termed ‘Improvised Learning’ in the Core Category, a theoretical perspective comprised of all dependent Theoretical Codes and their

properties, as outlined above, which emphasises the transcendent, frequently expressed improvisational motivations, strategies, or other behaviours to overcome the concerns, challenges and perceived needs of the substantive participant group. The study therefore provides an original, grounded and unified analysis of Blended Learning and suggests a new paradigm of self-regulated ‘Improvised learning’ for potential application beyond the field of study.

Part 2: Key Descriptive Codes contributing to the Theory

The descriptive codes, arising from initial Open Coding and sorting to create higher level substantive descriptive codes provide the procedural, physical or operational behaviours evident in the participant group and were mapped to an array of Theory Bits which in turn led to the development of theoretical codes.
Many early descriptive codes derived from Open Coding demonstrated a high level of Interchangability of indices with the Core Category ‘Improvised Learning’, these included:

- Communication tools e.g. email or social networks important to study.
- Considerable use of Google for E-Resources.
- IT or study skills development challenges.
- Low Contact Study.
- Mixed physical-online resource use.
- Multi-platform/ Internet resource discovery.
- Relies on VLE mostly for course materials.
- Studies whilst travelling using mobile computing.

- Use of Library computers due to need for computing.
- Use of Library computers due to need for quiet space.
- Use of VLE communication tools.
- Use of a range of computers/operating systems.
- Use of computers across multiple sites.
- Used techniques to manage information such as folders, favourites.
- Working to develop IT and study skills due to use of VLE.

Properties of the Core Category which led to the use of the term ‘Improvised Learning’ included the general prevalence and persistence of adaptive and innovative behaviours, modification of existing tools and platforms to engage in learning (such as social media and search engines), use of strategies to adapt diverse environments to suit individual study preferences or approaches (such as physicalisation via in-person discussion or printing digital course notes), use of institutional tools and systems to extend the possibilities for study (such as independent use of VLE communication tools) and coping or self-managed approaches for remote study purposes. It can be seen that a wide range of emergent Descriptive and Theoretical codes demonstrate interchangability with resulting properties of Improvised Learning, these properties include Motivational Learning, Adaptive Virtualisation of Learning, Self-regulated/managed learning, On-Demand Exploitation/ Improvisation (of systems, resources) and Navigating platforms/ equipment. The following venn diagram illustrates the relationship between the Core Category and Developed and High Level Theoretical Codes:

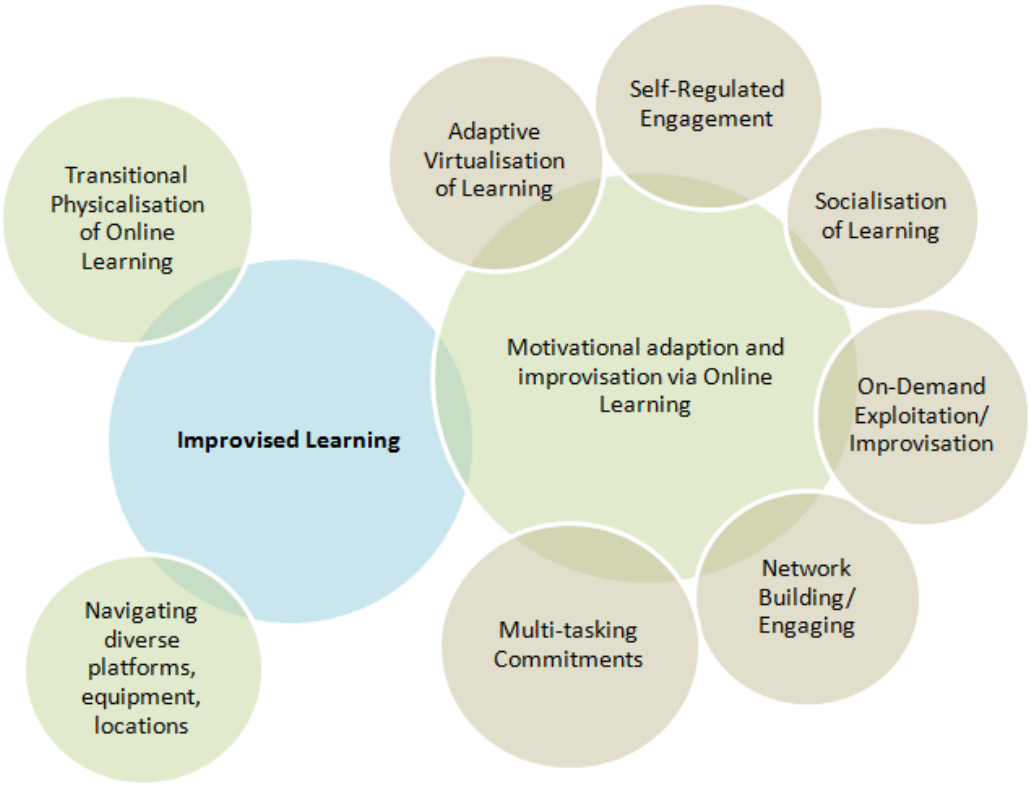


Figure 93: Venn Diagram of Core Category with Developed and High Level Theoretical Codes

Further elaboration on interchangability of indices is possible by examining the properties of the descriptive Substantive Codes; the frequency and frequency distribution scores obtained from systemisation of Open Codes as Control Terms provide a useful indicator of the weighting or prevalence of codes. For example, the code “Multi-platform/ Internet resource discovery” occurred in 30.69% of interview sessions:

Note (1) – Frequency of Control Terms used for Memo Descriptive Codes (Indicators).

Note (2) - Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators).

Memo Descriptive Code (Indicator) Translated into Control Term	Memo Descriptive Code (Indicator) Properties (comma separated list)	(1)	(2)	Paraphrase for sorting
Communication tools e.g. email or social networks important to study	Email, Social Network usage via Facebook or similar, use of course provided communication tools.	13	12.87%	Comms tools importance
Considerable use of Google for E-Resources	Starting point is often Google or Google Scholar for library type e-resources, may search Google rather than bibliographic or Library platforms, attempt to locate full text e-resources via Google rather than seek help via Library systems or support.	15	14.85%	High Google use
IT or study skills development challenges	Student may find development of skills in IT or study difficult, Student may consult the WWW or friends to gain information or workarounds, Finds it easier to develop skills independently rather than wait for support via email or in person, Finds self led approach to skills development essential due to inadequate support, specific support gap in certain areas such as use of VLE tools or software applications such as Statistics packages.	5	4.95%	IT/study development issues
Low Contact Study	Generally under ten hours contact with class per week, Sense of isolation from the institution including tutors and peer students, feeling of self-reliance and less scope for obtaining support, lack of social interaction and socialisation with peers or staff.	99	98.02%	Low contact study
Mixed physical-online resource use	Uses a variety of online tools and class or oncampus support, may use the VLE and associated tools, may also use print texts, may use hardcopy journals alongside e-resources and databases.	10	9.90%	Physical/Online experience
Multi-platform/ Internet resource discovery	May use Library databases such as Swetswise or other recommended platforms/portals such as BIDS or BiZED, may use open Internet sources such as PubMED or the Internet Information Archive, may use open source journals such as the Social Sciences Research Network, may use a variety of Library systems such as catalogue or inter library request Web site, may use a variety of VLE tools and features such as discussions or group tools, may also use WWW search engines and portals to locate information.	31	30.69%	Requires multi platform use

Relies on VLE mostly for course materials	May use the VLE for obtaining course notes or syllabus information, may access video or other interactive resources in the VLE, may use the VLE learning object tools and assessments/quizzes, may use communication tools such as group sharing and discussion or core module discussion boards for class participation, may use the VLE to view grades, may access ebooks and other kinds of links to library database content or WWW links, may use the VLE informally to communicate with peers and tutors (internal email or messaging features), may use the VLE to access technical and study support.	39	38.61%	Relies on VLE for materials
Studies whilst travelling using mobile computing	May use a laptop or mobile devices to access the VLE or email, may use internet cafes or other wifi hot spots, may use smaller mobile technology such as Blackberry phones to access course materials or email.	3	2.97%	Mobile device user when travels
Use of Library computers due to need for computing	Student may use Library PCs due to lack of adequate or personal computing at home or work, student may prefer computer equipment at the Library or IT labs due to system resources and internet availability, may need to share computer facilities at home with family members, may be unable to use work computing facilities or time for this purpose.	4	3.96%	Relies on Library PCs
Use of Library computers due to need for quiet space	Student may experience disruptive or noisy environment at home, work environment may be unsuitable due to vocational or manual nature of work or due to busy office environment and working demands during office hours.	7	6.93%	Uses Library PCs for quiet study
Use of VLE communication tools	Student may use VLE discussion board, messaging tool, email forms to send conventional email from the VLE, interactive quiz or survey tools, group features such as a shared file area or discussion board.	12	11.88%	Uses VLE comms tools
Use of a range of computers/operating systems	Student may use Macintosh, Linux, Windows or other types of computer platform.	2	1.98%	Uses a range of computer systems
Use of computers across multiple sites	Student may use computers at work or home, student may use Library/ IT Lab PCs, student may use computing services when travelling such as internet cafes, computing facilities may be very different in each location including differences in terms of computer specifications and internet access and bandwidth speed or system reliability.	9	8.91%	Uses a range of locations for ICT

Used techniques to manage information such as folders, favourites	Students may use Windows My Documents area to store documents locally on a PC, students may back up work to a CD or external storage device such as a flash disk, students may copy files to their network storage folder, students may categorise content into named folders or use pre-configured folders available in My Documents, students may create an original folder hierarchy on the computer hard drive, students may store materials on a variety of external disks such as Zip/ Iomega disks or re-writable CDS, students may use favourites in Windows or within the Web browser, students may use external storage options such as Google spaces or store files in the VLE shared areas, students may use social bookmarking sites such as Yahoo bookmarking.	4	3.96%	Uses content management skills
Working to develop IT and study skills due to use of VLE	Student may recognise need to develop personal skills in IT or study skills, student may be seeking to develop library or e-resource skills to utilise more current information beyond printed textbooks, student may be seeking to develop skills in use of the VLE to participate more actively in group work or use of course materials, student may wish to develop better information skills to search and assess useful materials on the WWW such as legislation or academic publications.	8	7.92%	Trying to build IT/ study skills

Table 16: Example Frequency and Frequency Distribution for Early Descriptive Indicators

It can be seen as a consequence of category development that some early descriptive codes, whilst appearing to reflect simple critical commentary or challenges often contained a richer array of properties reflecting behaviours practiced by student in each context; for example the open-coded Memo Descriptive Codes “Insufficient databases 10.89%” and “Too many platforms 5.94%,” appear to convey simple critical commentary, however further examination of these codes indicated students developing coping strategies to enable multi-tasking and cross-

platform use; the Substantive Code “Resource Discovery challenges” confirms a number of participative strategies to overcome challenges encountered:

> “Students appeared to be utilising a wide range of personal, work related and University derived sources, including e-resources linked or promoted via the VLE, email and course materials or reading lists, in many cases students described a reluctance to deviate from the VLE to obtain materials but accepted the need to consult wider information sources for effective study, to this extent many students indicated they had used formal Library databases and recommended Web portals although many stated their preference was often to attempt initial location of resources via a basic Google search. These characteristics suggest students are navigating a range of diverse platforms and systems to access information and are engaging with less familiar or more formal platforms to achieve effective study outcomes.”

Similarly, the Substantive Codes - representing descriptive codes derived from and sorting of Open Codes (shown as Memo Descriptive Code Indicators in Worksheet 1) also demonstrate significant interchangability of indices with the Core Category, ‘Improvised Learning’. All but one Substantive Descriptive code (Technical Challenges/Technical Problems reported) is absent in the following summary of Core Category properties:

- Study and Research Challenges.
- Study and Research Approaches.
- Resource Discovery challenges.
- Remote Learning Characteristics.

- Skills Challenges (Skills problems and concerns raised).
- Personal and Non-study related Challenges.
- Resourcing for Study (Equipment, costs and related resourcing problems reported).

Many codes and properties can be seen to cascade or inherit as codes are categorised and sorted, resulting in association of earlier codes or properties within higher or developed codes. For instance, the Substantive Descriptive Code, Study and Research Challenges is comprised of the following early Memo indicators: *VLE usability/ navigation issues, Study training /development issues, VLE under-used by programme, Group or peer communication issues, Low contact study, Too many documents in VLE, Digital communication under-used, VLE under-used by students, Library or IT Lab noise.* The inheritance or cascading nature of the codes is demonstrated in both the Excel workbook structure, with code properties typically derived from lower level codes and by the sorting sheets (Chapter 4, Part 2).

Further elaboration on Interchangability of indices is possible by examining the properties of Substantive Descriptive codes. Narrative explanation of these codes is provided below.

ii. Summary of Substantive (Descriptive) Code Properties Contributing to the Core Category

Study and Research Challenges

Students often mentioned difficulties using aspects of the VLE such as assessment or group working tools, some students complained regarding lack of contact or feedback from tutors or peers during group work, some students complained of an actual shortfall in the potential use of the VLE and other communication tools, suggesting this lack of engagement was detrimental to their part time, largely off-campus study context.

Study and Research Approaches

Students often reported relying on Google as a primary research tool for literature review or course work, students also often described attempts to access new or unfamiliar platforms such as specialist databases to improve IT and study competencies, many students also indicated a heavy reliance on the VLE as a central portal to course materials, often indicating frustration that materials were either external to the VLE or they were expected to use library resources oncampus or online. Many students linked time constraints and the need to optimise their schedule with the desire to work as far as possible via the VLE.

Resource Discovery challenges

Students frequently complained regarding the scope and usability of library databases and core systems such as Library Web pages or catalogue, students also drew attention to the need to use many different platforms and use multiple logins

such as a separate Athens login for some collections and other unique logins, some students also discussed the need to retain both personal, work and University login credentials citing this as a barrier to efficient study. Students frequently indicated unhappiness with resource discovery options within the University and described use of some formal databases alongside WWW sources and some work related sources.

Remote Learning Characteristics

Students indicated developing strategies for studying across different locations and using different equipment/ computer platforms, use of electronic communication tools to facilitate contact/feedback with tutors and peers for group working and using both online and physical study activities. Students who are part time and studying via Blended learning conveyed a range of characteristics typical of e-learning but also exhibited behaviours reflecting use of traditional library resources and services. Commuting is a particularly important factor for some students. Use of mobile computing is also important for some students.

Personal and Non-study related Challenges

Some students reported anxieties regarding work related links with the programme; some students indicated they were only studying due to work demands or were studying to maintain mandated work related skills or qualifications, these kind of demands added to the pressure felt by some students. Some students indicated a sense of isolation as part time students and disconnect from the wider student population. There was a perception that their kind of student was being facilitated in a less intensive or supported mode than full time students. Commitment issues

featured high in many narratives, including work-related, children or other caring commitments.

Skills challenges (Skills problems and concerns raised)

This included lack of confidence when using more complex or formal systems and platforms, such as certain VLE features or library databases, sense of lacking sufficient skills to fully utilise platforms or computing facilities to study effectively, specific anxieties in areas such as referencing and study methods. Closer examination of some of these codes indicate coping strategies, study techniques and other personal responses to challenges arising. These coping techniques or strategies are evident in the cumulative Theory Bits arising from the codes. These all represent properties of the Core Category ‘Improvised Learning’.

Technical Challenges (Technical Problems reported)

Students reported problems regarding personal PC or other peripherals they may have experienced maintenance problems with work PCs, or may have maintenance problems when using institutional PCs. Technical problems also included specific features not working properly in the VLE due to computer or VLE errors this included the assessment manager not working properly.

Resourcing for Study (Equipment, costs and related resourcing problems reported)

Many students appeared to print hardcopy versions of course notes, WWW content, presentations and other academic matter rather than attempt to manage digital copies within the computer environment, this indicates both anxieties in the sole

reliance on digital media and feelings of assurance in obtaining physical copies. Resource and cost implications were often cited regarding the reliance on printing with some students indicating the increased use of the VLE and digital content had exacerbated the need to print due to increased onus for self study and fewer classes.

Personal and Non-study related Challenges

In some cases students attempted to overcome personal commitment constraints by using VLE or other electronic communication tools to keep in touch with tutors or peer remotely, this kind of motivation appeared to channel the student toward the use of core communication tools and toward use of VLE communication features which may not have otherwise had such a large contribution. Students appear to have attempted to virtualise their social experience with peers and tutors to overcome these commitment and personal issues related to remote working and to attend a greater sense of engagement with the wider programme activities and engagement with tutors and peers.

Part 3: Early Theoretical Codes contributing to the Theory

As Theoretical Codes developed the emergent categories indicated a greater degree of conceptual explanation for behaviours, in contrast to descriptive codes which emphasised challenges, barriers or limitations to study, such as personal commitments, family caring responsibilities, technical problems or personal skills issues, such as online information literacy or Web searching.

i. Sample Theory Bits/ Insights from Substantive (Descriptive) Codes Contributing to the Core Category

The following provides a narrative of Theory Bits/ Insights derived from the Substantive Descriptive Codes (assimilated/ grouped directly from High Frequency Memo Descriptive Codes and commonly occurring Properties and based on category sorting):

Resource Discovery challenges

Students appeared to be utilising a wide range of personal, work related and University derived sources, including e-resources linked or promoted via the VLE, email and course materials or reading lists, in many cases students described a reluctance to deviate from the VLE to obtain materials but accepted the need to consult wider information sources for effective study, to this extent many students indicated they had used formal Library databases and recommended Web portals although many stated their preference was often to attempt initial location of resources via a basic Google search. These characteristics suggest students are navigating a range of diverse platforms and systems to access information and are engaging with less familiar or more formal platforms to achieve effective study outcomes.

Remote Learning Characteristics

Students indicated adaptive use of e-learning communications tools, mobile devices and the VLE features to engage with peers, tutors and course content. Some students are apprehensive regarding the use of e-learning and their remote study

context, some of these behaviours can be considered strategies to overcome this perceived separation from the physical institution and its facilities, perhaps reflecting the transitional phase of e-learning at this time or fundamental anxieties some students face when studying in a blended learning context.

Personal and Non-study related Challenges

In some cases students attempted to overcome personal commitment constraints by using VLE or other electronic communication tools to keep in touch with tutors or peer remotely, this kind of motivation appeared to channel the student toward the use of core communication tools and toward use of VLE communication features which may not have otherwise had such a large contribution. Students appear to have attempted to virtualise their social experience with peers and tutors to overcome these commitment and personal issues related to remote working and to attend a greater sense of engagement with the wider programme activities and engagement with tutors and peers

Resourcing for Study (Equipment, costs and related resourcing problems reported)

Students' anxieties over printing and digital content reveal a study pattern based around physicalisation of e-learning and digital content, perhaps indicating that these students are transitional in terms of skills and attitudes to e-learning approaches.

Skills challenges (Skills problems and concerns raised)

Students may use a range of techniques to compensate for poor confidence in specific platforms by resorting to familiar applications or WWW sources, some students resorted to using work derived information sources or government WWW sources due to familiarity, this behaviour exposes a behavioural pattern in avoiding engagement with certain unfamiliar technologies due to skills issues or lack of familiarity. Students also appeared to be avoiding some support services or optional courses available again reflecting this avoidance tendency.

Study and Research Challenges

Students exhibited a dependence on the VLE and many appeared to value online communication tools to improve and facilitate their studies as part time students, students often appeared to be investing in the VLE in terms of time spent using this platform, developing personal knowledge of the VLE and coordinating group or peer discussions via VLE and other online communication tools (including social networks). Some students felt they had to make up a shortfall in both tutor/peer engagement with the VLE and shortfalls in training or support. In some respects students were attempting to lead the use of the VLE or promote this amongst peer groups to achieve efficient group working and study outcomes.

Study and Research Approaches

Students exhibited a pattern of attempting to consolidate learning within the VLE, including access to course materials and use of communication tools, this consolidation was motivated by time constraints reflected in the nature of their predominantly part time, low class contact context and working schedule. Some

students used a variety of content management tools and services on the WWW to enable working remotely, across multiple sites or via removable media such as flash drives, achieving a mobile study approach to facilitate their circumstances.

ii. Summary of Early Theoretical Code Properties Contributing to the Core Category

There were 178 Theory Bits or Insights derived from sources such as initial Open Coding, cumulative insights from developed Substantive Codes and from Theoretical Sensitivity. These Theory Bits were consolidated or sorted directly within Workbook 4 (Appendix 10, Table 5) into around 120 commonly occurring Control Terms. These aggregated Theory Bits were then sorted to develop Early Theoretical Codes. These theoretical codes had begun to provide conceptualisations of processes and behaviours, including aspects such as resolving information resource challenges or physicalisation of resources where hardcopies were preferred over digital copies; these adaptation and improvisation properties would ultimately be reflected by the Core Category, 'Improvised Learning'. These include the following Early Theoretical Codes:

- Self-Management of Study Regime and Programme.
- Exploiting Facilities and Services.
- Resolving and Supplementing ICT Problems.
- Engaging with and Negotiating Online Communications.
- Acquiring and Supplementing Study Skills.
- Resolving and Supplementing Information Literacy for Effective Research.

- Engaging with and Negotiating Digital Platforms.
- Physicalisation of Virtual Learning (such as creating printouts from the VLE).
- Virtualisation of Learning to accommodate Remote Study (where digital copies were preferred in a remote context).
- Learning Resources Capital Acquisition.
- Organisation of Learning Assets.
- Supplementing and Innovating Literature Searching Approaches.
- Virtualisation and Engagement for Online Feedback and Assessment.
- Socialisation of Learning for Group/Peer Working.
- Engaging with and Negotiating Remote Group Working.
- Resolving and Networking for Acquisition of ICT Support.
- Engaging with and Negotiating VLE and course content.
- Managing and Negotiating Work-Study Relationships.
- Resolving and Negotiating WWW usage issues.
- Developing Confidence in Technologies and Low Contact Study.

iii. Early Theoretical Codes in Context to Related Insight

The Early Theoretical Codes provided considerable evidence for the conceptual process of ‘Improvised Learning’, including many behaviours focused around adaptation, exploitation of resources or exploration of digital or collaborative platforms; the following narrative for Early Theoretical Codes demonstrate these properties of ‘Improvised Learning’. The following narrative explanation of Early Theoretical Codes is accompanied by hierarchical visuals demonstrating the relationship to surrounding Theory Bits/Insight:

Self-Management of Study Regime and Programme

Students indicated they had a significant remit to self-manage their own study processes and resources, this extended to management of work and family commitments to detailed coordination and facilitation of shared group work. Students also had to manage access to and use of diverse computing facilities and workplace support. Another aspect of self-led management of study included a sense of personal career, skills, professional and academic development for lifelong learning and workplace security. Students also indicated varying levels of support/facilities expectancy and indicated methods to source or engage in a variety of strategies, support networks or developmental processes to accommodate the realities of these expectations.

Figure 94: Early Theoretical Code: ‘Self-Management of Study Regime and Programme’ in context to Theory Bits/Insight

Exploiting Facilities and Services

Students frequently indicated they were seeking to exploit or optimise the use of student services, IT facilities, library services and online/digital resources to benefit their studies and use their time most effectively. Strategies and activities related to exploitation of support and facilities included searching for or mutually sharing advice or guidance on useful online resources, Web site, or portals or shared knowledge on institutional services. The use of online and campus based services implicated an inclination to use both these contexts optimally, although for some students there could be bias toward either virtualisation or physicalisation in terms of preference for differing contexts and services.

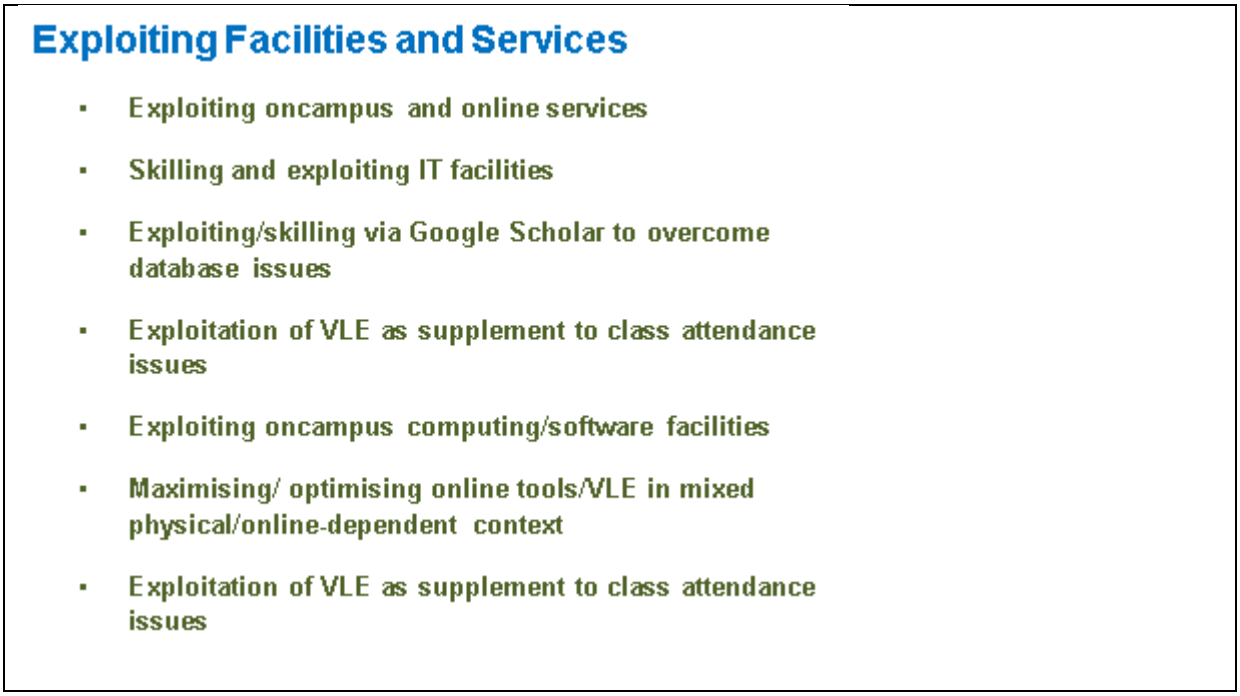


Figure 95: Early Theoretical Code, ‘Exploiting Facilities and Services’ in context to Theory Bits/Insight

Resolving and Supplementing ICT Problems

Students exhibited a range of concerns and challenges using ICT services and equipment, including printers, scanners and individual online platforms such as the VLE or Library systems; students also experienced problems accessing or using library databases. Students indicated a variety of strategies to overcome these issues including attempts to improve awareness/ skills for technologies and network with support departments or peers. Students indicated that overcoming poor confidence in the use of ICT was related to these challenges.

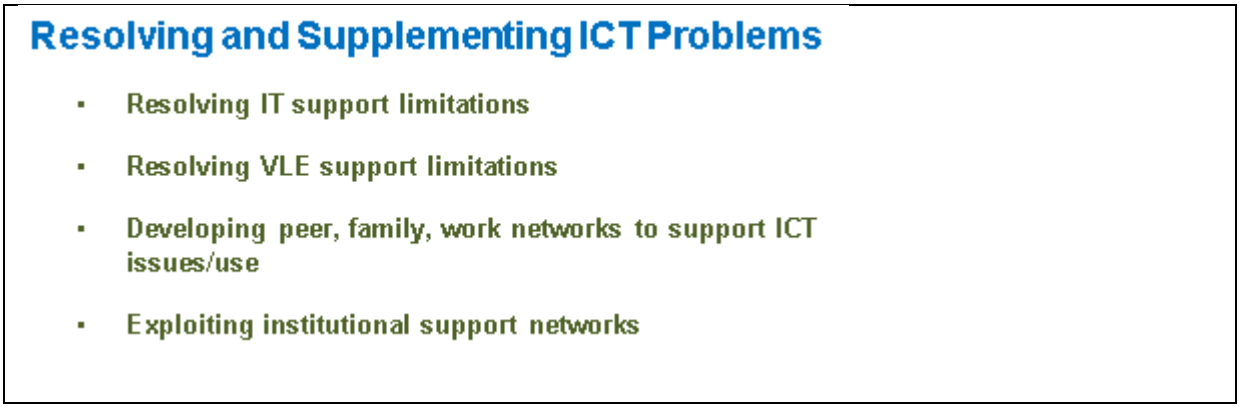


Figure 96: Early Theoretical Code, 'Resolving and Supplementing ICT Problem' in context to Theory Bits/Insight

Engaging with and Negotiating Online Communications

Students indicated they engaged with a range of online communication platforms and tools including VLE based tools such as group/discussion features, assessed class discussion tasks, use of email to communicate with peers and tutors and informal or external communication technologies such as Skype or social networks such as Facebook. Students indicated problems engaging with some peers and tutors due to lack of engagement and also described usability or technical problems

regarding some technologies. Overall, communication technologies represented a positive facilitator for remote study in this predominantly low contact environment.

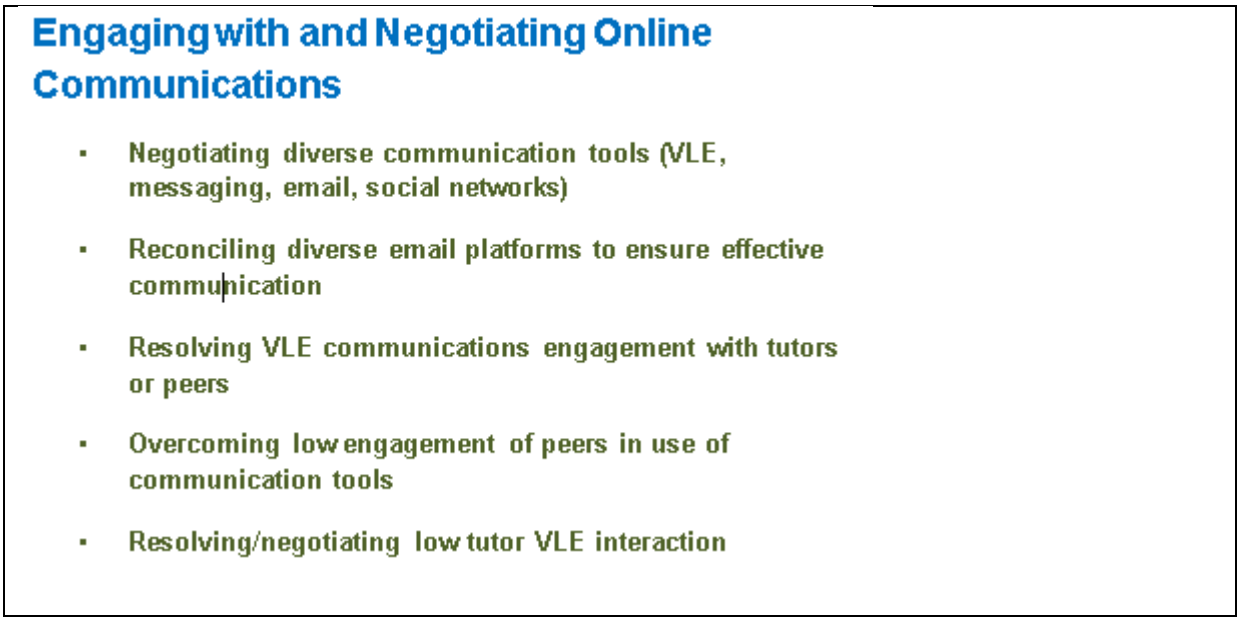


Figure 97: Early Theoretical Code, 'Engaging with and Negotiating Online Communications' in context to Theory Bits/Insight

Acquiring and Supplementing Study Skills

Students indicated a perceived shortfall in availability (and in some cases quality) of support for general study skills including course work development skills and research skills related to information literacy. Students described the need to supplement low contact and infrequent opportunities to engage with supplementary training available via personal attempts to acquire skills in areas such as use of the VLE or databases. For some students there were challenges in the acquisition of skills for core internet tools such as browsing the Web or use of email. These students tended to represent non-conventional mature students returning to education. Students described the need for high quality support materials for research, library systems and learning tools such as VLE assessment features.

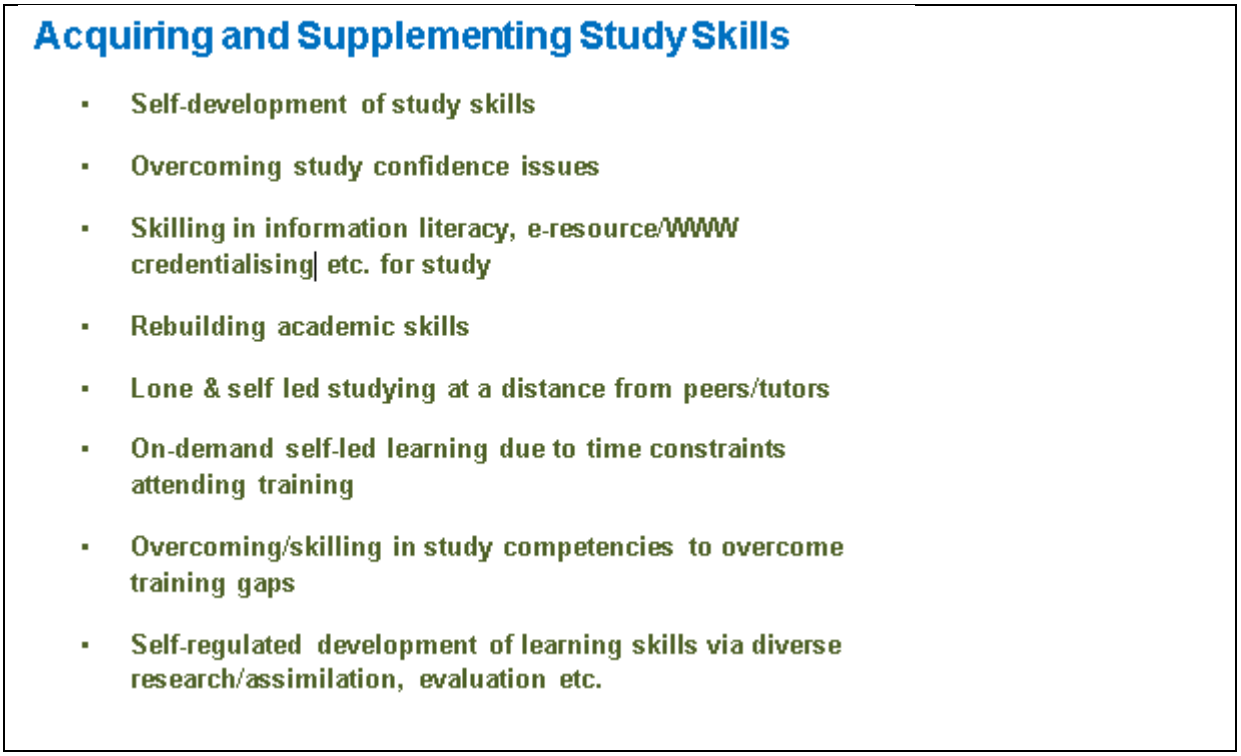


Figure 98: Early Theoretical Code, 'Acquiring and Supplementing Study Skills' in context to Theory Bits/Insight

Resolving and Supplementing Information Literacy for Effective Research

Students described considerable problems accessing online library databases due to multiple sign in issues, usability issues, limited scope for availability of platforms, lack of specialist platforms and problems navigating systems or interpreting search results. These issues extended to both formal library-sourced Web services and databases but also referred to Internet sources and WWW search engines on occasion. Students frequently referred to facilitation of literature searching via non-conventional or informal methods such as Google to overcome the aforementioned issues. In some case, students actively assessed and selected resources based on WWW academic portal recommendations (databases such as BizEd) or using links from the VLE or Library. Students also used Google Scholar to refine WWW search

outputs or occasionally used advanced options within WWW platforms and search engines. Students described a variety of strategies to develop information literacy skills and improve engagement with library and informal WWW search options.

Figure 99: Early Theoretical Code, ‘Resolving and Supplementing Information Literacy for Effective Research’ in context to Theory Bits/Insight

Engaging with and Negotiating Digital Platforms

Related to the theoretical code "resolving and supplementing information literacy for effective research", this code represents the ongoing challenges and strategies for students in the navigation of diverse platforms and systems. Many students found the range of online Web sites, databases, student portal, University Web pages, government and standards sources, special interest Web sites, corporate Web sites and work related Web resources difficult to assimilate into their research and academic output. Students described a variety of challenges and corresponding strategies for overcoming the proliferation and diversity of platforms and systems including reliance on the VLE, reliance on core printed texts, physicalisation of key materials into a learning set to avoid digital content negotiation or avoidance of online sources. Other students expressed a variety of strategies to optimise the use of diverse platforms, including use of desktop PC bookmarking tools, Web based bookmarking, hierarchical file management for downloaded materials or reliance on hierarchies found in Web portals or the VLE to provide a structured interface to these sources. The negotiation of diverse sources and development of competencies to access and embed these sources into study was acknowledged as a key requirement by many students, despite widespread aversion to the need to navigate, discover, evaluate, interpret and selectively use these resources effectively and in an appropriate context.

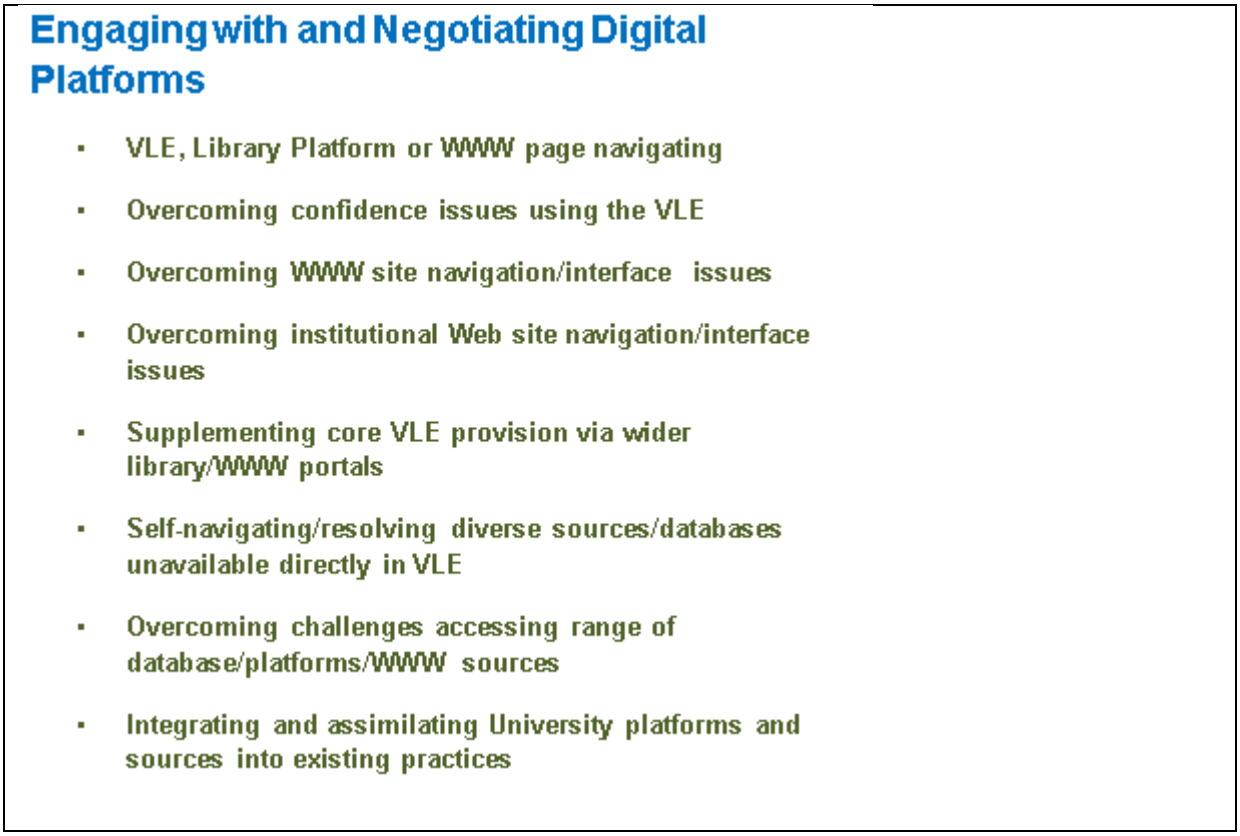


Figure 100: Early Theoretical Code, ‘Engaging with and Negotiating Digital Platforms’ in context to Theory Bits/Insight

Physicalisation of Virtual Learning

Students frequently described printing hardcopy resources including presentations, course information, online articles, course handouts or even the display of information shown directly in the VLE. Students sometimes described the need for hardcopy resources a key requirement for study, rather than consider the use of digital files virtually within a computer environment. This process suggested that some students were undertaking a "physicalisation" of digital assets and online services to undertake course assignments and other academic work solely or largely via printed media. Another aspect of this behaviour included avoidance of the VLE and other online service and tools. Whilst some students admitted to this processing

of online systems and digital assets, the same students would often acknowledge the need to improve their management of digital media to reduce print costs and work more rapidly without the need to print.

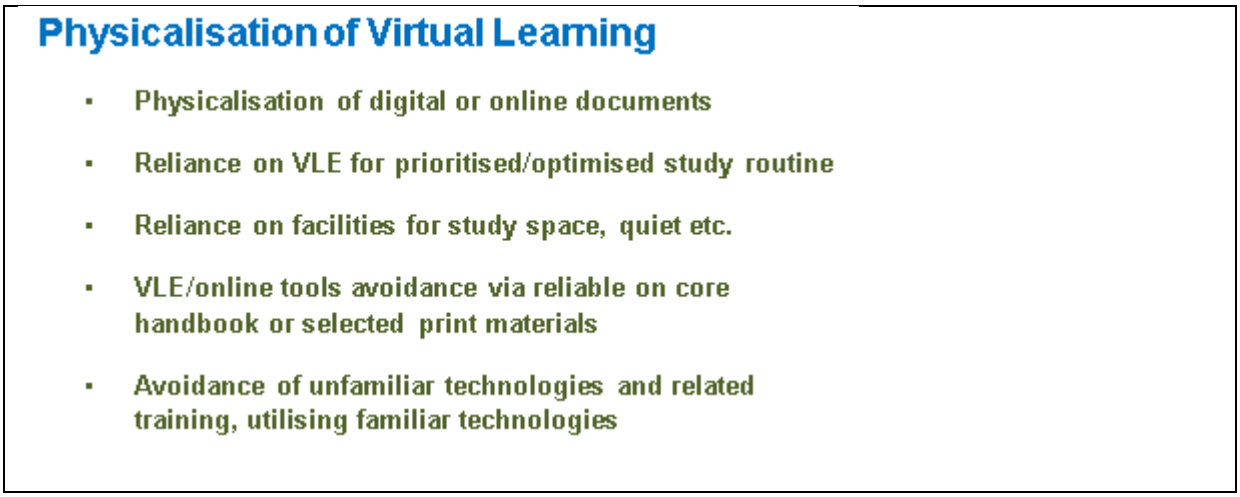


Figure 101: Early Theoretical Code, 'Physicalisation of Virtual Learning' in context to Theory Bits/Insight

Virtualisation of Learning to accommodate Remote Study

Many students described processes or strategies to virtualise their experience to accommodate their remote or low contact context; this included management of online sources and digital assets within a computer environment, use of cloud style computing approaches such as Microsoft Live spaces for sharing and networking with peers, use of extended communication tools such as Skype or further use of VLE communication tools beyond regular classroom interaction such as personal messaging in the VLE or use of group features. Use of mobile devices and laptops was also raised as a means of working across diverse locations in a virtual and remote context. The virtualisation of learning was important for many students to varying levels, with some students suggesting these approaches should be

implemented more fully to allow for more flexible study and increased online learning options.

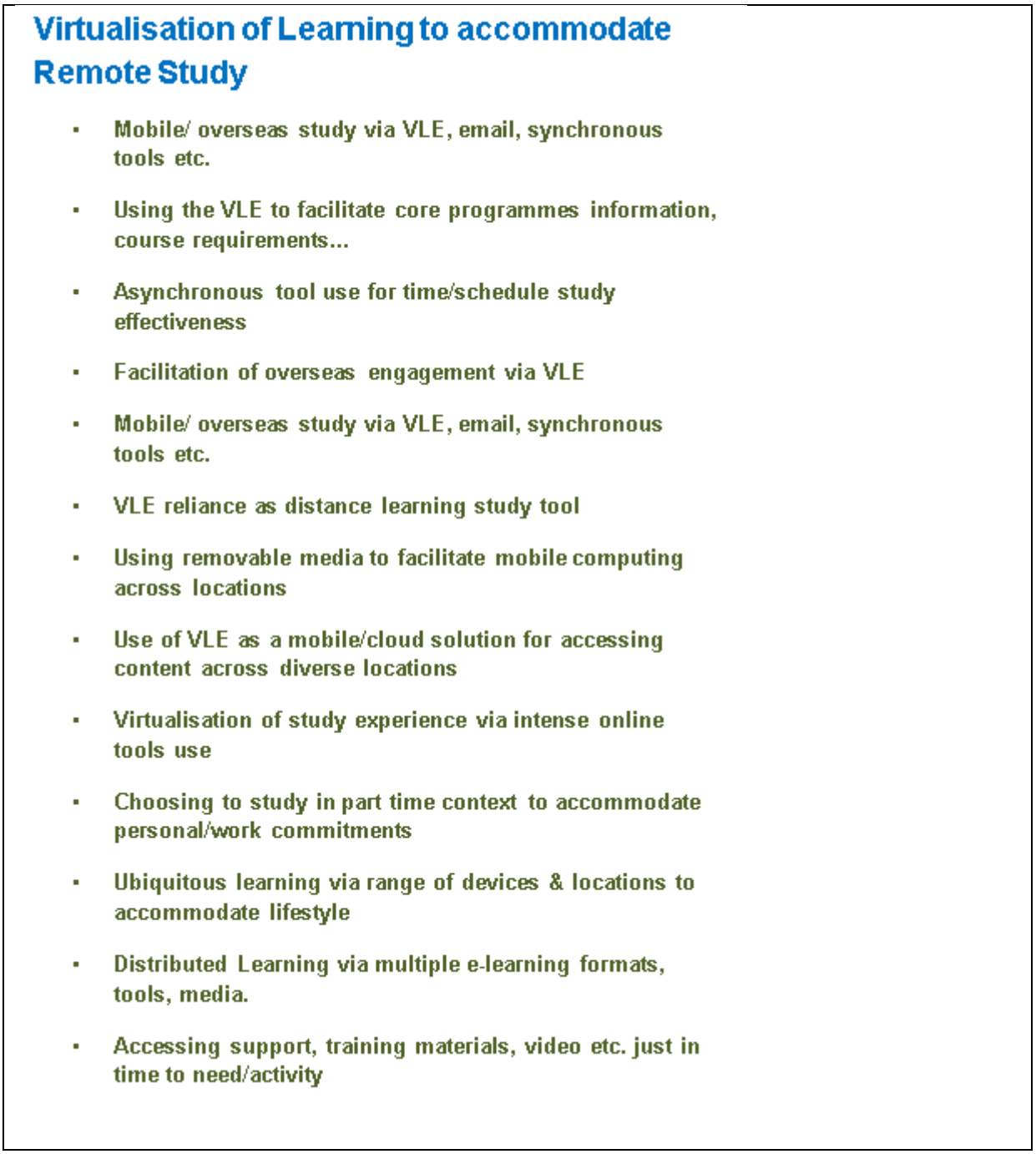


Figure 102: Early Theoretical Code, 'Virtualisation of Learning to accommodate Remote Study' in context to Theory Bits/Insight

Learning Resources Capital Acquisition

Some students expressed the need to acquire and install software applications on a range of personal and work PCs. Access to this software was considered a key issue for successful study, despite the availability of some specialist software on University PCs. Students described a range of strategies and approaches for obtaining these software applications.

Figure 103: Early Theoretical Code, 'Learning Resources Capital Acquisition' in context to Theory Bits/Insight:

Organisation of Learning Assets

Some early pilot interviews revealed techniques to store, sort and archive digital assets such as course work or articles downloaded from databases or the WWW, some students used basic folder hierarchies whilst others were most comfortable using the standard 'My Documents' and related folder structure available on Windows computers. Some students used removable media whilst others saved files to their network drive or stored documents in email for access at diverse computing locations. When this code was raised for selective coding, many students expressed a lack of familiarity and difficulties managing their digital assets but indicated the organisation of assets was important for effective study.

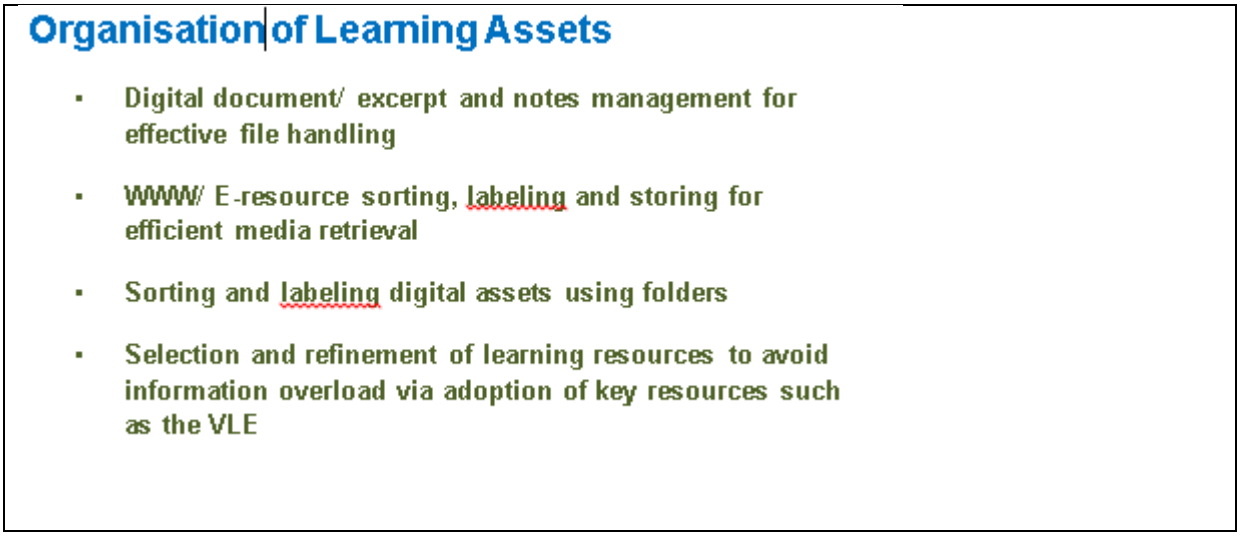


Figure 104: Early Theoretical Code, 'Organisation of Learning Assets' in context to Theory Bits/Insight

Supplementing and Innovating Literature Searching Approaches

Students often expressed difficulties using library databases due to multiple sign in, password problems, usability or search results filtering issues. Many students indicated they used WWW portals, Google, Google Scholar, work related platforms or other authoritative sources such as major standards Web sites or government/public sector portals to access articles and information. Students expressed a variety of strategies and techniques to access full text documents and indicated this was a key issue for effective study.

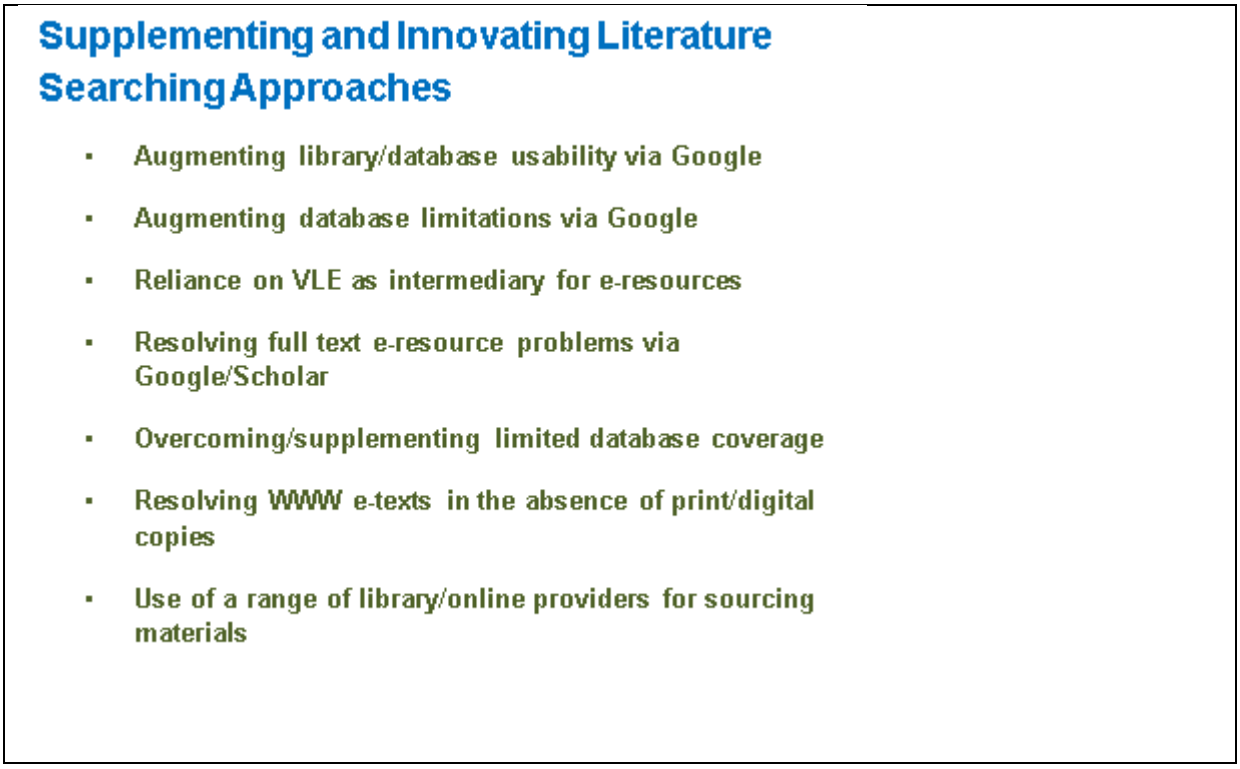


Figure 105: Early Theoretical Code, 'Supplementing and Innovating Literature Searching Approaches' in context to Theory Bits/Insight

Virtualisation and Engagement for Online Feedback and Assessment

Students often expressed the need to communicate electronically with tutors for the purposes of feedback and assessment. Strategies for achieving this included use of email, VLE messaging, discussion boards and use of the drop box i.e. a tool provided within the VLE for sharing files between users or for sharing with a tutor, often used for document delivery (such as commented Word files for group work). Some students also described use of the 'Virtual Classroom' and other VLE features for synchronous feedback. Online VLE-based assessment, grading and survey tools were also discussed. The virtualisation of feedback and assessment was considered an important component for effective remote engagement in assessment.

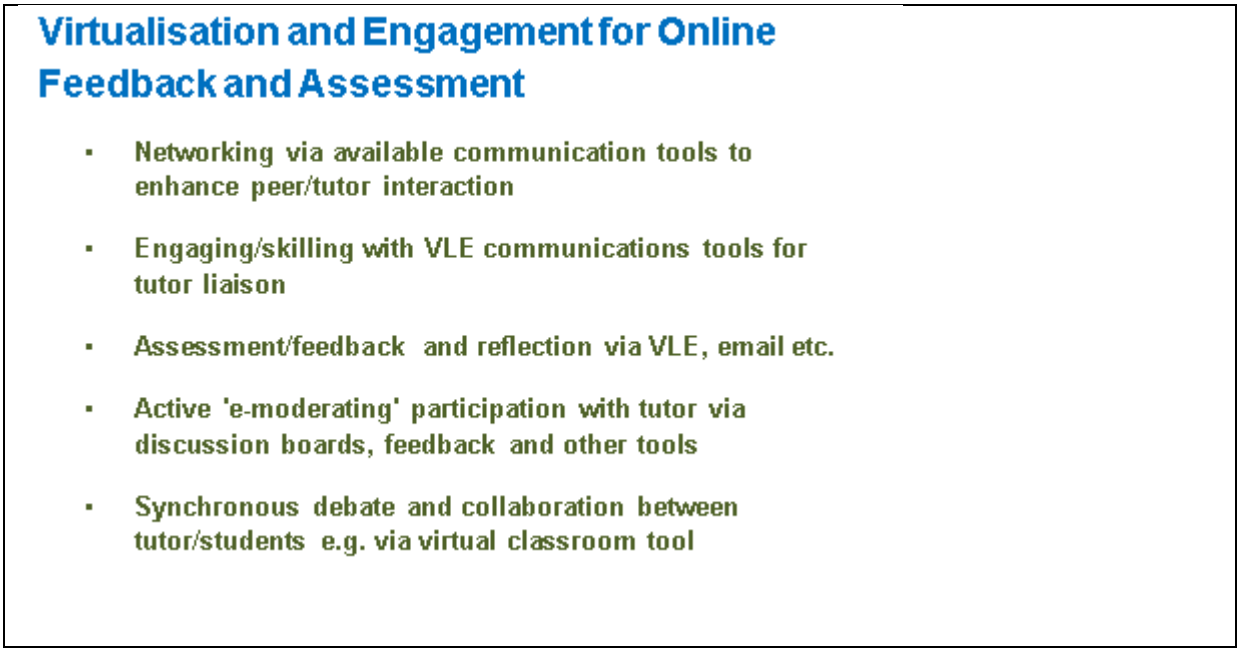


Figure 106: Early Theoretical Code, 'Virtualisation and Engagement for Online Feedback and Assessment' in context to Theory Bits/Insight

Socialisation of Learning for Group/Peer Working

Some students expressed the need to use informal electronic communications to facilitate group working and general networking with peers, via tools such as VLE messaging, VLE group tools, file sharing, Microsoft Live Spaces and social media, these approaches reflect learning engagement within the use of social media and personal online spaces.

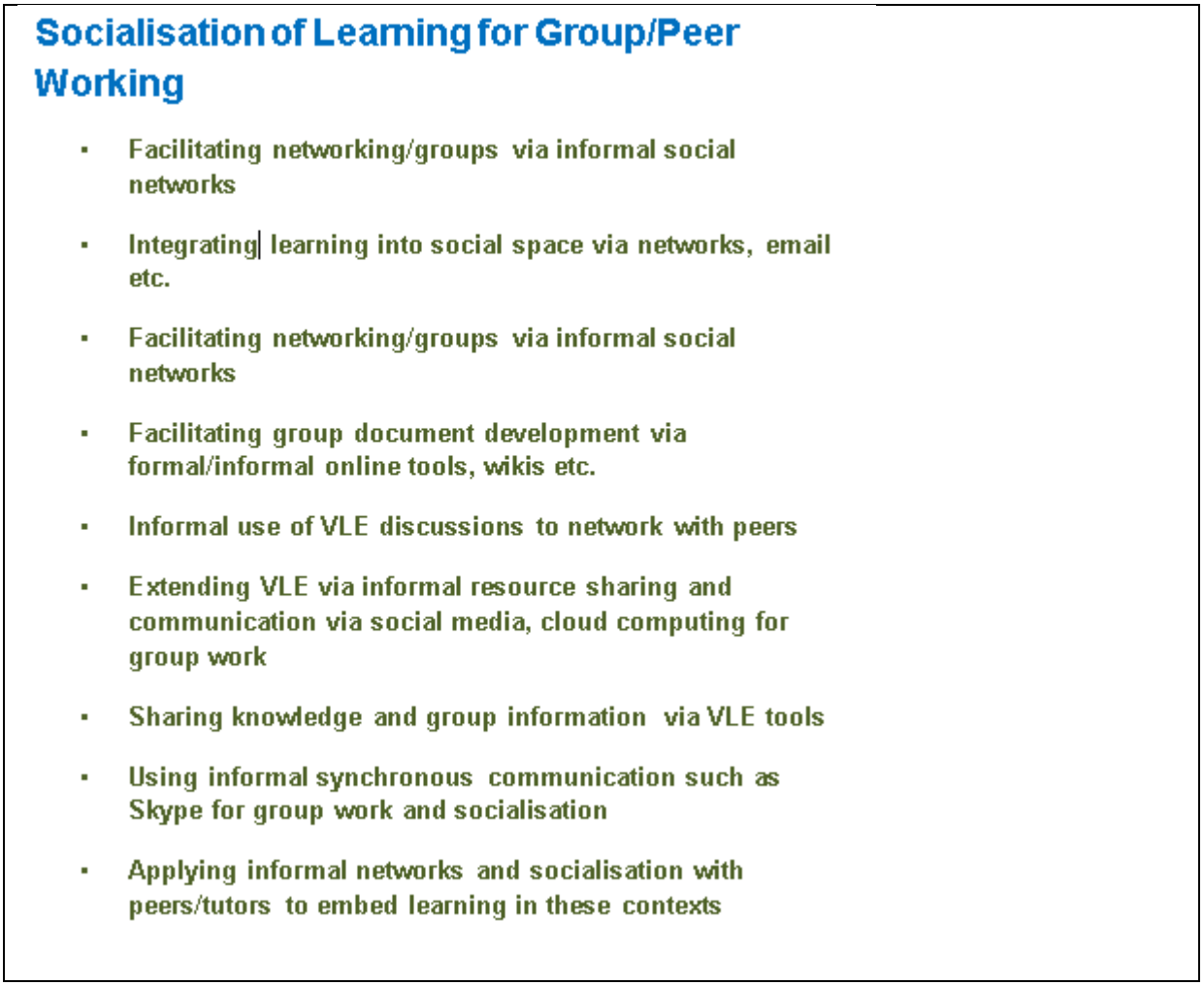


Figure 107: Early Theoretical Code, 'Socialisation of Learning for Group/Peer Working' in context to Theory Bits/Insight

Engaging with and Negotiating Remote Group Working

Group working was often mentioned in terms of challenges for facilitating and coordinating shared project development without persistent oncampus presence (virtually all the students interviewed lived off campus); a range of strategies and tools were used to achieve group working, including use of social media, the VLE and email features. Challenges in group working included: motivation of peers and balancing group working activities alongside personal commitments.

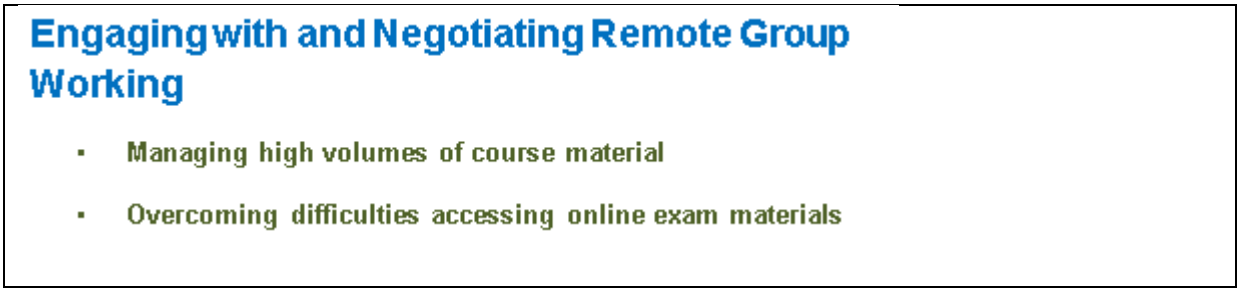


Figure 108: Early Theoretical Code, 'Engaging with and Negotiating Remote Group Working' in context to Theory Bits/Insight

Resolving and Networking for Acquisition of ICT Support

Students described a range of strategies to obtain ICT support to resolve technical problems; these solutions included networking with other students and sharing advice on platforms or consulting family or friends. Students often state that conventional IT support was difficult to obtain or slow in terms of meeting needs during timescales for completion of work (e.g. during weekends).

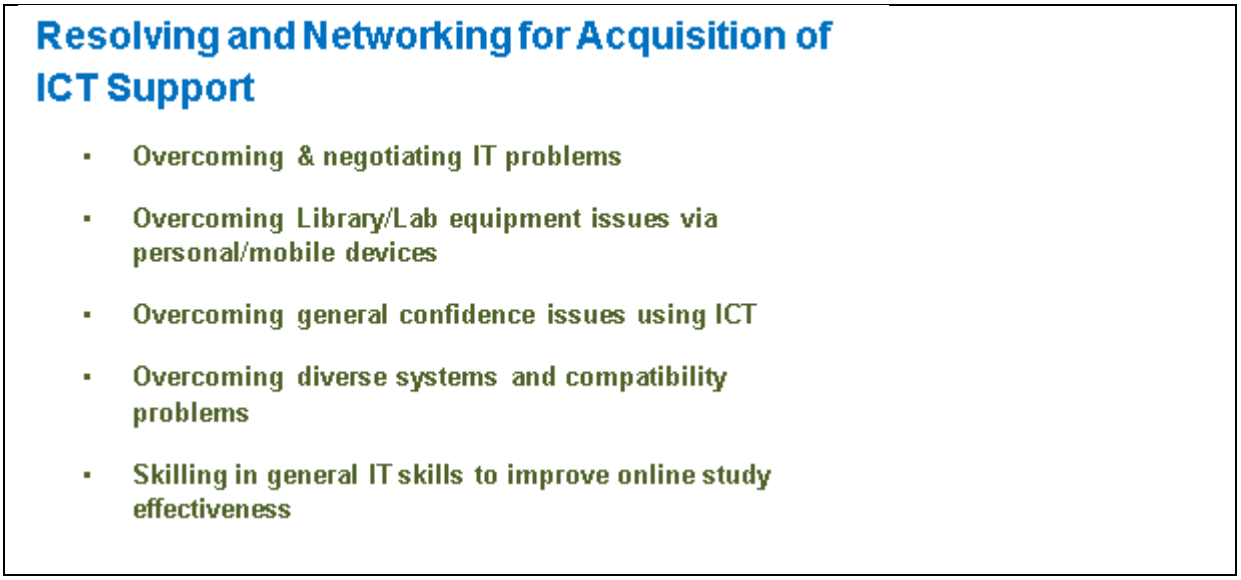


Figure 109: Early Theoretical Code, 'Resolving and Networking for Acquisition of ICT Support' in context to Theory Bits/Insight

Engaging with and Negotiating VLE and course content

Some students expressed the need to negotiate and mange considerable documentation via the VLE, this has implications for printing and document management. The VLE was cited as the most valuable and relied upon online platform for most students, acting as a hub for course materials and communication tools. The provision of materials in the VLE and effectiveness of course layout and structure was described in terms of significant importance. Students often mentioned the need to navigate the VLE successfully to obtain course materials or engage in discussions.

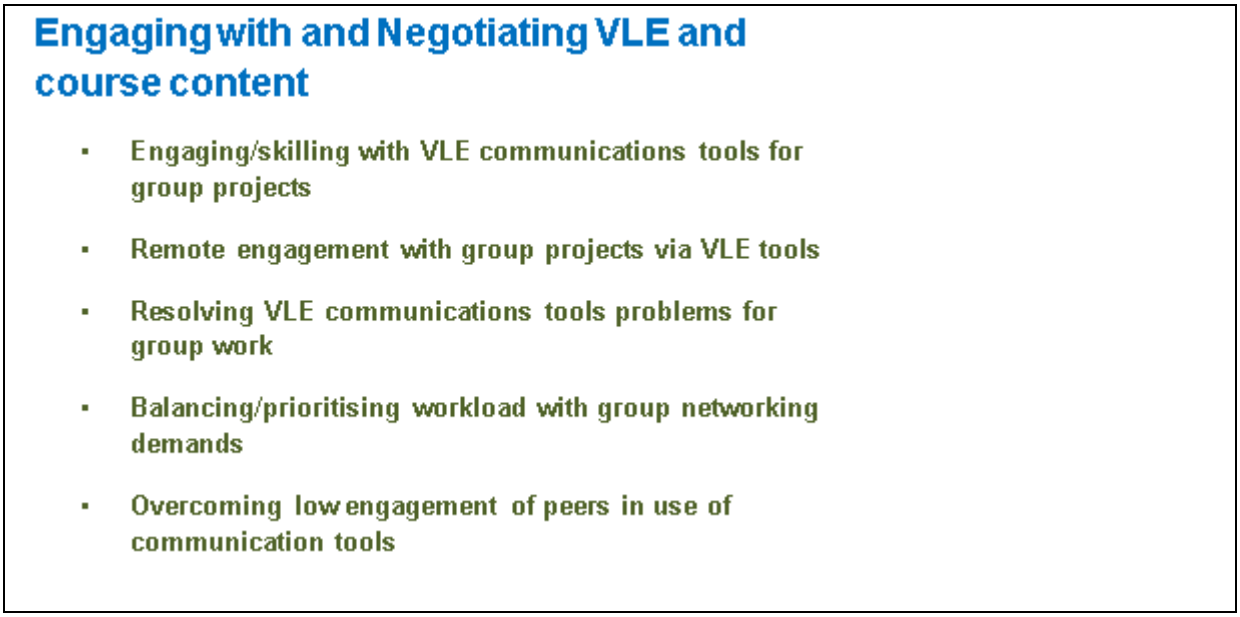


Figure 110: Early Theoretical Code, 'Engaging with and Negotiating VLE and course content' in context to Theory Bits/Insight

Managing and Negotiating Work-Study Relationships

Some students had a significant imperative to negotiate or manage work-study relations, with some students facing pressure from employers to participate and

complete programmes with others expressing anxieties regarding work related funding for programmes fees.

Figure 111: Early Theoretical Code, 'Managing and Negotiating Work-Study Relationship' in context to Theory Bits/Insight

Resolving and Negotiating WWW usage issues

The use of the WWW was mostly cited as a positive experience and tool for most students, providing a supplementary resource for obtaining academic or commentary materials, however some students expressed anxieties regarding the evaluation and appropriate use of WWW derived materials. Other students expressed difficulties in selecting appropriate resources from volumes of search results shown in search engines. Some students expressed the desire to develop better information literacy skills to use the WWW more effectively.

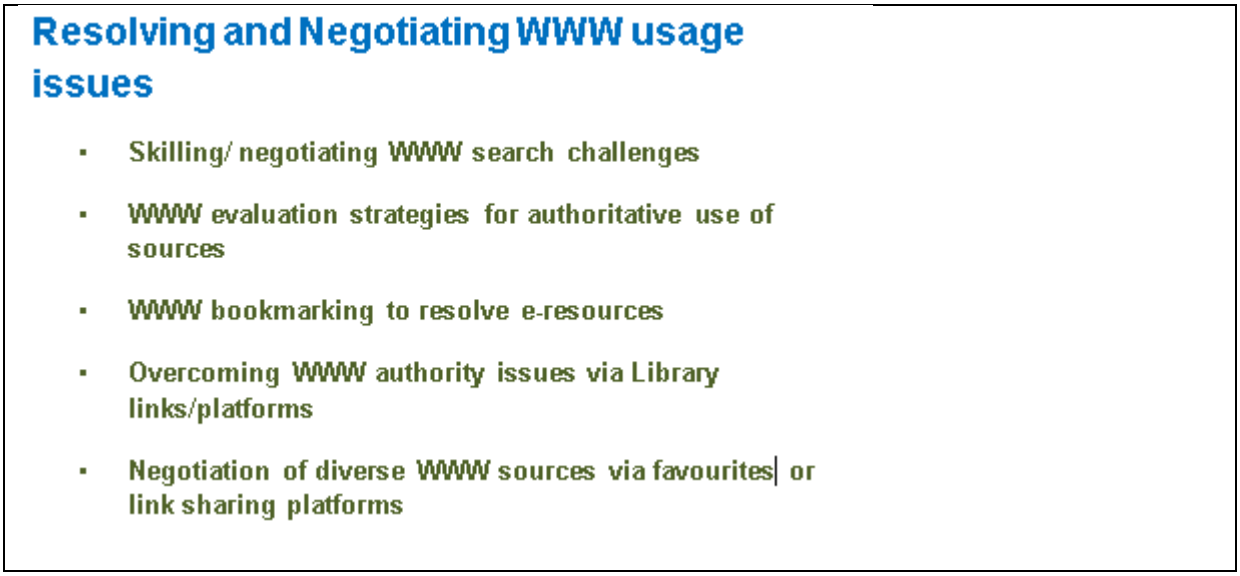


Figure 112: Early Theoretical Code, 'Resolving and Negotiating WWW usage issues' in context to Theory Bits/Insight

Developing Confidence in Technologies and Low Contact Study

Development of confidence as a part time or predominantly remote based student was cited by many students as a challenge, with some students perceiving themselves to be at a disadvantage due to their remote study context.

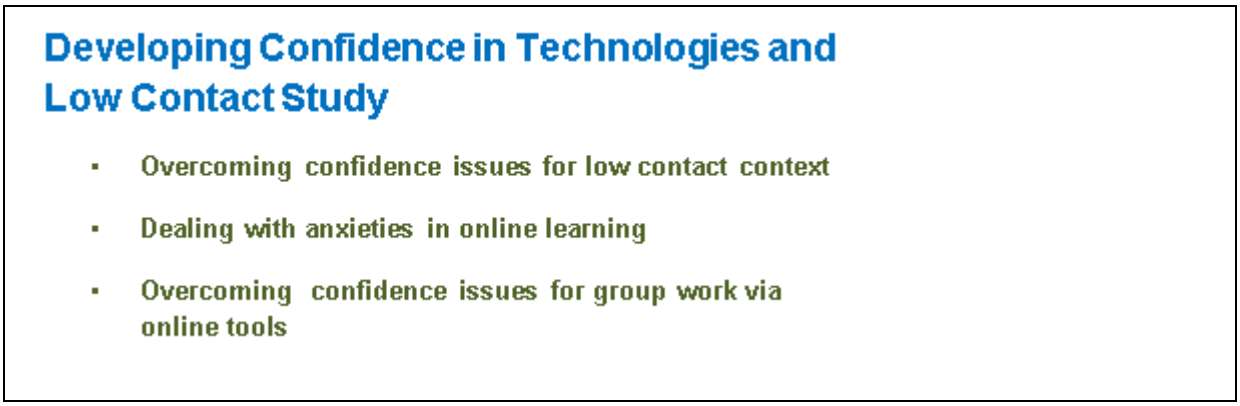


Figure 113: Early Theoretical Code, 'Developing Confidence in Technologies and Low Contact Study' in context to Theory Bits/Insight

We can see therefore that ”improvisation” as an active, participative and constructive trend reflecting behaviours such as adaptation, exploitation of resources and experimentation to achieve efficiencies or improved study outcomes can be strongly evidenced in the narrative explanation for the Early Theoretical Codes. These codes could therefore be said to display a high level of interchangability of indices for the Core Category, ‘Improvised Learning’.

Part 4: Developed/ High Level Theoretical Codes Contributing to the Theory

Developed Theoretical Codes can also be shown to demonstrate high interchangability of indices with the Core Category ‘Improvised Learning’, including emerging conceptualisations of behaviour reflecting aspects such as multi-tasking and “transitional” approaches usually signifying a shift from traditional to digital or online focused behaviours. Key Developed Theoretical codes reflecting self-led improvisation, adaption and engagement with diverse systems and platforms include:

- Multi-tasking Commitments.
- Self-Regulated Engagement.
- Transitional Physicalisation of Online Learning.
- Network Building/ Engaging.
- Adaptive Virtualisation of Learning.
- Socialisation of Learning.
- On-Demand Exploitation/ Improvisation.

- Navigating diverse platforms, equipment, locations.

i. Summary of Developed Theoretical Code Properties Contributing to the Core Category

The Developed level Theoretical Codes suggest significant interchangability of indices with the Core Category ‘Improvised Learning’. Key aspects of improvisation-style behaviours and theoretical insight are provided in the narrative below. The following narrative explanation of Developed Theoretical Codes is accompanied by hierarchical visuals demonstrating the relationship to dependent Early Theoretical Codes and some examples of Theory Bit/Insight (see Early Theoretical Codes above for further explanation/Theory Bit examples):

Multi-tasking Commitments

Managing simultaneous commitments via prioritisation across the programme, work commitments, and family or private life; students demonstrated self-regulated behaviours to manage programme requirements, self-led planning for group work and collaboration, prioritising tasks, assignments and strategies to manage these commitments a unified schedule, integrating work and study commitments.

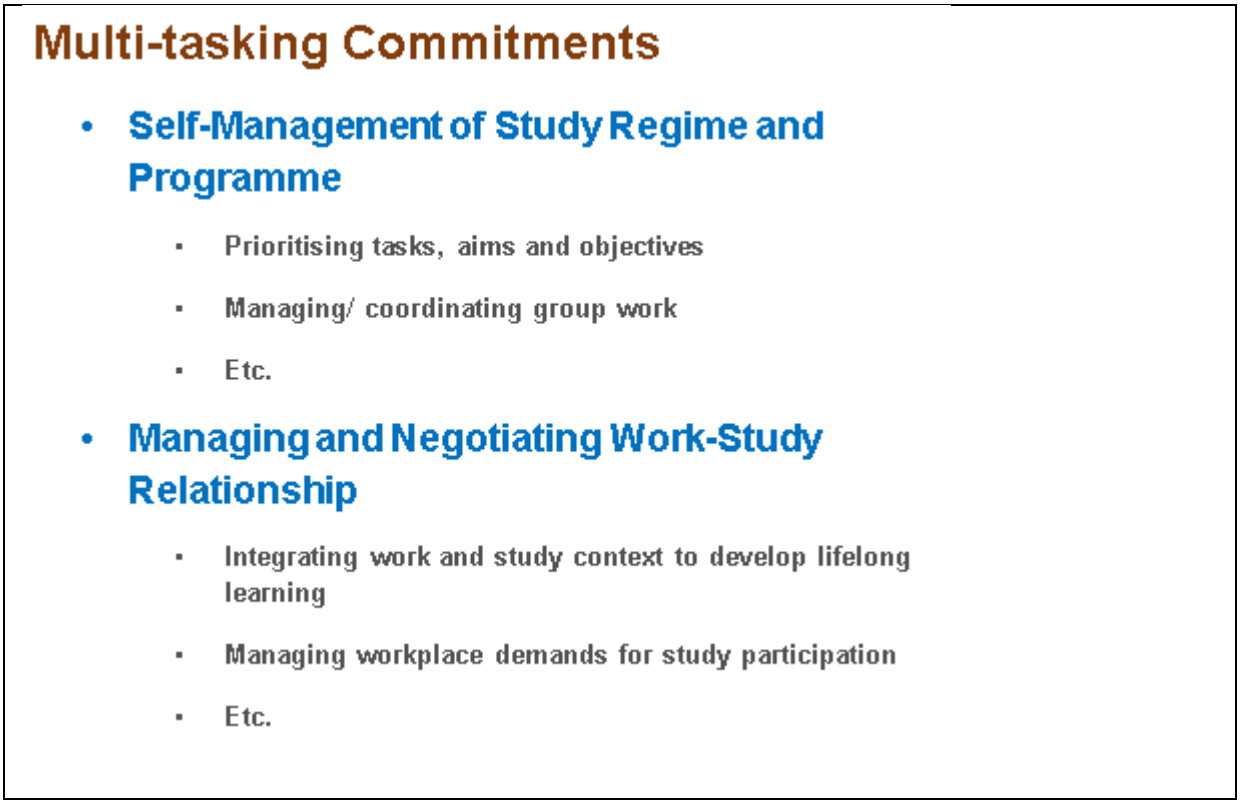


Figure 114: Developed Theoretical Code, 'Multi-tasking Commitments' in context to Early Theoretical Codes and example Theory Bits/Insight

Self-Regulated Engagement

Students reported leading or regulating their own personal study, this relates heavily to perceptions of low contact and class/study support where students develop self-led approaches to managing their work, overcoming skills barriers, developing strategies for overcoming resource or access issues and leading project work.

Figure 115: Developed Theoretical Code, 'Self-Regulated Engagement' in context to Early Theoretical Codes

Transitional Physicalisation of Online Learning

Most students exhibit some level of transitional or traditional approaches to study. The most evident aspect of this behaviour is the heavy reliance on printed media amongst some students; other characteristics include avoidance of wider e-resource/database engagement or poor engagement within group work or associated electronic/VLE communication tools. Students may also have anxieties regarding management or storage of digital media and may rely on printed textbooks. Students may also either avoid the VLE where there are options to work around this platform or minimise usage. Students who exhibit these kinds of tendencies could be considered transitional in terms of cultural acceptance of digital technologies more generally. Their reliance on printed and class-based participation (vs. online or social learning interactions) could be described as physicalisation of remote learning. This Theoretical Code cascades or inherits from the High Level

Theoretical Code of the same name; the following visual provides an overview of this group of related Theoretical Codes:

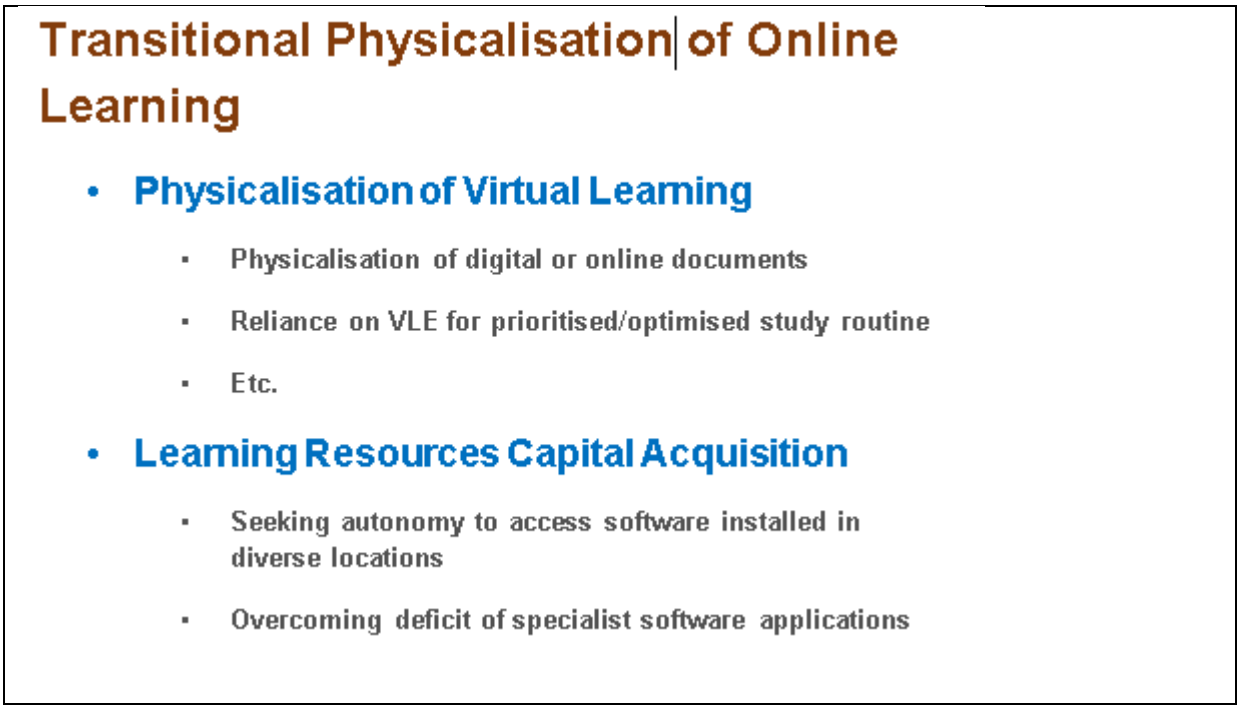


Figure 116: Developed Theoretical Code, 'Transitional Physicalisation of Online Learning' in context to Early Theoretical Codes and example Theory Bits/Insight

Network Building/ Engaging

Students often developed information or links within their social sphere and the educational institution to obtain a range of support, including support via peers, family, work colleagues or University staff. Networking can also be said to occur at the group or class level where students exchange information, tips or discuss academic work via formal (VLE, discussion board) or informal social media channels.

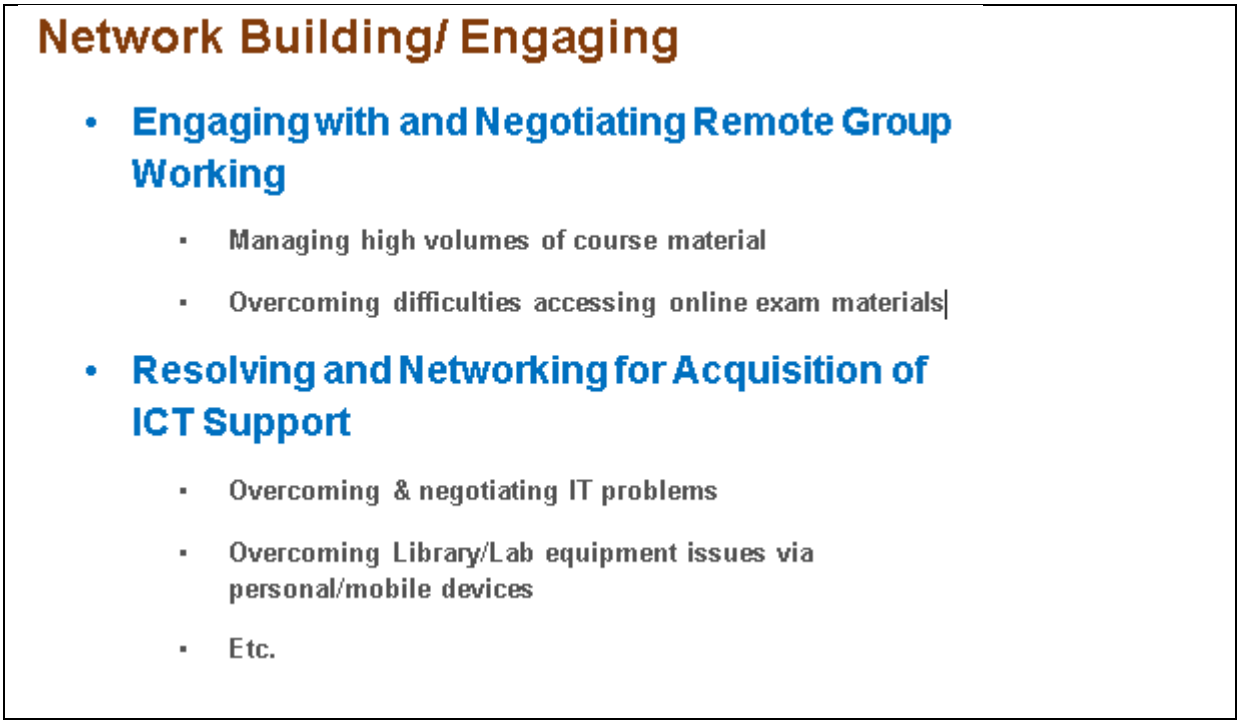


Figure 117: Developed Theoretical Code, 'Network Building/ Engaging' in context to Early Theoretical Codes and example Theory Bits/Insight

Socialisation of Learning

Students sometimes discussed aspects of group work or networking with peers which involved informal channels such as personal email or social media. These channels illustrate the embedding and assimilation of blended learning into existing or adopted technologies accessible to the student and their social sphere. Socialisation of blended learning illustrates student strategies to enhance the learning experience via use of technologies which may extend or build upon those offered in class, such as Skype for video discussions, Live Spaces for document sharing or Wikis for shared document creation.

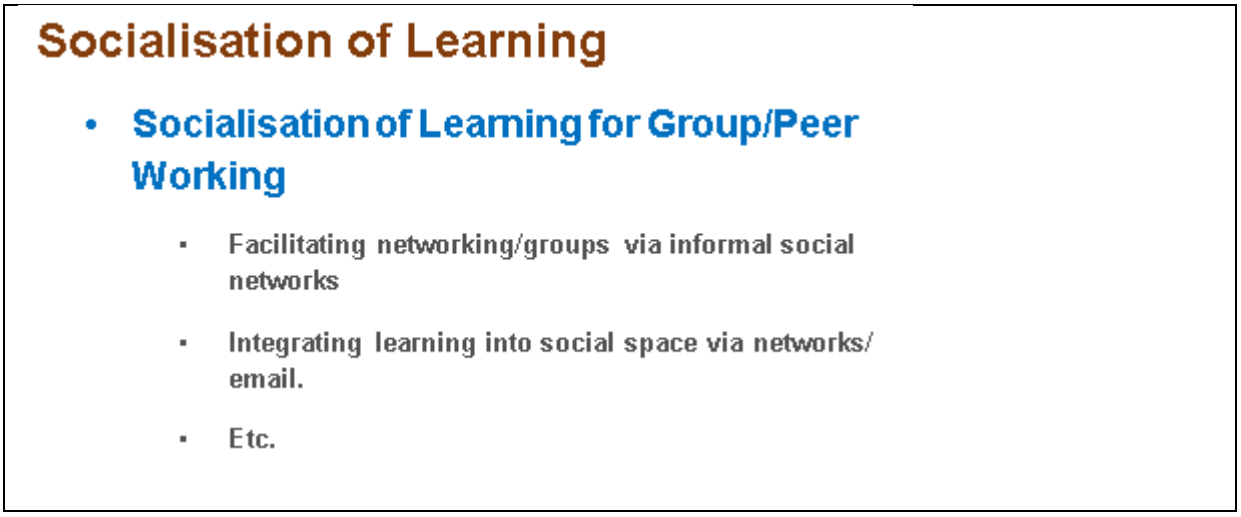


Figure 118: Developed Theoretical Code, 'Socialisation of Learning' in context to Early Theoretical Codes and example Theory Bits/Insight

Adaptive Virtualisation of Learning

Students often exhibited adaptive strategies and behaviours to maximise the use of electronic platforms and communications tools for working remotely. This is often in context to low class contact and low attendance at the University for informal networking and discussion with peers or tutors. The enhanced adoption of communication tools and social media for networking and group work is explained by the need to virtualise this experience. Virtualisation is also noted in the diverse use of platforms, databases and WWW portals/ search engines which may be more prolific than conventional amongst oncampus students. These virtualisation tendencies illustrate the characteristics of student interactions in a directed sense when undertaking blended learning, but also illustrate motivations and strategies to expand or push the boundaries of available tools, platforms and systems to facilitate study effectively at a distance.

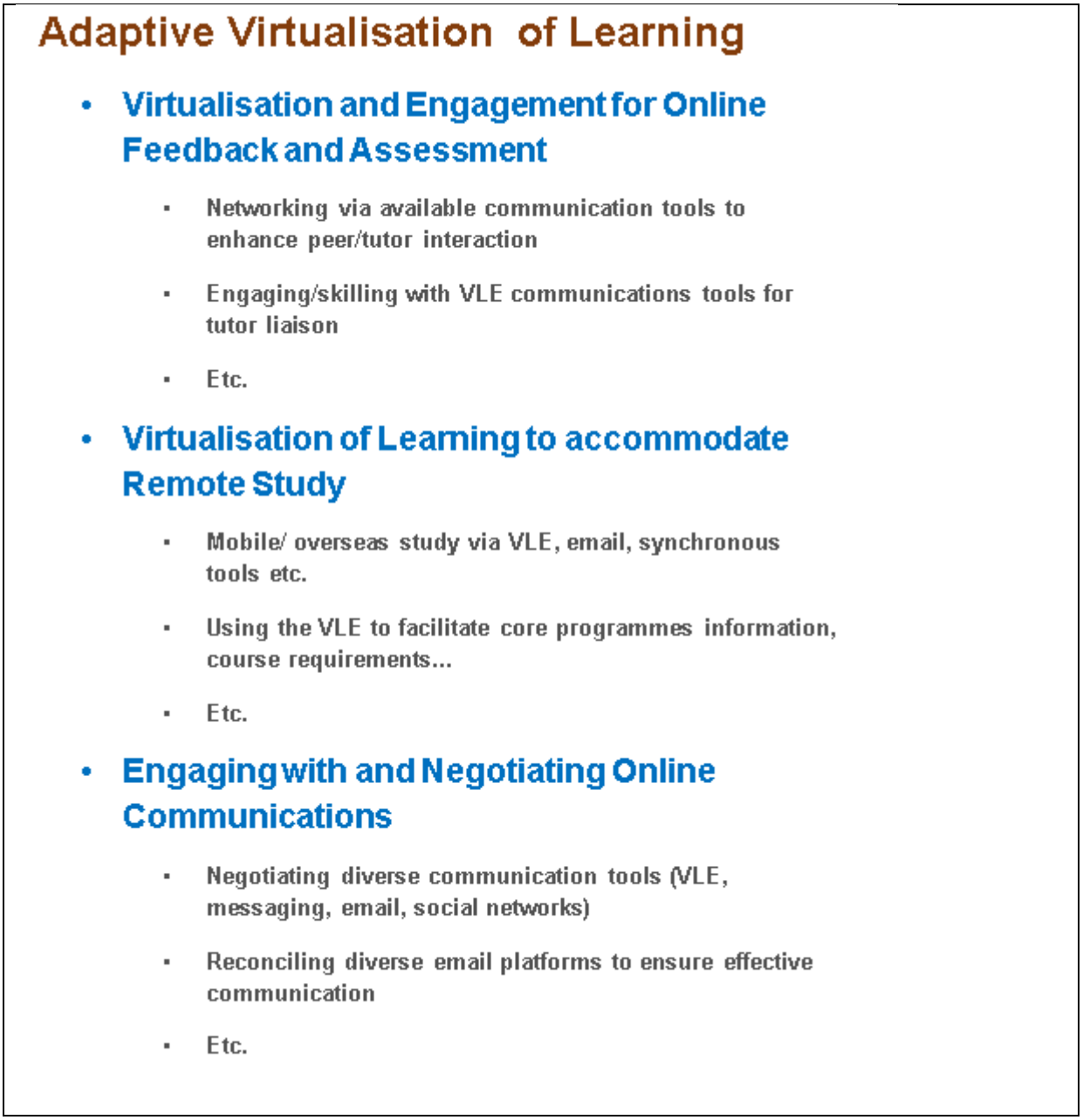


Figure 119: Developed Theoretical Code, 'Adaptive Virtualisation of Learning' in context to Early Theoretical Codes and example Theory Bits/Insight

On-Demand Exploitation/ Improvisation

Students exhibited strategies to resolve a variety of technical, informational and resource-based needs in a low contact context, including access to support networks within their social or family sphere, exploitation of University or other local services

such as local libraries or improvisation such as use of WWW search engines to locate e-resources or supplement formal databases for literature searching. Exploitation and innovation emerged as a highly important strategy and process for literature searching due to perceived problems using databases and platforms provided within the Library.

Figure 120: Developed Theoretical Code, 'On-Demand Exploitation/ Improvisation' in context to Early Theoretical Codes and example Theory Bits/Insight

Navigating diverse platforms, equipment, locations

Students also reported the need to become familiar with and overcome challenges in the use of a wide range of WWW portals, government and standards Web sites, public sector Web pages, library platforms, catalogue, databases and other online tools and platforms such as the VLE and informal systems such as Live Spaces. Students also reported using diverse locations for computing and other formal systems such as the Library classification system or work related information

sources. Students also reported challenges using equipment, computing facilities and personal or work computer equipment. The navigation of diverse platforms, equipment and locations for remote study was therefore a significant challenge and process observed within this student population. This Developed Theoretical Code also shares the same name as the High Level Theoretical Code from which this code inherits or cascades.

Figure 121: Developed Theoretical Code, 'Navigating diverse platforms, equipment, locations' in context to Early Theoretical Codes

ii. Summary of High Level Theoretical Code Properties Contributing to the Core Category

High Level Theoretical Codes also indicated significant interchangability of indicators with the Core Category:

- Transitional Physicalisation of Online Learning (identical to the Developed code mentioned above).
- Motivational adaption and improvisation via Online Learning.
- Navigating diverse platforms, equipment, locations (identical to the Developed code mentioned above).

Transitional Physicalisation of Online Learning / Navigating diverse platforms, equipment, locations

The narrative explanation for “Transitional Physicalisation of Online Learning” and “Navigating diverse platforms, equipment, locations” is unchanged from their uses as Developed Theoretical Codes; however, an original High Level Theoretical Code was created from all other Developed Theoretical Codes excluding the two retained Developed Theoretical Codes. This original code, “Motivational adaption and improvisation” represents a significant contribution to the emergent Core Category, emphasising a wide range of adaption, innovation and related behaviours.

Motivational adaption and improvisation

Motivational learning represents the need for highly driven and efficient study practices as an imperative to online/blended study. This property featured heavily in almost all High Level Theoretical Codes contributing to the Core Category. Motivational learning represents self-led or self-regulated study management and responsibility-taking for studies, group work, interactions with peers and tutors, development of study skills and familiarisation with diverse platforms, equipment and services and the self-led negotiation of personal commitments such as work and family life. Adaptive learning represents the imperative to create or construct

strategies and solutions to overcome a range of technical, study-related and networking-related needs within the study context of low contact learning. Students often exhibited adaptive strategies and behaviours to maximise the use of electronic platforms and communications tools for working remotely; this is often in context to low class contact and low attendance at the University for Informal networking and discussion with peers or tutors.

The following figure illustrates the relationship of the High Level Theoretical Codes to surrounding Developed and Early Theoretical Codes as a hierarchy:

Key to theoretical codes shown in the hierarchy:

High Level Theoretical Code [Red]
Developed Theoretical Codes [Purple]
Early Theoretical Code [Blue]
Theory Bit [Green] refined as Control Terms

Improvised Learning

Transitional Physicalisation of Online Learning

Transitional Physicalisation of Online Learning

- **Physicalisation of Virtual Learning**
- **Learning Resources Capital Acquisition**

Motivational adaption and improvisation via Online Learning

Self-Regulated Engagement

- Resolving and Supplementing Information Literacy for Effective Research
- Acquiring and Supplementing Study Skills
- Developing Confidence in Technologies and Low Contact Study
- Resolving and Supplementing ICT Problems

Network Building/ Engaging

- Engaging with and Negotiating Remote Group Working
- Resolving and Networking for Acquisition of ICT Support

Socialisation of Learning

- Socialisation of Learning for Group/Peer Working

Multi-tasking Commitments

- Self-Management of Study Regime and Programme
- Managing and Negotiating Work-Study Relationship

Adaptive Virtualisation of Learning

- Virtualisation and Engagement for Online Feedback and Assessment
- Virtualisation of Learning to accommodate Remote Study
- Engaging with and Negotiating Online Communications

On-Demand Exploitation/ Improvisation

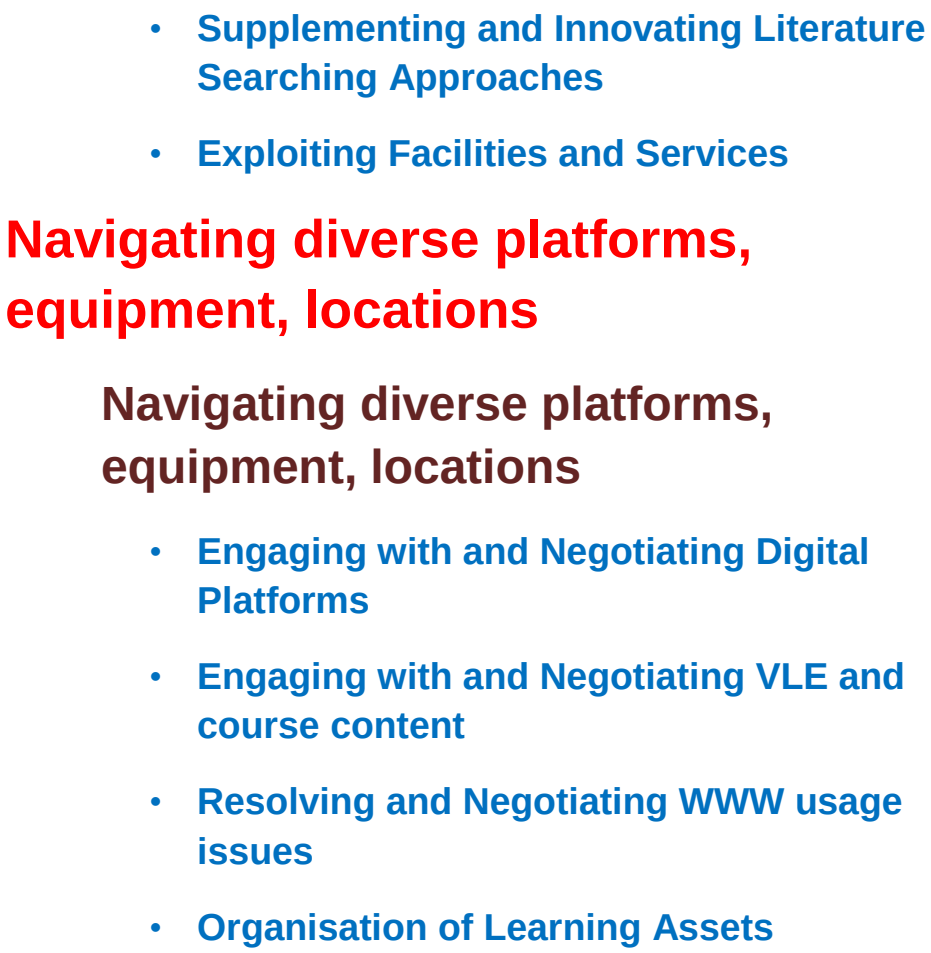


Figure 122: High Level Theoretical Codes in context to Developed and Early Theoretical Codes

Part 5: Summary of Properties of the Core Category 'Improvised Learning'

In summary, the Core Category of 'Improvised Learning' included the following theoretical perspectives explaining behaviours indicated via the practical research: The High Level Theoretical Code, and its single, Developed Theoretical Code, 'Transitional Physicalisation of Online Learning' reflected tentative or hybrid patterns of learning via education technology, suggesting partial acceptance or facilitation of technologies by student participants, whilst also demonstrating engagement with

learning technologies such as the VLE and in some cases, reliance on the VLE for all aspects of programme provision, communication, tutor interaction, group study, access to electronic/programme resources.

Most of these behaviours are related to the Early Theoretical Code ‘Physicalisation of Virtual Learning’; these behaviours indicated intense use of institutional platforms within the planned, structured or institutionally-led Managed Learning Environment, in contrast to behaviours demonstrated amongst other student groups/participants demonstrating either novel or adaptive use of institutional applications for study or group activities, or indeed use of external, non-institutional platforms.

This High Level Theoretical Code also comprises behaviours related to the dependant Developed Theoretical Code, ‘Physicalisation of Virtual Learning’, reflecting behaviours attempting to adjust the role of systems, platforms and electronic resources for greater in-person communications, some examples of reliance on print resources or printing of electronic resources, reliance on physical resources on-campus such as Library shelf collections and other related behaviours such as avoidance of additional or unfamiliar technologies.

The High Level Code ‘Transitional Physicalisation of Online Learning’ also reflected behaviours to acquire or exploit use of software or platforms located on the campus environment (the Early Theoretical Code ‘Learning Resources Capital Acquisition’), in contrast to personal access to software/systems in a remote context.

The High Level Theoretical Code ‘Motivational adaption and improvisation via Online Learning’ concerned a range of self-regulated or motivational behaviours, strategies or approaches exhibited by participants, these behaviours could be grouped under several Developed Theoretical Codes. The Developed Theoretical Code ‘Self-

Regulated Engagement' reflected a range of behaviours indicating self-led or self-regulated activities to enhance, develop, supplement, adapt or otherwise exploit the students' wider environment to engage effectively in study; Early Theoretical Codes such as 'Resolving and Supplementing Information Literacy for Effective Research' and 'Acquiring and Supplementing Study Skills' reflected a range of behaviours to ensure access to scholarly resources, to acquire skills for use of institutionally provided databases and other external sources, similarly to develop personal confidence and skills in the use of educational technology and online learning platforms and to resolve Information Technology related problems via self-led solutions or use of external stakeholders.

Another Developed Theoretical Code related to motivational adaption and improvisation included 'Network Building/ Engaging', with an Early Theoretical Code 'Engaging with and Negotiating Remote Group Working' reflecting participants' often self-led facilitation and sustaining of group based study activities, often in a remote context away from the institutional campus; a further dependant Early Theoretical Code included ''Resolving and Networking for Acquisition of ICT Support'', reflecting self-led resolution or acquisition of information technology support needs, i.e. developing networks to ensure technology problems or needs could be resolved, via personal contacts, family, the workplace or institutional support.

Another Developed Theoretical Code related to motivational adaption and improvisation, 'Socialisation of Learning' comprised a single Early Theoretical Code 'Socialisation of Learning for Group/Peer Working', reflecting a range of behaviours related to students' self-led engagement within their own communities of practice, including development of informal networks beyond institutional-led group work for shared study, integration of diverse learning systems within personal learning

approaches, such as use of social media or personal email, use of VLE tools beyond tutor-led direction for discussion, file sharing or group project documentation, use of non-institutional applications such as Skype and use of informal or non-institutional tools/ approaches for both peer and tutor interaction.

Another Developed Theoretical Code relating to motivational adaptation and improvisation included ‘Multi-tasking Commitments’, reflecting students’ personal or self-led management of study, including use of internet based tools such as chat clients to work from a range of locations and in an online context with peers and tutors, managing resources and equipment for study purposes and managing long term personal development and lifelong learning, these properties were reflected in two Early Theoretical Codes, ‘Self-Management of Study Regime and Programme’ and ‘Managing and Negotiating Work-Study Relationship.

A further theoretical perspective related to motivational and adaptive behaviours includes the Developed Theoretical Code ‘Adaptive Virtualisation of Learning’, reflecting strategies to engage intensively and in an extended manner with internet-based tools and platforms, including features of the VLE and external applications or platforms such as Skype, messaging platforms or social media. These behaviours also reflected self-led or self-regulated engagement with tutors and peers and use of synchronous tools such as an online chat application (Virtual Classroom) in the VLE. These behaviours reflected attempts to extend the blended learning experience toward greater use of tools and platforms in a digital or online context, negotiating and engaging in peer communication to study remotely, perform group work and engage more fully with tutors via online assessment. Related Early Theoretical Codes included ‘Virtualisation and Engagement for Online Feedback and Assessment’ and ‘Virtualisation of Learning to accommodate Remote Study’.

The final Developed Theoretical Code dependent on motivational and adaptive improvisation was defined as ‘On-Demand Exploitation/ Improvisation’, reflecting behaviours to ensure immediate or on-demand access to resources, scholarly materials, Information Technology support or advice and strategies to extend the use of VLE-based features or materials to supplement class based study. Related Early Theoretical Codes included ‘Supplementing and Innovating Literature Searching Approaches’ and ‘Exploiting Facilities and Services’.

The third High Level Theoretical Code, ‘Navigating diverse platforms, equipment, locations’ included a single Developed Level Theoretical Code of the same name, with three Early Theoretical Codes, reflecting behaviours to develop skills, extend, adapt or otherwise exploit institutionally provided systems or platforms alongside external applications sourced beyond the organisation. These theoretical perspectives include the Early Theoretical Code ‘Engaging with and Negotiating Digital Platforms’, including behaviours to navigate, resolve, supplement, and overcome confidence issues in the use of institutional platforms and to integrate or assimilate institutional systems within external or preferred applications, systems or platforms such as social media, personal email or workplace practices. The Early Theoretical Code ‘Engaging with and Negotiating VLE and course content’ reflected use of VLE applications and systems, including group based use of these features, such as use of online chat (synchronous) and a-synchronous tools such as fire sharing or discussion forums. The Early Theoretical Code ‘Resolving and Negotiating WWW usage issues’ reflected a range of self-led behaviours to manage and effectively use Web based resources, including development of personal skills for evaluation and critical appraisal of Web based and scholarly resources. The Early Theoretical Code ‘Organisation of Learning Assets’ similarly comprised

strategies or behaviours to effectively manage learning resources, scholarly materials, course materials via strategies such as file handing in the computer operating system, management of excepts and notes using computer applications, sorting and labelling digital files using folders within the operating system or use of similar functions in the VLE.

Part 6: Further Insight Arising from the Core Category 'Improvised Learning'

The emergent Grounded Theory of 'Improvised Learning' and its dependant variables can be shown to demonstrate high Interchangability of indices across all practical research data. This can be most clearly demonstrated in the retention of the common properties shared by almost all Developed Theoretical Codes (*Motivational Learning, Adaptive Virtualisation of Learning, Self-regulated/managed learning context, On-Demand Exploitation/ Improvisation, Navigating platforms, equipment*). These properties are reflected in High Level and Developed Theoretical Codes discussed in the previous section. Some of the observable characteristics which lean toward a Core Category of 'Improvised Learning' include the following commonly observed characteristics evidenced in data:

i. Improvisation via Motivational and Self-Regulated/ Managed, Coping Behaviours

The Grounded Theory of 'Improvised Learning' reflected self-led behaviours which seek to resolve a wide array of challenges, barriers or limitations in the blended learning, social, environmental context. These self-led, self-regulated or motivational

behaviours are most clearly demonstrated in the High Level Theoretical Category ‘Motivational adaption and improvisation via Online Learning’, the Developed Theoretical Category ‘Self-Regulated Engagement’ and other Developed Theoretical Categories such as 'Network Building/ Engaging', 'Socialisation of Learning', 'Multi-tasking Commitments', 'Adaptive Virtualisation of Learning' and 'On-Demand Exploitation/ Improvisation'.

Adaptation, experimentation and similar resolving activities could be said to represent ‘improvisation’. Improvisation is at least partly concurrent with behaviours, such as being self-managed, self-regulated, self-motivated, self-skilled and other similar self-reliant behaviours visible in the data .The individual is often resolving challenges, technical problems or study needs individually, usually without external or formal support. In some cases this involves approaching family members or friends for support, e.g. in Memo comment ID 240, session 44: “Student may find development of skills in IT or study difficult, Student may consult the WWW or friends to gain information or workarounds, Finds it easier to develop skills independently rather than wait for support via email or in person, Finds self-led approach to skills development essential due to inadequate support”.

Improvisation may also represent a means of coping with stressful and difficult personal circumstances including reduction, simplification or minimalisation of study overheads, this could include use of file sharing to achieve group work, thus avoiding travel to meet peers at the place of study, in Memo ID 383, session 69: “Have been using Microsoft Spaces to share work for group projects outside of NEWI systems”.

Improvisation is also often not facilitated by the educational institution, in some cases, students may utilise resources via another online or physical source such as use of workplace access to digital content or databases. In the broadest sense,

improvisation is often self-led and may be a spontaneous or learned pattern or strategy which overcomes the present challenge, but has been accomplished beyond formal or institutional processes or systems.

ii. Improvisational Behaviours – Supplementing, Adapting, Enhancing, Exploiting

A wide range of early and developed descriptive and theoretical codes refer to improvisational strategies, where digital or physical resources are accessed, re-purposed or used in an innovative or unexpected form to achieve study outcomes, ensure access to required resources or otherwise facilitate study in some form. Adaptation is illustrated by the Early Theoretical code, Resolving and Supplementing Information Literacy for Effective Research; example Theory Bits related to this code include: Overcoming database issues to obtain core reading texts and Skilling with challenging databases to enhance research.

Improvisation can occur to supplement or enhance study, group work or access to electronic information sources; individuals may exploit the WWW to obtain a greater range of online information or may use informal systems such as social networks to collaborate with peers, e.g. in Memo comment ID 293, session 52: “Has used Facebook to connect with other students and develop shared group projects”.

Improvisation can also provide a substitute or supplementary solution for a formally required resource or can allow for replacement of a required resource or environment with one which is accessible, such as the use of social networks to interact with peers remotely (see above) or use of Web base sources to obtain materials when these were not provided in the VLE, e.g. in Memo comment ID 365,

session 65: “Already have some knowledge of legislation/ regulations. Would be good to have access to the same Web sites/ materials in Blackboard used for work purposes, some students may not be aware of these sources and finds they often assist students”.

Innovation can be seen to complement and include all existing theoretical categories and particularly the following Developed and High Level Theoretical Categories: Motivational adaption and improvisation via Online Learning, Adaptive Virtualisation of Learning; Self-regulated engagement; On-Demand Exploitation/ Improvisation; Navigating diverse platforms, equipment or locations.

Exploitation of digital resources, systems, software, networks or physical resources also emerged as a highly important strategy and process for literature searching due to perceived problems using databases and platforms provided within the Library. Exploiting type behaviours in some instances also reflected reliance on the VLE and associated tools and features. An Early Theoretical Codes related to this behaviour included ‘Supplementing and Innovating Literature Searching Approaches’, reflecting supplementing or augmenting scholarly databases with external and third party resources, including search engines and Google Scholar and self-led exploration of diverse databases/ scholarly sources within the VLE or institutional electronic Library to locate readings not immediately visible or accessible from the VLE. The Early Theoretical Code ‘Exploiting Facilities and Services’ also reflected this behaviour, including exploiting of on-campus support services such as the IT Helpdesk via in-person or online support for assistance when sourcing resources, dealing with login issues, exploiting VLE features or tools for remote contact with tutors/peers and for remote working when travelling or away from campus and exploiting the VLE as an

alternative to class based attendance in some cases.

iii. Transitional Improvisation Behaviours

Transitional behaviour was reflected in the form of some students' limited or tentative toward use of ICT resources, reflecting an early stage of learning via technology. This kind of behaviour is reflected in the High Level and Developed Theoretical Code 'Transitional Physicalisation of Online Learning' and Early Theoretical Code, 'Physicalisation of Virtual Learning'. Examples of early or tentative use of learning technologies included reliance on the VLE for programme materials or communications features in some cases, with avoidance of unfamiliar technologies. In some cases, student behaviours could be shown to evidence physicalisation rather than virtualisation, reflecting some behaviour which did not embrace online learning but sought to avoid or physicalise the learning experience, including behaviours reflecting heavy printing of digital content or reliance on basic course materials rather than seeking further digital content via the VLE, scholarly/Library sources or external sources.

iv. Longitudinal Strategies for Improvisation

Improvisation can represent longitudinal behaviour, representing by long-term or repeated behaviours, such as habitual use of alternative platforms or systems external to those advocated or provided within the institution or habitual use of external, work-based resources. Related Theoretical Codes include behaviours related to development of personal skills over an extended period, such as the Early

Theoretical Codes ‘Acquiring and Supplementing Study Skills’ and ‘Developing Confidence in Technologies and Low Contact Study’. Related Theory Bits/ Theoretical Insight included 'Self-regulated development of learning skills via diverse research/assimilation, evaluation', 'Skilling in information literacy, e-resource/WWW credentialising for study' and 'Overcoming/skilling in study competencies to overcome training gaps'.

These behaviours also reflect the Developed Theoretical Code, 'Multi-tasking Commitments', the Early Theoretical Code 'Self-Management of Study Regime and Programme' and dependent Theory Bits/Insight such as 'Flexible locating to overcome opening/facility limitations', 'Facilitating lifelong learning via studies' and 'Facilitating career development via academic skills progression'.

Also see Chapter 5: Discussion in Relation to the Literature, Part 2: Findings in Context to Prior Theory and Studies, then see the section entitled: ‘Improvised Learning’ as a Perspective for Longitudinal Change, Insight and Development.

v. On-Demand/ Just-In-Time Improvisation

Improvisation can also be unplanned, individuals can be faced with the need to identify just-in-time resources, support networks, online information, physical facilities, referencing help or achieve other academic or personal study aims, e.g. Memo comment ID 255, Session 46: “Some difficulties accessing PCs in the Library, mainly studies in the evening”, or Memo ID 261, session 47: “Some links are provided in the VLE but often needs to visit the Library, navigate to the database and search this separately, sometimes being directed to additional 3rd party databases, Web sites or legislation”. On-demand behaviours also reflected seeking support or

training for immediate needs such as seeking training or support for use of scholarly databases or VLE tools and features. Related Theoretical Codes include the Developed Theoretical Code ‘On-Demand Exploitation/ Improvisation’, the dependent Early Theoretical Code ‘Supplementing and Innovating Literature Searching Approaches’ and dependent Theory Bits/Insight such as ‘Augmenting database limitations via Google’, ‘Resolving full text e-resource problems via Google/Scholar’, ‘Overcoming/supplementing limited database coverage’, and ‘Resolving WWW e-texts in the absence of print/digital copies’. Skills related on-demand behaviours can be seen in the Developed Theoretical Code ‘Self-Regulated Engagement’, the Early Theoretical Code ‘Acquiring and Supplementing Study Skills’ and dependent Theory Bit/Insight ‘On-demand self-led learning due to time constraints attending training’.

vi. Passive and Active Improvisational Behaviours

The Core Category ‘Improvised Learning’ can be said to represent an attempt to refine or encompass what has been identified as a combination of “passive” participant data, representing highly descriptive-focused Codes such as processes, challenge or barriers, alongside “active” and “aspirational” Codes represented by improvisatory strategies, techniques or other behaviours which include adapting, substituting, supplementing, physicalising, virtualising or avoiding.
Improvisation concerns strategies to access on-demand support, resource location or learning needs such as use of support networks within the social or family sphere, exploitation of University based or other local services such as local libraries or

improvisation such as use of WWW search engines to locate e-resources or supplement formal databases for literature searching.

Glaser describes several kinds of data such as ‘baseline data’- data derived directly from the participant source, or ‘properline data’- where the interviewee responds with what they think the interviewer wants to be told (Glaser, 1998, p.111). In addition to these value or ontological data types, it may be possible to define several original types of code based on observed data in this study. In evaluating the relationship between initial Memo Descriptive (Indicator) codes and the Core Category, it could be argued that two broad types of descriptive code had emerged in terms of participant narrative; the first type of code included a passive, commentary-based narrative or perspective emphasising participant perspectives on problematic processes, experiences or environmental/ resourcing issues; the second narrative type reflected active or participatory behaviours or strategies employed by students to achieve objectives, optimise their learning experience or study environment. The following table illustrates Initial Open (Memo Descriptive Indicator Codes):

Passive	**Active**
Commitment issues	Expresses communications tools importance
Commutes	High Google use
Compatibility issues	IT/study development issues
Internet access/cost	Low contact study
Digital exam paper issues	Physical/Online experience
Obtaining software difficult	Requires multi platform use
E-resource databases usability	Reliance on hardcopies

Database results issues	Relies on VLE for materials
Database full text access issues	Mobile device user when travels
Digital communications under-used	Uses VLE communications tools
Feelings of Isolation as a student	Uses a range of computer systems
Group or peer communications issues	Uses content management skills
IT skills training access issues	Trying to build IT/ study skills

Table 17: Initial Open (Memo Descriptive Indicator Codes) Passive and Active Examples

Passive Theoretical Codes can be demonstrated in the High Level and Developed Theoretical Code ‘Transitional Physicalisation of Online Learning’ and Early Theoretical Code ‘Physicalisation of Virtual Learning’, reflecting behaviours related to reliance on received systems, scholarly resources, course materials, for example, the Theory Bit/Insight ‘Reliance on VLE for prioritised/optimised study routine’ or ‘VLE/online tools avoidance via reliance on core handbook or selected print materials’ – suggest reliance by some students on a transmissive rather than active approach for engagement with their programme.

Active Theoretical Codes are widely evident, including the High Level/ Developed Theoretical Code ‘Motivational adaption and improvisation via Online Learning’ and High Level Theoretical Code ‘Navigating diverse platforms, equipment, locations’, reflecting a broad range of behaviours, strategies or activities for self-led, self-regulated and motivational engagement with the programme and blended learning environment to extend, adapt, innovate or exploit both on-campus and external systems, scholarly resources, stakeholders/networks and physical resources.

vii. Holistic and Transcendent Characteristics of 'Improvised Learning'

It can be seen that the Core Category and its dependant variables provide a Grounded Theory broadly representative of Glaser's advocacy for a theory which is transcendent of the immediate participant group, local sector or organisational context and thereby offers an holistic theory of learning, comprising many dependent and related high level theoretical perspectives; this attribute is discussed in Glaser's text, 'Conceptualization Contrasted with Description' (2001): "The most important property of conceptualization for GT is that it is abstract of time, place and people. This transcendence also, by consequence, makes GT abstract of any one substantive field..." (Glaser, 2001, p.11).

The Core Category 'Improvised Learning' can be seen to strongly reflect the original motivations and interests surrounding the early phase of this research project, namely the condition of low-contact or part time students engaged in professional-related programmes, often anecdotally known to comprise older (mature) students/ adult returners.

The emerging theoretical codes present a model of institutional reliance on the VLE and other online platforms such as library systems, but also reflect disparity between institutional implementation of the Blended Learning model and aspirations of students engaged in this mode of study.

Challenges encountered by students in this learning environment can be seen in their attempts to overcome technical, social or environmental issues via self-led strategies and in expanding, adapting, supplementing, substituting or engaging in other "improvisation" style responses to the Blended Learning context.

To this extent, the theoretical model or paradigm for ‘Improvised Learning’ establishes an original relationship between emerging trends in ICT driven learning, self-led strategies to function in this environment and the parallel prevalence or trend toward the low-contact participant context, often characterised by features such as personal or work related commitments, professional-related study and other factors discussed earlier in this study.

In exploring the inter-dependency of E-Learning and the low-contact, professional-related context further, we could elaborate toward a more specific theory of Blended or Distributed learning– possibly termed ‘Distributed Improvised Learning’ or for this participant context – ‘Professional Improvised Learning’; however these terms would detract from the broad scope of the emergent Core Category and would present a less universal and less transcendent explanation of learning. It should also be considered that this study has addressed a Blended Learning institutional context. In this regard the emergent theory does seem to address both the digital and physical context for these participants and does communicate the broad, holistic scope of self-led strategies for navigating both digital and physical resources.

To this extent, the Core Category does exhibit a universality and transcendence which could be expected to explain behaviours in either a purely physical, non-blended class context, or in a remote-based online learning context, providing broad conceptual and narrative understanding for individual behaviours and responses, typified by a process of improvisation.

The Grounded Theory of ‘Improvised Learning’ can be shown to illustrate a range of conceptually presented processes inherent in the setting of low-contact, blended learning via learning technologies. However the theory can also be shown to reflect transcendental qualities which could equally appeal to a wide range of sectors,

businesses or other areas of human activity where learning and acquisition of knowledge or skills is practiced. Example Theoretical Codes lending toward transcendent qualities include Developed Theoretical Codes such as 'Network Building/ Engaging', 'Socialisation of Learning', 'Multi-tasking Commitments', 'On-Demand Exploitation/ Improvisation', 'Navigating diverse platforms, equipment, locations'; these theoretical perspectives can be seen to suggest a high level of generic, non-specialised behaviours which could arguably be easily applied to a wide range of sectors, educational contexts or industrial contexts. Many Theoretical Codes related to educational or learning processes, strategies or behaviours could also arguably be applied to a wide range of sectors for the purposes of individual professional development, lifelong learning or other specialist development. these could include a wide range of Early Theoretical Codes such as 'Acquiring and Supplementing Study Skills', 'Engaging with and Negotiating Remote Group Working', 'Socialisation of Learning for Group/Peer Working', 'Managing and Negotiating Work-Study Relationships', 'Virtualisation of Learning to accommodate Remote Study' - also reflecting Developed Theoretical Codes such as 'Transitional Physicalisation of Online Learning' and 'Adaptive Virtualisation of Learning'.

The theory of 'Improvised Learning' also provides originality in its usefulness as a continuum for explaining learning behaviours, including a wide range of descriptive narratives of student behaviour visible across memo indicators, Open and developed Substantive Codes (describing mostly challenges or barriers for students), followed by various levels of Theoretical Codes - providing conceptual explanations for these behaviours. This continuum or range of closely related variables, cumulating in the Core Category, 'Improvised Learning', can be demonstrated to provide an

increasingly precise or clearly defined paradigm for study and learning via learning technologies as codes/ categories become more refined.

The theory of ‘Improvised Learning’ provides a series of induction-derived narrative and conceptual models or paradigms of learning which seek to aggregate all sub-variables or dependant factors in a unified or continuous series.

This model includes the emergent High Level Theoretical Code, ‘Transitional physicalisation of online learning’ – where ICT-based learning, whilst characterised by many aspects of innovation is also characterised for some students by ICT avoidance strategies, including behaviour which seeks to create physical hardcopy or in-person experience, this code contrasts with the developed theoretical code ‘Adaptive Virtualisation of Learning’, where individuals sought to expand the limits of institutional or contemporary VLE or systems availability or implementation.

Another of the emergent High Level Theoretical Codes, ‘Navigating diverse platforms, equipment, locations’ also reflects the use of this theory as a continuum, with its many dependant variables or codes providing examples of student behaviours in response to challenges related to systems, technologies, equipment, resourcing; whilst this emergent theoretical code provides a conceptual explanation of a developmental and improvisation paradigm for behaviours in a highly distributed learning environment, it can be seen that this code reflected the tentative Core Category ‘Self-led multi-systems traversing’.

Finally, the High Level Theoretical Code “Motivational adaption and improvisation via Online Learning” reflects the greatest diversity of dependant variables, i.e. individual behaviours, processes or concerns which participants are continually resolving, reflecting also many properties of ‘Transitional Physicalisation of Online Learning’ and ‘Navigating diverse platforms, equipment, locations’ – reflecting variables

present in the Core Category such as adaption, substitution and supplementing.
For a visual representation supporting the continuum as a model or structure for consideration of the diverse theoretical codes and dependent properties inherent in 'Improvised Learning' see Appendix 15: Hierarchical visual representation of all theoretical codes - demonstrating the breadth of individual bur related theoretical perspectives present and potential for visualisation of these perspectives as a single, inter-related continuum of perspectives.

Part 7: Concluding Statement

It can be seen that the Core Category, 'Improvised Learning' concerns a wide range of strategies to access on-demand support, scholarly resource location/sourcing, strategies to develop learning needs, or support networks in the context of study, social or family sphere; these behaviours also concern exploitation of University or local services and improvisation related to Web based resources or supplementing sources for literature searching.
In this context, the term improvisation can be seen to inter-relate across a broad range of codes throughout the data and emergent categories. Constant behaviours engaged in by students typically lend toward highly self-regulated or motivational processes of adaption, innovative use of, or re-purposing of facilities, technologies or physical resources. These behaviours lend toward behaviours which allow students to facilitate their study or allow for strategies to reduce or compensate for perceived shortcomings or absence of resources or systems. The following discussion chapter will explore these behaviours in greater detail in relation to conceptual models, theory or studies presented in the literature.

CHAPTER 5: DISCUSSION IN RELATION TO THE LITERATURE

Part 1: Introductory Statement

The following chapter provides a broad overview of literature encountered in relation to research outcomes, including prevalent theory and studies reflecting the substantive area of the study, i.e. a low contact, professional and technology enhanced student context. This chapter explores current literature in the area of 'improvisation', relating to the Grounded Theory of 'Improvised Learning'. The chapter also presents an overview of original characteristics of research outcomes in relation to the literature, blended learning studies and recent developments for learning technologies and presents further possible research areas suggested by research outcomes.

i. Summary of Findings

Theoretical perspectives arising from the practical study can be seen to offer an explanation for improvisational behaviours as a self-led, self-regulated and motivational process, often operating in a highly individual context beyond the remit of the organisation and characterised by continual adaptation to modify, exploit or adapt online platforms, networks, physical resources or systems to individual requirements. These perspectives reflect behaviours for originality and innovation beyond modification of existing practice, including use of non-institutional media and systems for data transfer between locations and communications.

ii. Rationale for Retrospective Review of Literature in Improvisational Theory

Following the development of the theoretical codes and proposal of ‘Improvised Learning’ to establish Interchangability of indices across all or most Theoretical Codes, it was felt appropriate to carry out a review of literature on the topic of improvisation with respect to Higher Education but also areas beyond the field of study. Approaches used for a retrospective review of the literature:

- Assessment of prior definitions of Improvisation and ‘Improvised Learning’ via reference sources such as dictionaries, encyclopaedia and online wikis.
- Use of keywords to signify variants of ‘Improvised Learning’ including use of component elements as a search expression rather than an exact phrase for a wider search, with truncation in the word “Improvised” e.g. “improvis*”. There is no US version of the word “improvise” (Merriam-Webster, 2014) allowing a search for only the above term.
- Searching the EBSCO multi-platform “Discovery” system via access credentials at University of Liverpool, including access to around 50,000,000 online scholarly resources and citations, also searching Google Scholar as an alternative source for world-wide citations drawn from the Google search engine.
- Summaries of a range of scholarly works reflecting the above terms.

Definitions of “improvisation” include the online Oxford English Dictionary which provides two definitions, namely one reflecting improvisation in creative or artistic

endeavour or improvisation as an ad-hoc production or execution of anything “on the spur of the moment”:

> “1. a. The action of improvising or composing extempore; also... ... verse, music, etc. so improvised.
> 1872 ‘G. Eliot’ Middlemarch I. ii. xx. 364 This speech.was not indeed entirely an improvisation, but had taken shape in inward colloquy.
> 2. The production or execution of anything off-hand; any work or structure produced on the spur of the moment.
> 1874 J. A. Symonds Sketches Italy & Greece (1898) I. xi. 214 The terra-cotta decorations have all the spontaneity of improvisation.”
>
> (OED Online, 2014)

The Wikimedia Foundation dictionary, Wiktionary (https://en.wiktionary.org) defines “improvisation” as actions which are “impromptu” and “without planning ahead”:

> “improvisation (plural improvisations)
> 1. The act or art of composing and rendering music, poetry, and the like, extemporaneously; as, improvisation on the organ.
> 2. That which is improvised; an impromptu.
> 3. Musical technique, characteristic of blues music.
> 4. The act of improvising, acting or going about something without planning ahead”
>
> (Wiktionary, 2014)

The Britannica Encyclopaedia defines several applications or uses of “improvisation” including uses in music: “extemporaneous composition or free performance”, in

theatre: “the playing of dramatic scenes without written dialogue”, in Jazz music, in military explosives, in south Indian music (*rage* and *tala*) and related musical and arts usage (Encyclopædia Britannica, Inc., 2014).

Part 2: Discussion on Prior Improvisational Theory and Blended Learning Studies

i. The Origins and Context of Improvisational Theory

Since the late 1990s, improvisational theory has been discussed in context to disciplines such as management, organisational planning and corporate activity, often debating these processes in comparison with improvisational techniques found in jazz music and other performance arts. Hatch (1998 p.556) cites practices such as spontaneity, adaptation and related performance techniques, commenting that the “21st century organisation” is characterised in being "flexible, adaptable, responsive to the environment, loose boundaries, minimal hierarchy...”

The contextualisation of improvisational practices drawn from the performance arts has led to wider debate on the application of improvisation for learning and teaching. Berk and Trieber (2009, p.37) provide a definition of improvisational practices for education, suggesting these include behaviours such as spontaneity, unplanned or unscripted actions and application of intuition to current problems and activities: "Improvisation, at the opposite end of the continuum, involves unscripted, spontaneous, intuitive, interactive small-group exercises."

Xambó (2013) describes the use of the Reactable TUI (Tangible User Interface) system with adult musicians, providing a synthesised music output based on the placement of blocks on a small table-like structure; Xambó explores the role of improvisation and constructional behaviours for expert musicians, commenting that "...the analysis focused on overarching research questions on the challenges and opportunities for groups in using a tabletop TUI over time." (Xambó, 2013, p.36).
For Xambó, the activity of group working in an educational setting for music is closely linked with coordination across group members in “a situated context, supported via the system offering a shared space and real-time feedback...”
The reactable is described in terms of individual specialisation for group members, with each specialist role interacting and collaborating to attain an original outcome, this perspective reflects existing perspectives on improvisation in a specialist group context(Hutchins, 1991; Weick, 1993).
Parsonage, Fadnes and Taylor (2007, p.4) similarly outline the use of creative and unplanned musical scores, including jazz within the academic programme of a Leeds conservatoire. Their paper outlines case studies of informal performance work undertaken by students and outlines how practical improvisation can complement formal academic practice and training in musical theory, commenting that “...improvisation thus involves many of the fundamental skills contained within a typical music degree and is therefore an appropriate area for the promotion of the integration of theory and practice." Parsonage, Fadnes and Taylor further outline difficulties for assessment of learning which could be regarded as improvisational, suggesting these processes, whilst having value are not easily compatible with established forms of assessment (Parsonage, Fadnes and Taylor, 2007, p.5).

Wright and Kanellopoulos (2010, p.72) discuss the uses of improvisation for teaching music amongst trainee teachers; the student teachers maintained reflective diaries on their uses of improvisation techniques for teaching. The paper concludes that improvisation is a valuable teaching aid, both for implementation in the classroom and for developing student practice. The significance of the situated and improvisational context in the statutory music education sector is further outlined by Wright and Kanellopoulos (2010, p.72), suggesting that "...improvisation might emerge as a moment and a practice of rupture with linearity of progress..."

An early perspective on improvisation, drawing from the improvisational techniques of jazz and performance arts can be seen in the seminal political text ‘Rules for Radicals’ (Alinsky, 1971), comprising a textbook for political campaigning in the context of activist political persuasion. The deviation from formal planning and adjustment of campaigns in the form of changing “tactic” is outlined as a form of improvisation, commenting that "the tactic itself comes out of the free flow of action and reaction, and requires on the part of the organizer an easy acceptance of apparent disorganization." (Alinsky, 1971, p.177).

Preston (1991, p.81) outlined the role of improvisation for corporation management when dealing with striking workers, by developing a new product definition for the firm and adopting novel approaches for dealing with the conditions and restrictions otherwise imposed by the strike.

The uses of improvisational practices derived from music and the dramatic arts for wider application is also outlined by Bastien and Hostager (1992, p.92), suggesting the cooperative nature of improvisation in a group or team setting, comparing the interactions that occur between individuals when engaged in improvising techniques

of spontaneity or adaptation, commenting that "...understanding prototypical cases of organizational communication increases our understanding beyond the event itself..." Pinnington (2005, 615) further describes the relevance of improvisational techniques derived from music when implementing unplanned action in strategic management, suggesting a recent emergence of interest in improvisational theory reflects the role of “unplanned but effective action.”

Moorman and Miner (1998, p.706) also provided a systematic review of improvisation across a range of sectors and industrial spheres, offering a definition of improvisation as "deviation from existing practices or knowledge..." For Moorman and Miner, the fundamental processes or techniques of improvisation in jazz and performance arts can be identified and differentiated as distinct phases of improvisation: "...for example, a rhythm section will maintain rhythmic order and underlying harmonic structure, while an individual soloist improvises in various modes." (Moorman and Miner, 1998, p.703). Moorman and Miner outline several distinct techniques to adapt or effect change, commenting "...there are, generally, three distinct levels of improvisation."; the first type of improvisation involves partial modifications of existing practice, Moorman and Miner compare minor improvisation in jazz to changes in practice in industrial. Moorman and Miner suggest a further level or stage of improvisation, reflecting more advanced or wider changes to processes, comparing deeper structural change in the jazz performance with the development of new products based on existing templates: " …Organizational examples of this level of improvisation include improvised new products that represent variations on existing products..." (Moorman and Miner, 1998, p.703). Eisenhardt and Tabrizi (1995, p.84) similarly express this form of improvisation as the adaptation of existing production or “product innovation”, commenting that

"...adaptation can also occur through small, frequent shifts in how firms compete in the marketplace." A final stage of improvisation is also suggested by Moorman and Miner (1998, p.703) where an original rhythm, template or processes is created, without reference to existing knowledge or material, commenting that "...subgroups may create a new product not only outside of, but actually inconsistent with, existing firm strategy."

Thus, Improvisational Theory can be found to have been inspired by improvisational techniques derived from music and the performance arts, with early emphasis on the uses of these techniques in the commercial sector and for related activity such as product innovation and competition.

ii. Dewey's Theory of Situated Learning and Improvisation

Perhaps one of the most seminal texts on education and improvisation can be found in the early work of John Dewey, entitled Experience and Education (1938), described by Hobbs (2013, p.184) as an attempt to "[lay] out the organic connection between education and personal experience."

Dewey advocates integration of a range of experiential and real world activities for educational delivery in the statutory education context, remarking on the importance of experience beyond the educational institution for imparting learning experiences, commenting that "...it ought not to be necessary to say that experience does not occur in a vacuum. There are sources outside an individual which give rise to experience. It is constantly fed from these springs." (Dewey, 1938, p.15). In this context, Dewey can be seen to challenge traditional and established models of planned educational delivery by reference to an "experiential" characteristic for

education, reflecting both the role of individually experienced activities and contribution of insight or knowledge arising from this behaviour, expressed as “continuity of experience or what may be called the experiential continuum” (Dewey, 1938, p.9), commenting on a process of selection and differentiation "...in every attempt to discriminate between experiences that are worthwhile educationally and those that are not.." (Dewey, 1938, p.12).

Dewey emphasises the importance of integration of, social interaction and wider experience within formal educational processes, commenting on “...experiences that lead to growth." (Dewey, 1938, p.15). Dewey, echoing later theoretical perspectives on situated learning (Keskin and Metcalf, 2011; Jonassen and Land, 2000), outlines the role of diverse situations and interactions as discrete intersections, resulting in experiential transactions for the learner. This perspective suggests the importance of improvisational, real time behaviours in a ‘situated’ context, as outlined by Hutchins (1991, p.38). Dewey remarks on the relevance of the situated context, commenting that “The conceptions of situation and of interaction are inseparable from each other.” (Dewey, 1938, p.17). For Dewey, situated learning offers opportunities to avoid “stereotyped” educational practices; for Dewey this can occur in the class as a result of “special occasions” and the external learner context.

This form of educational creativity is presented as a principle of “intellectual freedom” (Dewey, 1938, p.34). Dewey also outlines a theoretical perspective of “continuity”, in reference to organisational knowledge or memory; reflecting Pinnington (p.627), Dewey comments that "... every experience both takes up something from those which have gone before..." (Dewey, 1938, p.13).

Dewey therefore outlined a paradigm of “situated” learning, emphasising the role of the learner’s diverse environment and wider experience integrated into structured

learning practice, also suggesting the role of improvisational behaviours in this process (Dewey, 1938, p.12-17). Dewey also emphasised the role of “continuity” in terms of shared development of knowledge arising from individual insight within communities (Dewey, 1938, p.13).

ii. Improvisation in the Situated Context

Following Moorman and Miner (1998) and Weick (1993), Pinnington outlines the role of improvisation in specific time and circumstances. In these terms, limitations of improvisation are demonstrated in the ability to recreate outcomes and for systematic integration of improvisational outcomes within systemic organisational systems, comprising organisational memory, commenting that "...in contrast with experimental learning it has the disadvantage of not being reliant upon a systematic methodology, making it harder to recreate the improvised action and therefore more difficult to commit to longterm memory and learning." (Pinnington, 2005, p.627).
Leading on from this perspective, Pinnington emphasises the relationship of improvisation in context to group approaches for learning, commenting that improvisation "...tends to be a process and product of group activity and thus enjoys the strengths and weaknesses of other forms of group-based learning." (Pinnington, 2005, p.627).
Berk and Trieber (2009, p.35) further outline the situational context for students engaged in improvisational behaviours, comprising diverse media not limited to textual sources, including visual sources and fast-paced, collaborative and participative learning behaviours, commenting that "...as a teaching tool,

improvisation is a natural fit for these students. The learning environment must be active, collaborative, social, and learner-centered for these students."

Pinnington (2005, p.615) also draws attention to the perspective of “competitive field”, suggesting the role of competitive stimulus within the scope of student interaction. The use of informal group learning, relying on tutor guidance rather than formal instruction is outlined as a means for stimulating improvisation.

Berk and Trieber (2009, p.30) outline an approach for improvisation via synchronous learning technologies: "students provide different responses throughout the class session, and the instructor does not evaluate any given response but instead facilitates the improvisation process among the students, with the goal of guiding them toward discovery of their own knowledge..."

Dillon et al. (2013) further explores the use of blogging as an “improvised” approach for peer collaboration amongst Masters level music students, suggesting improvisational approaches inspired by Jazz music and the writings of Jerry Coker such as ‘Improvising Jazz’ (1964). Dillon et al. Comments on how improvisation allows for “...new beginnings and new possibilities, drawing out difference from within the same, capturing interconnections between ideas, and comparing and contrasting possibilities.” (Dillon et al., 2013, p. 14). For Dillon et al. collaboration is an important part of learning and innovation for exploring new approaches to problem solving: “Collaboration in learning and teaching is important if improvisation is to happen. In the jazz analogy, although individual moments of ‘shining’ in a performance are most commonly associated with improvisation.” (Dillon et al., 2013, p. 14)

The processes of improvisation, reflecting theories of product design and process innovation in a fast-paced, consumer-driven context (Brown and Eisenhardt, 1995, p.369) is outlined by Berk and Trieber (2009, p.40), suggesting synergy between

corporate and organisational perspectives on improvisation in a team based environment and educational practice and outcomes arising from group based activity for students. For Berk and Trieber, improvisation in a class based setting reflects processes such as review, evaluation and synthesis of perspectives or sources, commenting that "...more important, however, as a teaching tool, the activities can be used to review, apply, synthesize, or evaluate any content to facilitate learning..."

iv. Improvisation in Context to the Group or Team

The Group context is particularly prevalent in discussions on the role of improvisation in relation to emergence of insight and change for individuals, groups and organisations. Vendelø (2009, p.451) suggests that improvisation occurs when teams are able to engage in experimentation or problem solving rather than when relying on strategic decision making, i.e. "...when teams retain insights, obtained during improvisational trouble shooting, for further investigation later..."

The benefits of embracing innovation within communities of practice are outlined by Brown and Duguid (1991, p.50), commenting on the need for a dynamic and responsive stance in absorbing new developments and innovative practices and suggesting how small teams using improvisational and group strategies can “evade the ossifying tendencies of large organizations.”

Hutchins (1991, p.14) also outlined the role of improvisation for the crew of a ship dealing with emergencies such as engine failure, in this discussion, the shared, collective role of improvisation is clearly shown in terms of a group activity and one which is entirely disassociated from higher, strategic planning, demonstrating the

fundamental importance of improvisation via a range of navigational and technical adaptations and innovations: "Unlike many decision-making settings, when something goes wrong aboard ship, quitting the task or starting over from scratch are not available options.." Hutchins' (1991, p.38) theoretical perspective on improvisation outlines the importance of shared decision making in an unstructured and inter-relational context, describing the inter-dependence of crew to avoid catastrophic outcomes; complex "sub-systems" inherent in these relationships is demonstrated as a factor for improvisational processes, characterised by individuals with specific skills and responsibilities.

Moorman and Miner (1998, pp.703-704) offer a perspective on improvisation as a primarily collective behaviour, dependant on complex interactions and shared knowledge; improvisation is presented as a metaphor of "conversation", with adapted or new systems arising which supplant formal, planned organisational systems; the outcome of improvisational behaviour thus represents a "system" of collective organisational change. Moorman and Miner's "conversational" perspective on improvisation in groups is compared to an improvisational theatrical performance, comparing theatrical dialogue/exchange to the progression of communications: "...the first actor generates lines and movement, a second responds to that, and the group continues to interact..." (Moorman and Miner, 1998, p.704).

Brown and Duguid discuss the role of "communities of practice" for improvisational behaviour (1991, p.50), working cooperatively with peers, educators and other networks within the experience of participants; similarly, Hutchins (1991, p.38) describes the inter-relational context within communities for shared decision making, this perspective is further discussed by Moorman and Miner (1998, p.704) in terms of

a “conversational” process leading to improvisation, adaptation, innovation and the generation of insight or change.

v. Perspectives on Improvisation for Education

In a school-based study on “Improvization and strategic risk-taking in informal learning with digital media literacy” (2013, p.182), Hobbs examined the use of multimedia drawn from WWW sources by nine year olds in a classroom environment; the project illustrated the potential use of WWW sources via a collaborative approach in response to an encounter by one of the children with a homeless person: "Children's questions about homelessness became the organizing frame for learning experience, as the instructor helped children make sense of the information on the Internet, analyze popular culture films and news media, and conduct interviews with community leaders and advocates for the homeless."
As outlined in Dewey’s theoretical perspective on improvisation in a situated context, Hobbs describes the role of improvisation as engaged by a teacher and a group of pupils, utilising social interaction, community networks and the Internet to engage with the issues surrounding homelessness and develop outputs in an experiential, group context: "…improvisation and strategic risktaking must be conceptualized as a set of socio emotional and experiential competencies..." Hobbs further remarks on disparity between innovative uses of technology assisted learning and established uses of technology for basic functionality , commenting "…it is typically used to reinforce basic skills through skill-and-drill practice..." (Hobbs, 2013, p.182).
In a grounded study of kindergarten children’s learning of mathematics, Krummheuer (2012, p.317) further describes the use of interaction and collaboration amongst

early years children in a classroom environment for learning mathematics; the study explores the concept of 'NMT' (interactional niche mathematical thinking) as a socio-constructivist approach to teaching. This approach for teaching mathematics focuses on "cultural historic" and "socio-constructivist" theories. The social and contemporary culture of the learner is suggested as a key factor for learning, reflecting Dewey's theories of experiential and situated learning (Dewey, 1938, p.17). Krummheuer suggests the importance of group activities, outlining the importance of learning as a consequence of specific social events driven by interaction between participants and the educator (Krummheuer, 2011, p.324).

Reflecting comparative perspectives on the role of group interaction for the emergence of original learning in a situated, team or group based context (Hutchins, 1991; Weick, 1993; Moorman and Miner, 1998), Krummheuer considers the capacity for this form of learning as a consequence of "unexpected, noncononical" interactions between group members (Krummheuer, 2011, p.324-333). This process relies on the disregarding or withholding of "canonical knowledge" to allow for "new strategies of intervention", this is termed by Krummheuer as "competence of improvisation", suggesting the importance of "non-routinized" and collective interaction, commenting that "...he/she is drawn into a non-routinized collective problem-solving situation that provokes the necessity to improvise..."

The use of digital media and Internet sources has been cited as a medium for self-led or independent models of learning for statutory education, in context to improvisational behaviours and collaborative learning (Krummheuer, 2011, p.333; Hobbs, 2013, p.182; Berk and Trieber, 2009, p.35). Hobbs has also suggested the uses of technology enhanced learning and multimedia for group based activities. These kinds of behaviours are also described in context to structured or guided use

of these approaches by teachers (Hobbs, 2013, p.182).

There is demonstrably limited coverage within peer reviewed journals on improvisational theory in the post-statutory sector; related perspectives in context to post-statutory education focus largely on formally supported use of novel systems, technologies, or approaches to learning (Berk and Trieber, 2009). The lack of research in uses of improvisation beyond management and organisational change is suggested by Berk and Trieber, "Despite the documented effectiveness of the techniques in this domain, their potential for application to virtually all other disciplines has not been realized." (Berk and Trieber, 2009, p.51).

Sullivan (2010) explores the use of “active learning” via games and interactive tasks as a means of overcoming Higher Education “passive” learning models in a context where “the traditional didactically oriented modes of instruction reinforce passivity” (Sullivan, 2010, p.68). Sullivan outlines how concepts of theatrical improvisation can be applied for learning in a seminar based environment, commenting that theatre-related improvisational practices "are an effective way to get students to connect actively with each other and engage more fully with the material they need to learn." (Sullivan, 2010, p.67). Sullivan outlines how “theatre techniques, particularly those structures used in improvisation” can be used in a range of Higher Education settings with students to achieve fuller engagement with subject matter. Sullivan comments how “...using such exercises, we help students to take risks, increase their confidence, and demonstrate the critical-thinking skills and knowledge of concepts needed for the course..." (Sullivan, 2010, p.68).

Berk and Trieber (2009) describe the potential for uses of theatre derived improvisational techniques for post-statutory education. The authors suggest that the

role of performance derived improvisation can benefit recent generations familiar with interactive behaviours and learning styles related to digital technologies, suggesting that “techniques derived from the experiences in improvisational theatre can be adapted for the college classroom..." (Berk and Trieber, 2009, p.29).

Berk and Trieber (2009) further suggest how story development, playing roles and use of props, including “nonverbal communication, ad-libbing, role-playing” can stimulate a “learner-centered environment” and outcomes such as critical thinking (Berk and Trieber, 2009, p.29-30).

Following discussions on situated learning and the role of the organisation in context to innovation or adaptation by individuals (Hutchins, 1991; Weick, 1993; Moorman and Miner, 1998), Brown and Duguid have offered a perspective on Lave and Wenger's theory of "legitimate peripheral participation" (cited in Brown and Duguid, 1991, p.41) as a means of expressing practice-based and innovation-driven personal learning. Brown and Duguid suggest that conventional learning, reflecting prevalent theoretical approaches to learning and teaching detract from innovative learning experiences, suggesting that “conventional learning theory, including that implicit in most training courses, tends to endorse the valuation of abstract knowledge over actual practice and as a result to separate learning from working and, more significantly, learners from workers.” (Brown and Duguid, 1991, p.41).

Brown and Duguid comment that “...through their constant adapting to changing membership and changing circumstances, evolving communities-of-practice are significant sites of innovating.” The authors describe the need to impart innovation in practice in contrast to “transmissive” approaches to learning (Brown and Duguid, 1991, p.47). Brown and Duguid also comment on the need for recognition of the “periphery of practice” (Brown and Duguid, 1991, p.50) and for educators or trainers

to design learning or support systems to accommodate the informal and external remit offered by innovation, Brown and Duguid describe this factor as a “significant challenge for design to ensure that new collaborative technologies, designed as they so often are around formal descriptions of work, do not exclude this sort of implicit, extendable, informal periphery.” (Brown and Duguid, 1991, p.50).

Dillon et al. (2013, p. 13) comment on the need for pre-existing knowledge and skills to achieve improvisation, suggesting that improvisation is “the coincidence of creative, emergent and collaborative activities...”

In a study of MBA students’ use of improvisation for postgraduate study, Pinnington (2005, p.615) outlines the use of self-led approaches of MBA students engaged in delivering case study sessions in a seminar-based environment; this innovative approach is discussed in terms of improvisation, where the role of the tutor becomes secondary to that of the student in terms of session delivery "…in which Master of Business Administration (MBA) students learn through preparing and delivering their own case studies." The context of strategic and organisational planning, described by Pinnington (2005, p.615) as “command and control systems” is presented in contrast to localised activity and improvisation. Pinnington suggests the inadequacy of the lecture and discussion format in comparison to experiential type learning processes, characterised by constructivist forms of engagement by students, suggesting "...the typical ‘lecture-and-discussion’ methods of university business schools are inadequate learning experiences although they persist in dominating over more innovative forms of experience-based learning." (Pinnington, 2005, p.618). For Pinnington, a key characteristic of improvisation in the Higher Education context concerns behaviour which "...entails responding creatively and flexibly to actions and contexts as they unfold over time..." (Pinnington, 2005, p.615).

Berk and Trieber (2009, p.33) define “four major instructional reasons for using improvisation in the classroom”, firstly referring to a familiarity with technology for recent generations, suggesting “...their desire to learn by inductive discovery, experientially, their need for social interaction and collaboration, their emotional openness, and their limited attention span..." The second characteristic of improvisational behaviours concerns emotional intelligence, including students’ ability to engage verbally, spatially via practical engagement and via inter-personal communications and interactions with peers and tutors, “it taps into students’ multiple and emotional intelligences, particularly verbal/linguistic, visual/spatial, bodily/kinesthetic, interpersonal, and intrapersonal..."

The third characteristic for improvisational behaviours, outlined by Berk and Trieber, concerns the role of collaboration in a group setting, including listening skills when working with peers, verbal skills for communications and improvisational techniques derived from performance arts such as “ad-libbing” and “storytelling”.

The fourth characteristic outlined by Berk and Trieber concerns “deep learning”, reflecting the theoretical perspective of deep and surface learning defined by Marton and Säljö (1976), comprising advanced self-regulated traits or characteristics for learning such as self-reflection and critical evaluation of texts; Berk and Trieber suggests that deep learning behaviours can arise from improvisational techniques in the classroom, including linking past learning with current activities and “real-life applications”, suggesting that this practice "promotes deep learning through the active engagement with new ideas, concepts, or problems; linking the activities or tasks to prior learning..." (Berk and Trieber, 2009, p.33).

vi. The Role of Improvisation for Organisational Change and Knowledge

Discussions on innovation and improvisation in the corporate sector typically focus on the role of improvisational approaches in context to established or traditional business models, suggesting the value of organisational or employee-led improvisation, experimentation, risk-taking or other innovative practices (Eisenhardt and Tabrizi, 1995; Moorman and Miner, 1998).

Miner, Bassof and Moorman (2001, p.304) describe a study of improvisation as carried out within two companies, illustrating how employees uses improvisation to overcome immediate challenges and how this sometimes contributed to their personal development and changed long term business practices: "...improvisation can fruitfully be seen as a special type of short-term, real-time learning. Specifically, in improvisational learning, experience and related change occur at the same time..."

Large scale, strategic management is further outlined by Eisenhardt and Tabrizi (1995, p.84) as the prevalent model for organisational change, reflecting executive decision making processes operating at formal, strategic level within the organisation. This kind of formalised implementation of change is differentiated from market or consumer led, experimental and practitioner driven models of improvisation. Brown and Duguid (1991) also explored the use of innovation in developing skills and practices within organisations, pointing out the need for innovation as a disruptive and risk-taking process in order to achieve developmental outcomes, commenting that “...innovation is generally viewed as the disruptive but necessary imposition of change on the other two...” (Brown and Duguid, 1991, p.41),

in this view, improvisation is a positive outcome in the context of interrelated "working, learning, and innovating" processes (Brown and Duguid, 1991, pp.40-41).

Brown and Duguid (1991, p.51) describe two levels or stages of embracing innovation, including the "discovering organization" (Brown and Duguid, 1991, p.51), which seeks to meet to environmental change via a formal, organisational response, commenting that "...the archetype of the conventional innovative organization, one which responds-often with great efficiency-to changes it detects in its environment..."

The second tier or level of innovation comprises "the enacting organization" – an organisation willing to allow individuals to explore and develop new approaches to achieving outcomes, potentially allowing for organisational adoption of these new methods or approaches. We could envision the same kind of response to student innovation in the post-statutory education sector, commenting that "...the enacting organization is proactive and highly interpretive. Not only does it respond to its environment, but also, in a fundamental way, it creates many of the conditions to which it must respond."

Brown and Eisenhardt (1995, p.369) describe the role of rapid development at the practitioner level in opposition to large scale organisational change and planned strategic management. Pinnnington (2005, p.616) also discusses the relationship between improvisational behaviours and the outcome of change, drawing comparisons between organisational memory (comprising the acquisition of shared experience) and individual knowledge.

The role of improvisation is also cited in terms of 'competitive demand' or pressure for industry (Eisenhardt and Tabrizi, 1995, p.84), suggesting that practitioner groups engage in uses of recent technology to ensure rapid innovation to meet consumer demand; for Eisenhardt and Tabrizi, this kind of local or participant innovation is the

principal method for research and development in opposition to large scale restructure or strategic-led change.

Following perspectives on improvisation for organisational change and product innovation, Hutchins (1991, p.14) also outlines the impact of local teams on the organisation of work itself and how this organisation adapts and evolves over time; Hutchins describes the relationship of active participants in improvisation (in this case, the crew of a ship) in relation to higher level strategic planning and decision making. Hutchins suggests the delineation of participants outside the sphere of strategic planning and high level organisational change may be unhelpful in understanding the long term impact arising from improvisation. These behaviours are shown to impact organisational routines and practice at the higher level. Hutchins comments how "...changes in the organization of the navigation team were brought about by changes in the thinking of the participants of the system..." (Hutchins, 1991, p.38).

Moorman and Miner (p.704) offer a further perspective on practitioner improvisation, suggesting that improvisational processes such as adaption, innovation or serendipity for practitioners, can be applied conceptually to all forms of planning and to all forms of “executing action”. Pinnington similarly outlines how processes can arise from participant behaviours, suggesting the contrast this presents for “rationalist functionalist” perspectives of change characterised by formal structures and large scale planning (Pinnington, 2005, p.616).

The role of “surprise” is also cited in the context of as a key concept in improvisation, explaining how this becomes a driver for innovation and learning outcomes, Pinnginton (2005, p.616) comments that "...surprise should be studied for its own

sake, but rather, during improvisation, its occurrence is significant because it may lead to moments of creativity, innovation and learning."

In another perspective on improvisation, Hutchins reflects on the fundamental nature of knowledge used in an improvisational context, agreeing that improvisation relies on pre-existing knowledge inherent in the related sector, industry or sphere of activity where new specialist insight or knowledge has arisen from improvisational behaviours, in addition to the setting where improvisation is occurring (Hutchins, 1991, p.38).

Moorman and Miner (1998, p.698) similarly suggest that improvisation leaves a residual "memory" within the organisation; the paper suggests the importance of experimentation as an organisational practice for ensuring improved or more efficient corporate practices and for exploring new adaptations in achieving outcomes:

"…both organizational procedural memory (skill knowledge) and declarative memory (fact knowledge) moderate improvisation's impact on organizational outcomes in distinct ways. We also suggest that improvisation influences organizational memory..."

This discussion on the role of knowledge within the context of improvisational behaviour is also reflected in the seminal paper by Weick (1993), entitled 'The collapse of sensemaking in organizations: The Mann Gulch disaster', providing an historical study of the Mann Gulch wildfire tragedy in Montana, USA, when thirteen firefighting personnel were killed due to the sudden expansion of the fire, cutting off their escape route. In this analysis of improvisational behaviours, Weick focused on both the actions of the firefighters and adaptations ensuing within the firefighting organisation as a consequence of the tragedy and in response to the improvisational behaviours of the surviving firefighters. The breakdown of command structures is

evidenced as a potential weakness of command systems and planned organisational systems in emergency situations, suggesting the need for development of processes following adaptations evidenced by the survivors. The inability of the firefighting team to formulate responses to the emergency is defined in terms of a breakdown in “sensemaking”, described as “the disintegration of role structure and sensemaking in a minimal organization" (Weick, 1993, p.628). Weick further outlines the role of improvisation for “sensemaking” within groups, drawing on the experience of the tragedy, including the role of “wisdom” or local practitioner knowledge and interactions occurring within organisations to share this information, commenting that "...four potential sources of resilience that make groups less vulnerable to disruptions of sensemaking are proposed to forestall disintegration, including improvisation, virtual role systems, the attitude of wisdom, and norms of respectful interaction." Closely reflecting the generation of new insight or change as a consequence of group interaction and the situated or experiential context, Hutchins (1991, p.38) and Weick (1993, p.628) suggest the role of pre-existing knowledge for improvisational behaviour, suggesting how improvisational behaviours can generate new insight contributing to shared organisational or community knowledge, this is termed “sensemaking” by Weick (1993, p.628).

vii. Discussion in Context to Studies of Blended Learning and ‘Improvised Learning’

A range of studies have been undertaken in recent years focused on student perceptions of the blended learning context and related models for study via technology. Gardner et al. (2016) used a focus group and purposive sampling

methodology to explore health related students' perspectives of E-Learning platforms in a blended learning context; these students were located at Curtin University (Western Australia), working on placement projects concerning the management of chronic health problems. Benefits of learning via technology revealed by students included perceptions of increased flexibility for learning across diverse locations and perceptions that development of skills for the use of educational technologies would benefit work-based skills, Gardner et al. comments that blended learning modes "resonate with real world, integrated clinical practice were preferred as a mechanism for upskilling the emerging physiotherapy health workforce within an interdisciplinary framework." (Gardner et al., 2016, p.7). The interactive and personalised format of E-Learning tools and platforms was also cited as a benefit of blended learning. Interactive tools for collaboration such as blogs and wikis were cited for group working. Students often cited the relevance of these tools for developing enhanced Information Technology skills for related workplace activity in the management of chronic health conditions: "The effectiveness of blogging and social networking as tools to enhance clinical reasoning and metacognition among physiotherapy students have also been identified." (Gardner et al, 2016, p.6). The research concluded that the students generally prefer a mixed or blended model, incorporating both online and class-based learning, suggesting positive benefits for use of educational technologies to support these programmes and the need for further research to explore the chronic health academic context for integration with educational technologies. Gardner et al. comments that students "expressed a preference for a combination of both online e-learning and lecture-style learning formats for chronic disease management, citing flexibility to work at one's own pace and time..." (Gardner et al, 2016, p.1). Gardner's research broadly reflects outcomes

within the current study, similarly reflecting positive engagement with the blended learning environment, as shown in Developed Theoretical Codes such as ‘Virtualisation of Learning to accommodate Remote Study’ and ‘Virtualisation and Engagement for Online Feedback and Assessment’. The current practical research however, demonstrated significant interrogation of both students’ behaviours within the context of the institutional VLE and activities beyond the VLE or institutional-led systems, reflecting participant concerns, anxieties and aspirations to extend, adapt or enhance the blended learning experience via motivational behaviours such as use of externally sourced platforms, applications, social networks and innovative use of institutional platforms, such as communications tools within the VLE. The use of an entirely inductive, iterative approach in contrast to Gardner’s purposive sampling methodology can seen to have provided a broader and more diverse Grounded Theory outcome, comprising three High Level Theoretical Codes and several hundred dependent theoretical perspectives or conceptual models for student behaviour.

In a similar study of a short term blended learning programme at Vanderbilt University, Bruff, Fisher, McEwen and Smith (2013) outline a Grounded Theory based survey of student perceptions for the integration of MOOC derived content within a blended learning programme (machine learning) at Stanford University. The authors query if the inclusion of MOOC content, sourced from an external provider can be useful within the blended learning context, the authors question if development of MOOCs could enhance traditional forms of teaching, commenting that "...a Stanford University Machine Learning MOOC was integrated into a graduate course in machine learning at Vanderbilt University..." (Bruff, Fisher, McEwen and Smith, 2013, p.187). The research used a mixed methods approach

with student data collected via structured survey questions, use of coding for data recording and line-by-line analysis to determine students' views of blended learning approaches used: "...open-ended survey questions underwent line-by-line coding in order to establish categories and subcategories..." (Bruff, Fisher, McEwen and Smith, 2013, p.191). The research investigated student perceptions surrounding the integration of selected electronic sources derived from an external MOOC within the blended learning programme, presenting the concept of the blended learning programme as a "wrapper" which contained sub-elements sourced externally, including video and documentary course materials. The 'wrapper' approach was employed to allow for expansion of programme attendance, allowing for higher levels of class enrolment: "The blended course design... ...enabled the Vanderbilt instructor to lead an overload course in a topic much desired by students." (Bruff, Fisher, McEwen and Smith, 2013, p.187). One of the barriers or criticisms raised by the research concerned the "fixed" nature of the MOOC within the "wrapper" model, suggesting lack of flexibility for customising or adjusting MOOC content when linked from the wider VLE used by the students; however, the authors also acknowledge scope for selective use of materials within the MOOC: "The online component is, however, only relatively fixed because the instructor of the wrapper can always choose to use only parts of the MOOC..." (Bruff, Fisher, McEwen and Smith, 2013, p.189). The research outcomes indicated generally positive feedback from students on the blended learning programme and use of MOOC derived elements, however some students queried the lack of integration or synergy between wider blended learning related infrastructure/ and MOOC content, including lack of synergy for MOOC content with the face-to-face class teaching: "...students would have liked stronger subject coupling between MOOC and face-to-face components..." (Bruff,

Fisher, McEwen and Smith, 2013, p.195).The research concludes with the suggestion that blended learning can benefit from integration of diverse, modular type resources within wider learning platforms, suggesting benefits for widening access to video and interactive content and benefits for resourcing blended learning infrastructure, allowing for selective implementation of diverse, externally sourced content: "... it suggests the fascinating possibility for characterizing student and faculty interactions beyond any single MOOC..." (Bruff, Fisher, McEwen and Smith, 2013, p.197). The above research did not appear to present an entirely inductive, transcendent or holistic theory to explain student concerns, behaviours or strategies in the blended learning context, focusing on the single issue of external sources derived from a MOOC, with resources selectively issued for student use via their learning platform. In contrast to the above study, relying on a mixed methods approach and use of structured surveys, the current study did not pre-empt the discrete area of student concern, nor focus the qualitative research on any specific resource or platform. In contrast to the above research, the current study approached student participants via an inductive method and using an Open Coding approach, to generate a grounded series of narrative and conceptual perspectives to determine participant concerns, anxieties and behaviours. Whilst some similarities are apparent, e.g. positive student response to the availability of diverse media or sources (reflecting student engagement with diverse scholarly sources, as demonstrated in the Early Theoretical Code ‘Engaging with and Negotiating Digital Platforms’), the study carried out by Bruff, Fisher, McEwen and Smith (2013) reflected a focus on institutionally led provision of resources and assessment of those materials; in the current study, the Grounded Theory of ‘Improvised Learning’ demonstrates a varied interactions between student-led or self-regulated behaviours

and institutional provision, demonstrating student aspirations for wider or more diverse engagement with the blended learning context and self-regulated engagement with both institutional and external sources of information and scholarly sources.

In a study of “Student perceptions and achievement in a university blended learning strategic initiative”, Owston, York and Murtha (2013) describe research at York University, Canada, focused on student perceptions of programme outcomes in the blended learning context: "... the relationship between student perceptions in blended learning courses and their in-course achievement." (Owston, York and Murtha, 2013, p.38). The research was carried out on a wide scale across the institution, with research carried out via structured questionnaires: "The study encompassed 11 courses in the above three faculties. Total student enrolment in these courses was 1147.” (Owston, York and Murtha, 2013, p.38). Areas for investigation included “...overall satisfaction with blended learning, convenience afforded by blended learning, sense of engagement in their blended course, and views on learning outcomes." Owston, York and Murtha outline the emerging trend toward employed students with busy lifestyles and commitments, suggesting the need to assess blended and related models of learning via educational technology to facilitate this emerging context, commenting that "...a sizable proportion of full-time students are employed, the university sought to make learning more convenient and flexible to accommodate students' personal schedules." (Owston, York and Murtha, 2013, p.38). Owston, York and Murtha conclude that study outcomes and student perceptions for the role or usefulness of educational technology are closely related factors, suggesting that students who engage more fully with educational technology exhibit more positive views on engagement with learning via educational

technologies and achieved better study outcomes: “High achievers also found blended courses more convenient, more engaging...” (Owston, York and Murtha, 2013, p.38). Conversely, students who achieved less favourable outcomes often exhibited tendencies to prefer more traditional learning approaches, for Owston, York and Murtha, this suggests the need to consider alternative or traditional approaches for those learners, suggesting the development of independent learning related skills is a factor for technology-averse perceptions and study outcomes. Owston, York and Murtha comment that "It may be that low achievers need the structure that comes from regular (e.g., weekly) face-to-face classes as they may not have the independent study skills that blended learning demands." (Owston, York and Murtha, 2013, p.43). Similarities between the Owston, York and Murtha (2013) study and the current research project can be seen in the pattern of self-regulated or motivational engagement by some students in contrast to reduced or tentative behaviours for engagement with the blended learning context, these contrasting behaviours are reflected in the Early Theoretical Code ‘Physicalisation of Virtual Learning’ and the Developed Theoretical Code ‘Socialisation of Learning for Group/Peer Working’. Other similarities are present, such as the focus on a substantive area of study reflecting current trends toward part time or low contact study, via an educational provider aligned toward this emerging demographic and academic context; these aspects are evident in the current study, as shown in the Developed Theoretical Code ‘Multi-tasking Commitments’ and the Developed Theoretical Code ‘Managing and Negotiating Work-Study Relationships’.

Other aspects of the study, however are less comparable, principally as a consequence of the research methods used, with structured questionnaires informing student responses and the researcher’s focus during data collection.

Whilst Owston, York and Murtha's study was very broad in scope (1147 students), the research was defined by a structured questionnaire, so potentially focused on satisfaction and related issues in contrast to the open, inductive format of the current study, allowing for broader feedback.

In another similar study, Bueno-Alastuey and López Pérez (2014) explored student perceptions of blended learning in a language teaching context at the Department of Philology and Didactics, Public University of Navarre, across 36 language students enrolled in English second language classes (Bueno-Alastuey and López Pérez, 2014, p.514). The study was carried out via surveys "...to analyse students' satisfaction with the courses in order to establish improvements in future editions." (Bueno-Alastuey and López Pérez, 2014, p.514). In a similar outcome to the previous study mentioned, Bueno-Alastuey and López Pérez concluded that students who engaged to a greater level with educational technologies also exhibited more positive views regarding these technologies: "The students who had used ICT less in their course rated it as most useful for some areas of language..." (Bueno-Alastuey and López Pérez, 2014, p.509). Another outcome resulting from the research suggests the need for greater training for students who do not share positive views on their own use of learning technologies and for greater integration of these technologies within taught programmes: "This study... ...recommends adding guides and training to blended learning experiences to diminish the number of students rejecting the use of ICT." (Bueno-Alastuey and López Pérez, 2014, p.509)

The above study reflects similar broad outcomes to the current research project, indicating student aspiration for wider integration of diverse technologies within the blended learning context and to extent the study experience for mobile and situated learning; these behaviours are reflected in the Developed Theoretical Code

‘Adaptive Virtualisation of Learning’, the Early Theoretical Code ‘Virtualisation of Learning to accommodate Remote Study’ and Theory Bits/ Insight such as ‘Mobile/ overseas study via VLE, email, synchronous tools’ and ‘Ubiquitous learning via range of devices & locations to accommodate lifestyle’. However, the Bueno-Alastuey and López Pérez (2014) study demonstrated a limited student sample and also used a structured survey approach, potentially limiting the depth of student responses. The current research project, by comparison engaged in over 100 discussion sessions, led by the inductive Glaser derived Grounded Theory approach; therefore, the current research project also stands in contrast to the Bueno-Alastuey and López Pérez study in terms of methods used, i.e. seeking to identify grounded student data via direct inductive and interpretive methods, for the generation of conceptual insight into student concerns, behaviours and strategies.

In another study on student perceptions of blended learning, Suda, Sterling, Guirguis and Mathur (2014) described student feedback following “a blended learning approach to a drug information and literature evaluation course” (Suda, Sterling, Guirguis and Mathur, 2014, p.369). The research was carried out using structured online surveys at Tennessee College of Pharmacy, across 140 students; the authors describe a relationship between educational technology used for the programme and enhanced study outcomes: "Final course grades and student perception of achieving course objectives improved with the blended learning course." (Suda, Sterling, Guirguis and Mathur, 2014, p.370). Another key outcome for the study comprised the observation that blended learning encouraged active learning approaches, suggesting increased opportunity for more complex interactions and peer/tutor collaboration in the class context, arising from use of the VLE outside class for preparatory purposes. Suda, Sterling, Guirguis and Mathur comment that

"incorporating a blended learning approach allowed for increased active learning sessions while maintaining exam performance and increasing overall course grade..." (Suda, Sterling, Guirguis and Mathur, 2014, p.371).

The current research project similarly identified the relationship between blended learning and self-regulated behaviours, however, whilst the above study had focused on institutional-led provision via a structured survey, the present research project had attempted to investigate wider student perceptions, behaviours, strategies, anxieties or concerns via the inductive Grounded Theory method, perhaps more clearly demonstrating the dichotomy or contrast between the institutionally-led and self-regulated or motivational context for students studying via the blended learning environment. Similar outcomes within the present research project, indicative of 'active' type learning engagement were demonstrated via the Developed Theoretical Codes 'Network Building/ Engaging' and 'Socialisation of Learning', indicating a range of self-regulated behaviours to develop, maintain and extend digital or online communications for peer collaboration, tutor interaction and engagement with networks or stakeholders beyond the institutional context.

Another similar study of student perceptions for blended learning is evident in a 2013 paper by Osgerby (2013) examining Students' "perceptions of the introduction of a blended learning environment", describing feedback at University of Winchester via four student focus groups (of between 5-8 students) discussing the blended learning experience: "To explore students' views about the introduction of a blended learning approach, a case study approach using focus groups was chosen for this research." (Osgerby, 2013, p.89). Student perceptions of the blended learning experience included acknowledgment of the role of Information Technology skills for study and wider skills development for careers/ lifelong learning: "...students acknowledged that

ICT skills were essential to improve their employability..." (Osgerby, 2013, p.90). Negative student perceptions included views related to distraction due to use of computer devices, suggesting use of social media, mobile “apps” and related personal technologies and concern for lack of face-to-face contact. Osgerby comments that "... they remained concerned that the course work might involve too much distracting computer use. The main anxiety appeared to be that accounting and financial management were seen by students as potentially being difficult subjects, which would require considerable ‘face to face’ instruction..." (Osgerby, 2013, p.90). The role of preparatory style Technology Enhanced Learning is also suggested via use of video and other resources accessible before the lecture - reflecting a ‘flipped’ teaching model (Arnold-Garza, 2014); students had suggested this was a useful opportunity to prepare for the lecture, whilst some students also suggested early access to materials could prompt anxieties: "Some students in each of the focus groups were concerned about the impact of full visibility of the learning material from the outset, which increased their anxiety..." (Osgerby, 2013, p.91). The present research project presented similar student perspectives on wider aspirations for lifelong learning and skills development in the blended learning context to enhance career related training and progression, these aspirational perceptions are demonstrated in the Developed Theoretical Code ‘Self-Management of Study Regime and Programme’ and Theory Bits/ Insight such as ‘Facilitating lifelong learning via studies’ and ‘Facilitating career development via academic skills progression’. The above study, however did not perhaps explore student perceptions as widely as the present research study, with only a limited sample of four student discussion groups, comprising 5-8 individuals.

Related discussion on blended learning has also raised a further model or perspective often termed the “student centred learning environment” (SCLE). Lee and Branch (2017) carried out a Grounded Theory based study info students’ beliefs on student-centred learning environments in a blended learning context at Mississippi State University. Lee and branch suggest the need to design the wider environment encountered by students to encourage constructivist, motivational and active forms of study: “Influenced by the constructivist perspective of learning, student-centred learning approaches expect students to construct meaningful knowledge while working on authentic problems..." (Lee and Branch, 2017, p.1). This study used Grounded Theory concepts/approaches such as the ‘Constant Comparative Method’ to assess qualitative student views in the form of ‘codes’ and refine these toward higher levels of abstraction or conceptual perspectives (Lee and Branch, 2017, p.2). These perspectives reflect models for student-centred learning such as constructivist based “e-moderating”, facilitating student collaboration and self-regulated behaviours in an environment supported, rather than led by an educator (Salmon, 2014; Salmon, 2004) and related perspectives on adaptive based learning platforms to consider learner preferences and choices influence instructional design (Burgos, Tettersall and Koper, 2007; Fiaidhi, 2011; Heinze and Procter, 2004). Lee and Branch (Lee and Branch, 2017) concluded that the holistic student environment must be informed by a knowledge of students’ own prior learning and knowledge, to ensure sufficient resources, systems, platforms and skilling in terms of tutor/staff provision, extending to both the physical and online environment: "The results showed that students’ prior knowledge as well as their beliefs about teaching and learning influenced their perceptions of the SCLE. This study suggests that teachers and educational practitioners acknowledge students’ individual differences

in their beliefs and prior knowledge, and provide personal support and guidance." (Lee and Branch, 2017, p.1). The above research indicated a more complex, mixed methods approach for the research methodology, incorporating constructivist approaches and active learning approaches. The study focused on student responses related to the research area of the SCLE (Student Centred Learning Environment), suggesting a narrower approach for implementation of the Grounded Theory methodology, in contrast to the wholly inductive, iterative approach used within the current research project - for generation of an original, Grounded Theory of participant concerns and behaviours. The Lee and Branch (2017) study raised discussion on prior learning or knowledge and the scope for planning blended learning or related models for Technology Enhanced Learning based on student experience or knowledge, these considerations are partly reflected in the 'transitional' outcomes emergent from the current research project, e.g. the Developed Theoretical Code 'Transitional Physicalisation of Online Learning', suggesting scope for differentiation or differing planning and provision for students less engaged with Technology Enhanced Learning and related approaches, in contrast to behaviours reflected in the Developed Theoretical Code 'Adaptive Virtualisation of Learning', reflecting a range of behaviours, strategies and innovative behaviours to extent, adapt or exploit institutional and externally sourced platforms, resources, networks or stakeholders.

Many of the above recent studies reflect the current substantive area of research and emergent theoretical perspectives arising from the Grounded Theory of 'Improvised Learning'. Similarities include outcomes related to students' perceptions for benefits of learning via educational technologies (Owston, York and Murtha, 2013, Bueno-Alastuey and López Pérez, 2014; Suda, Sterling, Guirguis and Mathur,

2014), reflected in the High Level Theoretical Code ‘Motivational adaption and improvisation via Online Learning’ and related strategies for extending, adapting or exploiting institutional platforms such as VLE group tools for self-regulated collaboration. Other similarities include student perceptions on the requirement for managing or balancing external factors or distractions (Osgerby, 2013), reflected in the Developed Theoretical Code ‘Multi-tasking Commitments’ and similarities in perceptions on the need for development of skills for Technology Enhanced Learning to assist wider, lifelong and career development (Osgerby, 2013; Gardner et al., 2016). However, these studies often present a relatively structured, deductive and hypothesis based perspective for the generation of research outcomes, characterised by use of structured surveys and similar research methods (Owston, York and Murtha, 2013; Gardner et al., 2016), including use of these methods alongside grounded based research approaches (Bruff, Fisher, McEwen and Smith, 2013). These studies also can exhibit relatively small sample sizes (Osgerby, 2013; Gardner et al., 2016) in contrast to the current study, comprising over 100 discussion sessions and over 500 individual comments.

In a PhD based study concerning motivation and information behaviours, Saumure (2010) applied a Grounded Theory approach to assess pre-defined questions across 15 students via semi-structured interviews at the University of Alberta engaged in mixed/blended learning; Saumure comments that "students were asked to reflect on their experiences accessing and sharing information... ...as well as what they thought drove their information behaviours..." (Saumure, 2010. p.4). The pre-defined questions focused on information literacy related behaviours, seeking to address motivations for sharing information concerning routes of access to these sources, the research attempted to define a theoretical model to explain these motivations in

context to information seeking behaviours. Questions posed by Saumure included "(1) In what types of information seeking and sharing behaviours do online learning students engage? (2) What motivates online learning students to both seek and share information? (3) Can a theoretical model of students' motivational orientations as they apply to their information behaviours be developed?" (Saumure, 2010. p.4). The research project concluded that information seeking behaviours are important for blended learning related forms of study, indicating that students who felt anxious regarding information seeking via digital or online systems experienced difficulties using these technologies: "...this study revealed that both electronic and local resources are key to these students' information seeking successes." (Saumure, 2010. p.4). The research raised the issue of anxiety for blended learning engagement, suggesting the need for students to experience positive emotion for successful outcomes, and for further research to understand these anxieties. Saumure comments on the role of "emotion" in personal learning, indicating that "students had more trouble both seeking and sharing information when they felt anxious about the process, whereas information seeking increased when they actually enjoyed and felt happy engaging in this process." (Saumure, 2010, p.290). The research also concluded that professionally relevant coursework via blended learning proved to be motivational for students; "...results suggest that personally or professionally relevant assignments provide students with the greatest motivation to seek information for their coursework." (Saumure, 2010. p.4).

Morley (2016) in a PhD based study explored nursing students' experience of blended learning at Bournemouth University whilst engaged on professional practice away from the class based environment, the thesis concerned a Grounded Theory project "exploring first year student nurses' learning in practice" (Morley, 2016). A

mixed methods approach was used, with elements of Grounded Theory methodology, across 21 nurse participants (Morley, 2016, p.3). Morley's findings indicated a theoretical perspective focused around “learning to be a professional”, overcoming challenges, study requirements and personal commitments to achieve professional accreditation; Morely also raises the importance of the political and social context for the nursing environment, suggesting the need for nursing students to manage these factors on placement, Morley comments that “Recognition and negotiation of practice learning in the highly politicised clinical setting was influenced by both the social context of the placement and the individual influence of the student." (Morley, 2016, p.3). Support frameworks were recommended for this participant group, suggesting the need to assist student nurses when based remotely from the class setting in context to the issues of workplace politics and social aspects: "The primary research recommended the need for a greater awareness of practice pedagogy and support systems for students’ practice learning." (Morley, 2016, p.3). Morley also comments on the 'constructivist' approach used alongside Grounded Theory, suggesting the benefit of this approach for addressing nurses' experiential narratives; the role of the researcher was also highlighted in terms of 'reflexivity', suggesting an ongoing inter-relationship between the researcher and participant group: "The constructivist tradition, in particular, encouraged the studied experience of students’ practice learning to be illuminated by the wider and hidden influences of hierarchical differences and the organisation of the nurses’ work." (Morley, 2016, p.231).

In another PhD based study of mixed/blended learning, Feeler (2012) explored student perceptions of instructor engagement at University of Nebraska, via a Grounded Theory approach. The Strauss derived approach for Grounded Theory

was selected for the methodology, comprising a mixed methods approach, also incorporating 'Active Interviewing', a pre-defined theoretical model was explored, "in order to generate a substantive theory of community college student perceptions of online instructor presence..." (Feeler, 2012. p.3). The research was carried out across 16 student participants who had completed four modules facilitated via a Virtual Learning Environment. The research outcome was able to demonstrate a resulting theory of 'instructor presence', suggesting the presence of an instructor via electronic communications, networks, assessment and other interactions was beneficial for student learning. Feeler outlines the outcome comprising substantive grounded theory, the “Theory of Establishing and Sustaining Instructor Presence to Enable Student Learning”. This emergent theory states that the perception of instructor presence results from the student-instructor relationship..." (Feeler, 2012. p.3). Processes of student-tutor interaction are demonstrated in the research, suggesting a 'conditional phase' based around students' perceived needs and instructor response to these requirements or demands: "...the conditional phase in which student and instructor respond to perceived needs, especially the need for flexibility..." (Feeler, 2012. p.3).

The Feeler study was carried out using a relatively small sample size (16 students) in contrast to over 100 interviews in the current study, whilst the Feeler outcomes are useful in indicating student preference for mentor-related ‘instructor presence’, the study was also characterised by a pre-defined structural interview format, which may have detracted from potential responses beyond the issue of the instructor’s role, the hypothesis-type approach taken may therefore present a more limited Grounded Theory approach in context to approaching students in a blended learning environment; the study outcome however does support outcomes in the current

study related to theoretical perspectives such as ‘Network building/engaging’ and ‘Socialisation of Learning’, referring to students’ concerns and strategies for developing support networks – across peers, institutional staff/support teams and external support options such as family or in the workplace.

Chametzky (2013) outlines a grounded theory doctoral study of post-graduate international language learners at Northcentral University, on the theme of 'Offsetting the affective filter'. The research explored the behaviours of 15 adult learners within language classes, exploring student concerns in a VLE-enabled setting. The study highlights a link between student difficulties and experience of frustration in this context, suggesting an 'affective' state when students are exposed to an unfamiliar educational environment, the research also indicated a relationship between frustration and impact on study outcomes. Chametzky comments that the study "revealed the concerns that learners had regarding their experiences and how they dealt with those issues. When learners struggled, they became frustrated thereby causing an imbalance that prevented them from accomplishing their desired objectives." (Chametzky, 2013, p.4). The research suggests approaches for reducing "affective" factors which can impact study performance, the resulting theory was termed "offsetting the affective filter", suggesting this is the goal or concern for these online students. The research suggests approaches to assist the students in restoring a sense of "comfort" when studying in this context. Chametzky comments that "By taking online foreign language classes, learners stepped outside their comfort zones thus setting into motion an imbalance that needed to be offset." (Chametzky, 2013, p.4). The Chametzky study similarly reflects a lower student sample size (15) in comparison with the current study, however the “affective" factors identified - comprising issues related to the unfamiliar VLE environment also support

theoretical perspectives presented in the present study such as ‘Transitional Physicalisation of Online Learning’ - reflecting students engaged in strategies to off-set or reduce the role of digital systems, communications or applications) and ‘Navigating diverse platforms, equipment, locations’ – reflecting concerns and strategies for engagement in the blended learning environment, use of the VLE and working in a remote, low-contact context.

In another PhD based study, Newbury (2013) explored study outcomes in a blended learning context at University of Nevada via student surveys (comprising 4010 structured survey responses). The research examined completion rates for blended learning programmes, comparing these also with class-based teaching approaches. The study investigated "...whether there is a difference in students' successful completion rate and students' withdrawal rates among classes with different types of course delivery, i.e. online, blended, or in-person..." (Newbury, 2013, p.i). The research findings suggested higher levels of completion for the blended learning based classes, with higher levels of engagement with digital or scholarly materials, communications and other online tools facilitating blended learning: "... student successful completion rates are higher for courses delivered in a blended learning environment." (Newbury, 2013, p.80). The distribution of materials via the VLE was also highlighted as a significant factor, suggesting the absence of core study materials in this form led to dissatisfaction and retention problems: "The importance of having course reference materials was confirmed in the analysis of the data from both students and faculty surveys." (Newbury, 2013, p.80). The Newbury study was conducted using a basic structured survey, lacking scope for student feedback beyond fixed questions such as questioning the frequency of access to the VLE or how important were specific features of the VLE. In contrast to the Newbury study,

the current study implemented an open memoing approach, allowing for some leading comment based around the early substantive/selective coding, resulting in a very wider range of open-ended comments (over 500 across 100 interviews), allowing for an objectivist-based research process. The reported dependence of students on core materials shown in the Newbury study reflects theoretical outcomes of the current study, across code such as ‘Physicalisation of Virtual Learning’ and ‘Learning Resources Capital Acquisition’, supporting the perspective that some students can reply on core materials and seek to reduce or limit the role of the VLE and related online context. The outcome of course completion and grading outcomes is an aspect of the Newbury study lacking in the current research project, which had approached only current students, the Newbury study demonstrates a causal link between positive student perceptions of blended learning context and positive study outcomes.

A further PhD study by An (2006) concerned “Collaborative Problem-Based Learning”, exploring collaborative “problem-based learning” or “PBL” across three graduate-level programmes facilitated via a Virtual Learning Environment at the University of Indiana Bloomington; the research used a mixed methods approach with some Grounded Theory elements alongside ‘formative research methodology’, case studies, reviewing three individual programmes and a preceding literature review to guide the theory. An described the three courses, including: “...(1) "Technology: Use and Assessment," (2) "Introduction to Reference," and (3) "Advanced Problems in Librarianship: Collection Development...” (An, 2006, p.iv). The thesis described the importance of collaborative problem-based learning in online environments due to the rapid growth of online learning and the need for innovation in instruction. The study identified what worked and did not work in

collaborative PBL and how it could be improved. The thesis proposed a series of guidelines for designing and implementing collaborative “problem-based learning” courses (An, 2006, p.v). The study concludes that PBL could be improved by collecting both descriptive and evaluative data to inform local practice. The study also highlighted the evolving nature of Technology Enhanced Learning and the need to continually review the PBL model in this context: “...when more advanced technologies are available, we might need to develop different kinds of guidelines...” (An, 2006, p.98).Whilst the above research project focused on the PBL dimension, the project concluded that this teaching approach was lacking for some programme areas and did not support collaborative practice as expected. The case studies suggested there was insufficient communication between instructors and students, the planned or mentor-led model for PBL appeared to be absent in some cases: “The instructor let the students solve the problem on their own without any structure and guidance…..and had them take initiative to talk with her if they needed any help or had a question.” (An, 2006, p.81). The An study indicated the role of adaptive learning approaches in a technology-facilitated environment, reflecting theoretical perspectives in the current study related to student concerns, strategies and aspirations for wider accommodation of the VLE-facilitated, low-contact context, such as ‘Virtualisation of Learning to accommodate Remote Study’ and ‘Virtualisation and Engagement for Online Feedback and Assessment’. The qualitative research approach was based around a PBL hypothesis and theoretical model, this may have limited the scope of student responses, in contrast to the current study which avoided framing the research within specific theoretical perspectives. The An study also considered a relatively small sample student population - three programmes in contrast to coverage by the present study of programmes across most subject areas

across the institution. The An study however does support wider findings in the current study, suggesting the role of adaptive approaches for designing blended and related learning contexts and for responding to student learning patterns, commitments and lifestyle demands.

Another doctoral study by Varthis (2016) explored student perceptions of blended learning for dental programmes at Columbia University across 40 second year dental students, comparing the blended learning approach to traditional lecture formats. The study focussed on dental students' perceptions of blended learning and its effectiveness in this context (Varthis, 2016, p.26). A mixed methods methodology was used, incusing use of exam type questionnaires, Likert questionnaires and interviews, students were also randomly assigned to specific discussion groups and date was analysed statistically (Varthis, 2016, p.26). The study found students reported very positive opinions of blended learning. These perceptions related to the organization, support of learning and potential merits in dental education. Varthis comments that "...the overall effectiveness of the blended learning method in comparison with the traditional teaching approach was positive..." (Varthis, 2016, p.70). The study concluded a range of positively perceived outcomes expressed by students, suggesting that the blended learning model promotes programme satisfaction, offers greater flexibility for students and therefore contributes to student retention, also reducing the need for intensive class based attendance. Varthis comments on the benefits of blended learning in terms of "...increased enrollment and enhanced use of physical facilities by requiring less seat time than fully face-to-face courses. It targets more relevant and hopefully transferrable learning in a personalized, mastery based, and meaningful way." (Varthis, 2016, p.76). The Varthis study supports theoretical perspectives in the

current study reflecting motivational, self-led engagement in the blended learning context, in particular perspectives based around self-led peer and tutor interaction, adaptive use of the VLE to facilitate group work and active ‘virtualisation’ strategies to extend VLE functionality via use of chat, discussion and related tools in these contexts. The Varthis study, as seen in other cited studies of blended learning, was based around structured survey questions (across 40 respondents) and did not facilitate wider student feedback, focusing almost entirely on student’s positive engagement within the blended learning environment, the current study can be seen to have approached a wider student audience across the institution, with a more open, grounded methodology for discovery of wider student concerns.

The above theses provide a sample of doctoral level theses surveyed over the course of the retrospective literature review following the practical research phase of the current study; the theses surveyed indicated general use of mixed methods, use of deductive and hypothesis -based methodologies, often preceding the research with a defined perspective or theoretical model for testing or review. These theses also tended to explore relatively limited student populations, in many cases reflecting less than thirty student responses. Whilst theses were consulted engaging in a qualitative, Grounded Theory approach, most theses did not use Grounded Theory in either a purely inductive, iterative format, based on direct interpretation of participant responses for generation of an original theory, but instead tended to guide the theoretical outcome via the adductive, Strauss derived approach or via experiential or other mixed methods approaches, such as use of structured surveys. The literature surrounding contemporary theses in the area of blended learning via grounded methodologies therefore present a significant contrast to the Grounded

Theory model used in the current research project, reflecting the Glaser derived, inductive Grounded Theory approach.

In contrast to studies identified in the literature, the present study explored the substantive area via an inductive, interpretive approach, seeking to develop an original theory for participant behaviours in contrast to structured or planned approaches such as use of pre-defined interviews or surveys.

In summary, the current study sought to explore student responses via a holistic, inductive format via the Glaser derived Grounded Theory methodology.

Recent studies exploring student's perceptions of study via the blended learning model can therefore be shown to reflect the current substantive area of research and study outcomes. Similarities include students' perceptions for benefits of learning via educational technologies, reflected in the High Level Theoretical Code 'Motivational adaption and improvisation via Online Learning' and student perceptions on the requirement for managing or balancing external factors or distractions, reflected in the Developed Theoretical Code 'Multi-tasking Commitments' and similarities on aspirations for development of skills for Technology Enhanced Learning to facilitate lifelong and career development. However, these studies often present a relatively structured, deductive and hypothesis based perspective for the generation of research outcomes. These studies also can also exhibit relatively small sample sizes in contrast to the current study, comprising over 100 discussion sessions and over 500 individual comments. In contrast to studies identified in the literature, the present study explored the substantive area via an inductive, interpretive approach, seeking to develop an original theory for participant behaviours in contrast to structured or planned approaches such as use of pre-defined interviews or surveys.

viii. Discussion on 'Transitional Physicalisation of Online Learning'

'Transitional Physicalisation of Online Learning' is a High Level Theoretical Code comprising one of three component high level theoretical perspectives within the Core Category, this perspective conceptually explains some students' preferences, strategies or behaviours to engage in the institutional Blended Learning environment in a limited or progressive manner. The preference of some students to engage in a less digital-focused context, including preferences to avoid use of the VLE and other digital tools or platforms was evident in the Early Theoretical Code 'Physicalisation of Virtual Learning'. It could be argued that behaviours related to 'physicalising' or reducing the virtualised learning experience – such as conversion of VLE content to printed resources, preferring printed Library resources rather than use of electronic databases, or avoidance of group work within the VLE - indicate a partial or transitional engagement with digital resources and wider learning technologies. These behaviours could be said to reflect a self-led or self-managed learning pattern where technology-facilitated learning is used in a reduced or limited form as a consequence of student choice rather than institutional design. It could be suggested from this behaviour, that some participants actively choose to 'physicalise' or transform the virtual learning element via reduction to physical, in-person and other strategies. Transitional behaviours were particularly shown in dependence on programme materials within the VLE, where some participants chose to work primarily via the VLE, avoiding or reducing the context for wider use of institutional platforms or external sources, these behaviours were shown in Theory Bits/Insight such as 'Reliance on VLE for prioritised/optimised study routine' and 'VLE/online tools avoidance via reliance on core handbook or selected print materials'.

Transitional behaviours or stages of engagement in the blended learning environment were also reflected in comments regarding personal acquisition of skills for ICT and use of the VLE; students demonstrated a transitional approach in acquiring skills, sometimes accompanied by aspiration to develop skills further. In a significant number of cases students were dissatisfied with support or training (such as the induction process) and expressed the need to acquire knowledge of systems and resources in a self-led context.

There may be some evidence that limited engagement in the blended learning context can impact study performance. Owston, York and Murtha's blended learning based study at University of York (2013) suggested students relying on traditional media would be less successful than those engaged more fully in the blended learning environment, with requirement for implementation of further training to facilitate less engaged students, this perspective is shared by Bueno-Alastuey and López Pérez (2014) following a study of blended learning bases students at Navarre university, suggesting training for the use of learning technologies for students with less positive perceptions of learning technologies. These studies did not however define strategies or approaches used by students to compensate for lower engagement in the us of these technologies; compensatory approached used by these students is indicated in the current study, via 'physicalisation' strategies and more limited use of core VLE functions and materials.

Limited engagement may also reflect student anxieties or concern engaging within the blended learning contact, potentially also impacting study outcomes. Following a study of blended learning based students at University of Winchester, Osgerby (2013) outlined anxieties of some students in the use of multimedia in a blended learning context, supporting perspectives in the current study focused around

student reliance on physical resources and reflecting anxieties for use of technologies, as shown in the Early Theoretical code ‘Developing Confidence in Technologies and Low Contact Study’.

Similarly. Chametzky (2013) carried out a Grounded Theory based study of blended learning at Northcentral University, identifying student difficulties in this context, identifying an 'affective' state when students are exposed to an unfamiliar educational environment, impacting study performance and sense of "comfort"; these findings reflect the findings in the current study related to transitional or limited engagement via the blended learning environment; Chametzky’s study however suggests an additional dimension potentially less visible in the current study related to longitudinal development of skills for engagement via blended learning, suggesting the importance of supporting early phases of engagement more fully.

Similarly, Saumure (2010) conducted a Grounded Theory-based blended learning study at Alberta University, concluding the need for positive emotional experiences for successful study outcomes, whilst this semi-structured based research did not potentially provide an inductive, objective analysis, this perspective supports the current study findings in suggesting the need for consideration of students exhibiting concern when engaged via blended learning.

Transitional and physicalising behaviours can be shown to reflect perspectives on individual approaches for learning such as ‘deep’ and ‘surface learning’ (Marton and Säljö, 1976; Prosser and Trigwell, 1999; Ramsden, 2003), which sought to define characteristics of high level engagement with learning processes, these behaviours may also reflect levels or types of motivational engagement via learning technologies (Garrison and Cleveland-Innes, 2005; Dimitrova, Sadler, Hatzipanagos and Murphy, 2003).

In related research, Suda, Sterling, Guirguis and Mathur's study at Tennessee College of Pharmacy (2014) outline a relationship between engagement in the blended learning environment and enhanced study outcomes, suggesting that blended learning encouraged active learning approaches. This outcome reflects a wide range of early theoretical insight (Theory Bits) in the current study such as 'Facilitating group document development via formal/informal online tools/wikis', 'Mobile/Overseas study via VLE' or 'Resolving VLE support limitations'.

The theoretical perspective of 'Transitional Physicalisation of Online Learning' reflects differing levels of student dependency on the VLE and wider institutional, Library and informal platforms when studying via a blended learning context (Bonk and Graham, 2006; Littlejohn and Pegler, 2013; Heinze and Proctor, 2004), reflecting engagement at a range of levels with institutional platforms, both in a class-based and external/remote context.

Theoretical perspectives derived from the practical study reflect improvisation at a lower level or tier, with existing practices adapted to achieve outcomes – these behaviours reflect discussion on synergies between stages or levels of improvisation and improvisation in music or performance (Moorman and Miner, 1998, p.703), example Theoretical Codes reflecting this kind of adaptation include the Early Theoretical Code 'Socialisation of Learning for Group/Peer Working' and dependant Theory Bits/ Insight such as 'Extending VLE via informal resource sharing' and 'Applying informal networks and socialisation with peers/tutors to embed learning in these contexts'.

For Gros and Garcia-Peñalvo (2016, p.1) developments in learning technologies have represented a generational change or shift in learning, suggesting that learning technologies can be grouped or classified as a series of evolving generations or

stages. The first generation of learning technologies is characterised by the focus on materials and supply of these in a digital context in parallel with print equivalents, described as “…physical materials enriched with digital formats and clearly influenced by the book metaphor." (Gros and García-Peñalvo, 2016, p.6).

A second level or generation for learning technologies can be characterised by transition of class based activity in an online and virtualised context, with greater emphasis on interactivity such as discussion: “In this generation the interaction dynamics start through messaging systems and discussion forums." (Gros and García-Peñalvo, 2016, p.6). A third generation suggested is characterised by increased levels of flexibility, use of specialised learning materials and media and greater use of tools such as e-portfolios, reflective blogs and game based learning, Gros and García-Peñalvo comment that “…the online content is more specialized and combines materials created both by the institution and the students. Reflection orientated tools, such as e-portfolios and blogs... ...and more interactive activities, such as games..." (Gros and García-Peñalvo, 2016, p.6).

These tiers of levels for adoption or engagement with learning technologies broadly reflects the various levels or stages of engagement demonstrated via the practical research for the current study, with higher or deeper levels of engagement reflected in the High Level Theoretical Code ‘Motivational adaption and improvisation via Online Learning’ and tentative or partial engagement reflected in the High and Developed Level Theoretical Code ‘Transitional Physicalisation of Online Learning’; whilst Gros and García-Peñalvo’s perspective for levels or generations of engagement with educational technology reflects an institutionally-led, planned or guided approach, the Grounded Theory of ‘Improvised Learning’ reflects both the institutional and, to a significant extent, self-regulated or self-led behaviours for

wider, extending or exploiting behaviours within the blended learning context. The current study also demonstrates highly motivational behaviours for innovating or extending the blended learning experience beyond the institutional context to encompass externally sourced applications, platforms, networks/stakeholders and locations, as demonstrated in the Developed Theoretical Codes ‘Resolving and Supplementing Information Literacy for Effective Research’ and ‘Engaging with and Negotiating Remote Group Working’.

The theoretical perspective, ‘Transitional Physicalisation of Online Learning’ extends extant concepts of blended learning by demonstrating patterns of behaviours surrounding this mode of study, including a continuum of engagement, which for some participants entailed reliance on class-based infrastructure, resources and activities, whilst others sought to physicalise or reduce the digital context, opting for in-person contact with peers, tutors and stakeholders and for physical rather than digital resources; conversely, other students sought to extend use of institutional platforms and systems, using institutional tools beyond the class context and also extended their study experience via non-institutional platforms and systems.

Thus we can see that the theoretical perspective of ‘Transitional Physicalisation of Online Learning’ offers insight into the used of the VLE and Managed Learning Environment, suggesting adaptive use of platforms and systems to ensure preferred processes or behaviours, reflecting current theory for situated, experiential and improvisational learning, but also suggesting original insight in the use of adaptive strategies to engage in the blended learning setting in a limited or controlled format.

ix. Discussion on ‘Self-Regulated Engagement’ and ‘Multi-tasking Commitments’

The High Level theoretical code, ‘Self-Regulated Engagement’ was used to conceptually explain students’ adaptive or extending behaviours such as self-led engagement in managing individual studies, overcoming skills barriers or resource issues, motivating peers and leading on project work. ‘Self-Regulated Engagement’ is one of the constituent properties of the High Level theoretical perspective ‘Motivational adaption and improvisation via Online Learning’. The closely related High Level theoretical code, ‘Multi-tasking Commitments’ reflects similar concerns and strategies focused around balancing personal, work-place, caring and other commitments whilst seeking to fulfil academic programme requirements, via strategies such as integration of workplace systems, facilities and projects within course-work, use of workplace commercial databases/systems to facilitate study and self-led management of schedules, timekeeping and coordination with peers/tutors for off-campus communications, tutor liaison and collaboration.

Literature related to this theoretical perspective can present discussion on varying forms of student engagement with Technology Enhanced Learning, ranging from engagement with VLE tools for assessment or collaboration to less positive forms of engagement, such as preference for face-to-face instruction (Bruff, Fisher, McEwen and Smith, 2013; Owston, York and Murtha, 2013; Langan et al., 2016); the literature often focuses on student engagement with VLE tools or features (e.g. Gardner et al. 2016; Bueno-Alastuey and López Pérez, 2014), however, there is typically little discussion on student behaviours for adapting, extending or innovating to virtualise or transform learning processes to enable remote, digital or online equivalents. The

literature often fails to address transitional models of engagement, to address behavioural patterns as a more complex continuum or process of varying forms of engagement.

Some evidence is raised in the literature suggesting a relationship between students' positive perception of learning technologies and successful engagement or outcomes via this learning context. In a study of student perceptions of blended learning at Navarre University, Bueno-Alastuey and López Pérez (2014), concluded that students with a positive perception of learning technologies were more successful than those with poorer perceptions of blended learning. This study was carried out across only 36 students in contrast to over 100 interviews and over 500 responses in the current study, however this outcome supports theoretical perspectives shown in the current study focused on a requirement for student differentiation between motivational engagement and more limited engagement in the blended learning context. Similarly, In Varthis's study of blended learning students' perceptions at Columbia University (2016), research findings indicated positive perceptions of blended learning programmes, citing greater flexibility for students with family and work commitments. The current study reflects these positive perceptions, suggesting motivational engagement with the blended learning via wider use of VLE tools to facilitate study, use of mobile devices for access to study when travelling or overseas and use of the VLE and informal tools such as Skype for peer collaboration beyond the institutional context. Whilst Varthis' study was limited in sample size (40 respondents) the research does demonstrate a more explicit relationship between engagement in the blended learning context and positive response/satisfaction, this form of response may however be dependent on the mixed-method approach used by Varthis in contrast to the inductive approach shown

in the current study, focused primarily on participant behaviours rather than an explicit measure of satisfaction.

The context of course work has also been cited as a motivational factor; in Saumure's (2010) study at Alberta University, the research concluded that professionally relevant coursework via blended learning proved to be motivational for students; this perspective supports some theoretical perspectives in the current study focused around self-led integration between study and workplace settings and student comments referring to workplace-based projects as the basis for academic work; Saumure's study raises an original research outcome in contrast to the current study, since the current study did not explicitly demonstrate the relationship between motivational behaviours and professional related course work.

The issue of balance for home, workplace and other commitments related to self-led, motivational behaviours – demonstrated via theoretical codes such as 'Multi-tasking commitments' is also supported in the literature; Morley's (2016) study of nursing students' experience of blended learning at Bournemouth University revealed students' concerns for overcoming challenges related to balancing study requirements with personal commitments, when "learning to be a professional" and dealing with the political and social context of the workplace. The current study reflects these demands via theoretical perspectives such as 'Self-Management of Study Regime and Programme', the present study however further reveals student behaviours as properties of these perspectives, including self-led group work planning and coordination, developing schedules for managing commitments and integration of work and study resources, systems and projects.

Similarly, Bruff, Fisher, McEwen and Smith's (2013) research on blended learning students' perceptions at Stanford University, research outcomes suggested the

preference for a blended learning content, but also reflected the need for greater flexibility to accommodate student lifestyle and learning patterns. The aspiration for flexibility in a blended learning context is similarly raised in the current study, suggested in the Early Theoretical Codes/perspectives ‘Virtualisation of Learning to accommodate Remote Study’ and ‘Engaging with and Negotiating Online Communications’, reflecting aspiration to ‘virtualise’ group working processes and tutor interaction via greater use of the VLE and use of informal email, social media or conferencing applications to ensure remote/off-campus communications. Bruff, Fisher, McEwen and Smith’s study however reflected a mixed-methods approach focused around use of re-usable MOOC content and related student satisfaction in this context, hence the current study may offer a broader context via the inductive, open methodology used, indicating wider strategies and behaviours for self-led adaption in the use of the VLE and informal tools.

The theoretical perspective ‘Self-Regulated Engagement’ and properties of self-led, motivational behaviours for extending, adapting and engaging in institutional systems or informal systems reflects the commentary of Moorman and Miner (1998, p.704) describing characteristics of improvisational behaviour in terms of a situated experiential context, reflecting the role of wider experience in achieving insight or change and Hutchins (1991, p.38) describing the role of “active” participants who themselves lead or engage with peers, resources or their environment to effect insight or change. Engagement in a range of formal and informal solutions to achieve learning or change is also reflected in Brown and Duguid’s discussion on the “discovering organization” (1991, p.51), a conceptual model of structured or planned change within organisations.

The literature often demonstrates a lack of focus for motivational, self-regulated engagement for learners in the blended learning context with emphasis on institutionally-led processes. The role of the student is often discussed or explored in a transmissive or received capacity; whilst the literature or studies can explore self-regulated behaviours, this is often in a context where the institution guides or directs student choices or preferences (Salmon, 2012; Arnold-Garza, 2014; Bouki and Economou, 2015). Whilst some studies can outline student interaction with student-led, experiential approaches for learning, non-institutional sources, most studies reflect an institutional model for engagement with planned or mentor/tutor-driven use of diverse technologies.

x. Discussion on 'Network Building/ Engaging' and 'Socialisation of Learning'

The group context for improvisational behaviour can be shown via the Developed Level Theoretical Codes 'Network Building/ Engaging' and 'Socialisation of Learning', these are constituent properties of the High Level theoretical perspective 'Motivational adaption and improvisation via Online Learning', reflecting a range of behaviours for development or extending of networks for support, including peer-support and for extending or enabling programme-derived group work and informal group discussion/collaboration.

The importance of collaboration, peer and tutor-interaction within blended learning via a range of institutional and informal systems, locations and Web based resources - demonstrated in the current study is supported in the literature. In Gardner et al.'s study at Curtin University (20167), the role of group work, peer communication and related tools such as blogs and wikis is indicated, with positive student responses to

the availability of these applications for study in a low-contact context. The current study reflects the importance of these kind of applications for collaboration and peer/tutor communications, reflected in theoretical perspectives such as ‘Engaging with and Negotiating Remote Group Working’; the current study however, in contrast to Garnder’s purposive sampling approach – enabled a range of open comments, allowing for discovery of student behaviours such as use of non-institutional communication tools and wider, self-led use of VLE features for group work. Behaviours related to peer-support reflected seeking help within and beyond the study/institutional context and seeking self-led solutions to IT problems; related theoretical perspectives include the Early Theoretical Code ‘Resolving and Supplementing ICT Problems’, and Theory Bits/ Insight such as ‘Developing peer, family, work networks to support ICT issues/use’ and ‘Exploiting institutional support networks’. These behaviours reflect attempts to build networks for support purposes, to obtain assistance when using learning technologies and to seek mutual support within groups/peers within the class/online classroom environment. Networking and group working behaviours included self-led use of social networks for shared group work and off-campus communications, including facilitating/leading and maintaining group discussions, use of online tools such as wikis and sharing documents via email, the VLE informal ‘groups’ feature and other online tools; related Theoretical Codes include Theory Bits/Insight such as ‘Facilitating networking/groups via informal social networks’, ‘Informal use of VLE discussions to network with peers’, ‘Sharing knowledge and group information via VLE tools’ and ‘Facilitating group document development via formal/informal online tools, wikis’. Many of these properties reflect self-regulated or self-led approaches for extending use of institutional tools such as VLE messaging or email and also extending

collaborative working with peer via non-institutional platforms such as social networks or non-institutional platforms, as shown in the Theory Bit/Insight related to use of chat tools such as Skype - ‘Using informal synchronous communication such as Skype for group work and socialisation’.

Peer liaison via the VLE and informal channels such as social media is raised in the literature, often citing the role of the ‘E-Moderator ‘ (Salmon, 2014) in supporting off-campus study via electronic communications tools. Following a study at Nebraska University, Feeler (2012) raised the requirement for developing instructor communications to support students experiencing anxiety or concerns when engaged in use of learning systems, suggesting provision of frequent online tutor support can support learning in this context. The role of the instructor is highlighted, suggesting the benefits of wider engagement via electronic communications in a remote context, this form of student-tutor communication reflects theoretical perspectives in the current study, such as ‘Engaging with and Negotiating Online Communications’ – reflecting student aspirations for wider tutor and peer engagement when off-campus. Similarly, in a study at Indiana Bloomington University, An (2006) identified the requirement for student-tutor interaction, suggesting this can be a barrier for learning via educational technologies, this hypothesis-based, structured study, focused around “Collaborative Problem-Based Learning” may have omitted wider student concerns from this research, in contrast to the inductive, objectivist approach shown in the current study, however, this research suggests this potential barrier to remote or low contact study in a blended context.

Behaviours also referenced synchronous communications for group study – in a remote and international context (e.g. during travel for work or personal reasons),

these behaviours reflect Theory Bits/Insight such as ‘Using informal synchronous communication such as Skype for group work and socialisation’ and ‘Mobile/ overseas study via VLE, email or synchronous tools’.

These behaviours and concerns reflect behaviours in a group context to extend the limitations of the VLE as a document supply or course delivery platform to engage in learning activities with peers beyond the class context and also when located remotely, including overseas.

Some theoretical perspectives indicated attempts to motivate, encourage or sustain collaboration, peer communication or tutor relationships, these behaviours are indicated in the Early Theoretical Code ‘Virtualisation and Engagement for Online Feedback and Assessment’ – indicating use of both tutor-led and self-led approaches such as the VLE messenger to obtain assessment feedback and Theory Bits/Insight such as ‘Overcoming low engagement of peers in use of communication tools’ - indicating behaviours to motivate or encourage peers in the use of online tools for group working.

The role of improvisation is often described in context to the team or group, with interaction, dialogue or other exchange between group members playing a role in the arising of new insight or change (Vendelø, 2009, p.451; Brown and Duguid, 1991, p.50; Hutchins, 1991, p.38). The literature also raises the role of the wider community, local networks, facilities and family in informing and providing scope, resources or knowledge to inform learning, stressing the importance of informal and wider experiential influences. This wider learning context is often discussed in context to situated learning (Hobbs, 2013, p.182; Krummheuer, 2011, p.333; Pinnington, 2005, p.627; Dewey, 1938, p.13).

Whilst the use of synchronous and asynchronous tools is established in the literature

and across recent studies – indicating the role of these applications in facilitating blended and remote models of learning (Hyder et al., 2007; Wilson, 2004) and for communication across time-zones in an international context (Kochtanek and Hein (2000), the present study was able to demonstrate independent and individually-motivated engagement in the use of synchronous and asynchronous tools to facilitate learning, with students often engaged in self-led identification, maintenance, and coordination of social media, messaging and other tools via the institutional VLE and external or informal platforms.

Motivational student-led behaviours relating to peer or tutor engagement in the literature often reflect a predominantly institutionally-led approach or perspective for interaction or engagement with peers or tutors (e.g. Hew, 2015; Hew and Kadir, 2016; Salmon, 2012). Discussion on self-led or self-regulated students collaborative practice is often not explored widely or in great detail, including collaborative behaviours via personally sourced or preferred Web platforms and applications. Student-led assimilation or integration for diverse systems or applications for collaboration is often not explored, including integration of personal learning technologies or Web based services such as cloud based applications and social networks.

xi. Discussion on ‘Adaptive Virtualisation of Learning’ and ‘On-Demand Exploitation/ Improvisation’

The theoretical perspective ‘Adaptive Virtualisation of Learning’ indicates participants’ adaptation of known platforms for literature searching, such as combining existing knowledge and literature searching techniques with adaptive use

of the Google/Scholar platforms; this theoretical perspective is one of the constituent properties of the High Level theoretical perspective ‘Motivational adaption and improvisation via Online Learning’.

Adaptive behaviours, reflecting wider (adaptive) use of institutional platforms, including informal use of VLE tools such as self-led group discussions, whiteboard/virtual classroom, messaging and file sharing are reflected in theoretical Codes such as ‘Virtualisation and Engagement for Online Feedback and Assessment’, with dependant Theory Bits/Insight such as ‘Networking via available communication tools to enhance peer/tutor interaction’ and ‘Assessment/feedback and reflection via VLE, email’ and ‘Synchronous debate and collaboration between tutor/students e.g. via virtual classroom tool’.

Aspiration for extending, adapting or modifying institutional or informal Web based tools to ensure or develop learning experiences is reflected in the literature. Lee and Branch’s study (2017) used a constructivist approach to determine student perceptions of the ‘student centred learning environment’. this study indicated the importance of ‘E-Moderating’, a perspective for tutor guidance of independent, collaborative and constructivist learning outlined by Gilly Salmon (2014). Whilst this research outcome was possibly strongly influenced by the closely related constructivist methodology used and constructivist theoretical position of the researchers, this outcome broadly reflects an aspiration of students for student-tutor interaction and dialogue arising from the current study, reflected in theoretical perspectives such as ‘Virtualisation and Engagement for Online Feedback and Assessment’, the specific form of tutor-student interaction outlined (E-Moderating), is also reflected in the current study in context to self-led behaviours within the wider blended learning experience, as shown in theoretical perspectives such as ‘Self-

Management of Study Regime and Programme' and 'Managing and Negotiating Work-Study Relationship'.

The theoretical perspective 'Adaptive Virtualisation of Learning' also reflects originality in the use of novel systems or platforms, rather than modification of existing practice - an improvisational trait discussed by Moorman and Miner (1998, p.703). The informal, extending or adaptive use of the VLE and institutional/ Managed Learning Environment, where institutional platforms are used in an extended or enhanced format also reflects constructivist perspectives on improvisation in the use of digital platforms in a group setting outlined by Pinnington (2005) and Berk and Trieber (2009), these behaviours were found in the Developed Theoretical Code 'Socialisation of Learning', with related Theory Bits/Insight such as 'Integrating learning into social space via networks, email' and 'Informal use of VLE discussions to network with peers'.

'On-Demand Exploitation/ Improvisation' is a Developed Level Theoretical Code related to behaviours for information sources, other digital learning materials or physical resources or services in a just-in-time context (Littlejohn and Pegler, 2013; Langley (2007), with implications for remote study where physical resources may be inaccessible. Perspectives on improvisation related to adaptive practices and spontaneity (Bastien and Hostager, 1992, p.92) and improvisation via deviation from existing practices or knowledge (Moorman and Miner, 1998, p.706) reflect behaviours demonstrated in the current study to adapt, extend and assimilate institutional Library platforms, VLE based materials and informal or Web based sources, sometimes due to difficulties sourcing required textbooks or journal articles, or when experiencing difficulties obtaining texts remotely or when less confident using institutional platforms. Related Theoretical Codes include 'Augmenting

database limitations via Google' and 'Resolving full text e-resource problems via Google/Scholar'. Similar strategies for integration of novel or improvisational approaches alongside existing or prior skills include behaviours reflected in the Early Theoretical Code 'Resolving and Supplementing Information Literacy for Effective Research', characterised by Theory Bits/Insight such as 'Assimilating prior online resource behaviours with current facilities' and 'Skilling with challenging databases to enhance research'.

Miner, Bassof and Moorman discuss characteristics of improvisational practice in terms of overcoming immediate problems or challenges in an operational or organisational setting (Miner, Bassof and Moorman, 2001, p.304). Theoretical perspectives revealed in the practical study reflect these kind of improvisational behaviours, including the Early Theoretical Code 'Resolving and Supplementing ICT Problems' and the dependant Theory Bit/Insight 'Resolving IT support limitations', reflecting the need for expanding ICT support, networks, workarounds and solutions beyond the institutional context. This kind of improvisational behaviour is also reflected in the Theory Bit/Insight 'Augmenting library/database usability via Google', reflecting the need to obtain required reading material via alternative sources in a just-in-time context for current assignments. Similarly, the Early Theoretical Code 'Engaging with and Negotiating Digital Platforms' and dependant Theory Bits/Insight such as 'Self-navigating/resolving diverse sources/databases unavailable directly in VLE' and 'Overcoming challenges accessing range of database/platforms/WWW sources', reflect the need to overcome immediate problems when accessing reading materials and course materials when these were unavailable for various reasons, such as broken links or system issues.

Perspectives on the role of individual insight and adaptation within a structured or planned educational setting are outlined by Parsonage, Fadnes and Taylor (2007, p.4), this kind of individual insight and adaptation can be demonstrated across a number of behaviours such as development of skills for enhanced use of electronic Library resources and non-institutional Web resources, developing support channels such as acquiring knowledge of IT services and exploring new features in the VLE for individual study or peer communication – such as independent configuration and use of group discussion tools. Related Theoretical Codes include 'Supplementing and Innovating Literature Searching Approaches'/ 'Exploiting Facilities and Services ' and dependant Theory Bits/Insight such as 'Use of a range of library/online providers for sourcing materials' and 'Maximising/ optimising online tools/VLE in mixed physical/online-dependent context'.

The self-led or self-regulated role of students for adaptive learning, for customisation of systems and refinement of distributed learning solutions, across diverse systems, platforms and applications is poorly represented within the literature. Whilst self-regulated models of learning often emphasise individual approaches or styles for study (Marton and Säljö, 1976; Fransson, 1977; Prosser and Trigwell, 1999), or strategic teaching approaches for these preferences (Pashler, McDaniel, Rohrer and Bjork, 2008; Atherton, 2013; Garrison and Cleveland-Innes, 2005), these discussions are rarely presented in the context of corresponding improvisational behaviours in the Higher Education context, and especially for the blended learning and Technology Enhanced Learning context. The processes of extending, adapting, innovating, exploiting, as outlined in the current study, all comprise elements of improvisational behaviour. Whilst some elements of the literature can refer to student

aspirations to widen the format or interactive scope of blended learning, these discussions typically do not explore student behaviours to address these aspirations.

xii. Discussion on ‘Navigating diverse platforms, equipment, locations’

This High Level Theoretical Code indicated a range of behaviours for engaging with digital platforms, in-person or physical resources and facilities or stakeholders such as IT support services across institutional, local and workplace settings, including formal institutional platforms such as the VLE and informal platforms such as social media and messaging.

The practical research demonstrates a range of theoretical insight related to the wider experiential learning beyond the formal class or blended learning setting. Theoretical Codes arising from the study indicate behaviours related to selection of media or software for facilitating group activities and self-led solutions for resolving literature searching problems. These theoretical perspectives suggest a series of self-regulated strategies, behaviours or context surrounding improvisation which lends further original insight into improvisational processes.

Behaviours also reflect engagement in the use of facilities, networks and systems within students’ place of work, reflecting integration of formal study with wider vocational and lifelong learning needs, these behaviours are reflected in the Theory Bit/Insights, ‘Integrating work and study context to develop lifelong learning’ and ‘Managing and Negotiating Work-Study Relationships’.

The self-led use of social media rather than VLE discussion or chat tools could be described as disparity between student aspiration for hybridisation of learning and the reality offered by the VLE model, reflecting an insular, proprietary and corporate

product lacking the kind of integration or ubiquity offered by social media and Web 2.0 applications.

The importance of the situated context, reflecting behaviours across diverse locations, systems and contexts is reflected in the literature. Gardner et al. (2016) undertook structured surveys of blended learners at Curtin University, identifying students' aspiration for increased flexibility for learning across diverse locations, and perceptions that development of skills for the use of educational technologies would benefit work-based skills; whilst Gardner's structured sampling methods may have resulted in a less inductive, more focused outcome than the present study, these outcomes support the current study findings in relation to theoretical perspectives on motivational engagement with peers, tutors and wider external resources for adaptive or extending use of diverse systems, platforms or facilities, as shown in the Early Theoretical code, 'Resolving and Supplementing Information Literacy for Effective Research'.

Similarly, Owston, York and Murtha's study at University of York (2013), the research raised student's perceptions of busy lifestyles and the need for flexibility to accommodate work and home life commitments. These outcomes reflect theoretical perspectives in the current study focused around multi-tasking and integrating study and work commitments, expressed via adaptive or extending behaviours such as integration of work-related activities within academic projects or integration of work systems/ resources for academic purposes. Gardner's purposive methodology may have obscured wider behaviours related to integrating, adapting or extending these facilities as shown in the current study, Owston, York and Murtha's study however reflected a much wider sample size (1147 students), supporting this area of findings in the current study.

Lee and Branch (2017) carried out a Grounded Theory based study in a blended learning context at Mississippi State University on students' beliefs concerning 'student-centred learning environments', the study found that students preferred prior learning to be considered for planning the learning environment, suggesting the need to differentiate between students having differing skills levels when engaged in learning technologies. Lee and Branch (2017) further concluded that systems must be informed by student behaviours and requirements. This mixed methods approach focused however around the theory of he SCLE (Student Centred Learning Environment) when framing the research, resulting in a less objectivist approach than the current study, this research does however indicate the requirement for differentiation for student skills and engagement via blended learning.

Perspectives on situated learning in a group context - characterised by engagement of participants across a range of diverse locations and systems is also suggested by Xambó (2013, p.36:3); this situated context reflects a range of Theory Bits/Insight reflecting situated learning, including 'Using removable media to facilitate mobile computing across locations', reflecting use of removable drives, memory cards and similar media to work across diverse locations, and ' Ubiquitous learning via range of devices & locations to accommodate lifestyle', reflecting a broader series of behaviours characterised by access to technology based learning via diverse computer equipment, mobile devices or physical locations such as the workplace, home or during use of transport.

Improvisational, adaptive and other self-led behaviours in context to diverse platforms, networks or physical resources are evident in behaviours related to use of Information Technologies, Library resources and wider information sources, often

supplementing institutional provision via local, family, workplace or community facilities, these behaviours are suggested in the Early Theoretical Code ‘Resolving and Supplementing Information Literacy for Effective Research’, the Theory Bit/ Insight as ‘Assimilating prior online resource behaviours with current facilities’ and in the related Early Theoretical Code ‘Developing Confidence in Technologies and Low Contact Study’ and dependent Theory Bit/Insight ‘Overcoming confidence issues for group work via online tools’.

Behaviours reflecting specialist roles or cooperation between individuals in the situated, group context and in the planned educational context - reflecting Xambó (2013), Wright and Kanellopoulos (2010) and Fadnes and Taylor (2007) are suggested in behaviours arising from the practical study such as leadership of group organisation, use of wikis to manage off-campus peer collaboration and novel/adaptive use of VLE tools such as messaging or drop box (basic file sharing facility), these behaviours are reflected in Theory Bits/Insight such as ‘Facilitating networking/groups via informal social networks’ and ‘Facilitating group document development via formal/informal online tools, wikis’.

Previous parts of the thesis have outlined the role of the Virtual Learning Environment to provide a usable interface or gateway for the student to course materials, communication tools and other learning resources (Heaton-Shrestha et al., 2005). The theoretical perspective ‘Navigating diverse platforms, equipment, locations’ and related properties suggests disparities between student aspiration or behaviours - reflecting engagement in the use of peer-communications or informal digital channels beyond the institutional context - in contrast to the relatively static and insular VLE model. This contrast reflects Hobbs’ (2013) research on students’ engagement outside the institutional environment, Dewey’s (1938) theory of situated

learning, emphasising the role of independent learning and further theoretical perspectives on experiential learning beyond the institutional context (Keskin and Metcalf, 2011; Jonassen and Land, 2000).

Whilst discussion on experiential learning is prevalent in the literature (e.g. Dabbagh and Kitsntas, 2011; Fiaidhi, 2011) the issue of wider experiential behaviours in an improvisational context is typically absent, including student-led integration of externally sourced platforms, social networks, personal email, workplace facilities or external networks for support.

Disparities between institution-led, blended learning environment and student behaviours for adapting, extending or supplementing this environment is reflected in the Early Theoretical Code 'Supplementing and Innovating Literature Searching Approaches', reflecting behaviours for some users such as reliance on the VLE as an intermediary to access digital library resources and links to Web content. In contrast to the concept of the "discovering organization" (Brown and Duguid, 1991, p.51) – describing an institutional focused response to environmental change and client demand, we can see aspects of the practical research reflecting Brown and Duguid's concept of "the enacting organization" (1991, p.51), reflecting an organisation prepared to encourage or support individual improvisation and to develop new models of working. Theoretical Codes reflecting this model are suggested in the Early Theoretical Code 'Virtualisation and Engagement for Online Feedback and Assessment', reflecting provision of online feedback for student/tutor interaction and provision of online communication tools within the VLE for self-regulated group projects, these behaviours reflect engagement by tutors with students seeking to expand or develop their communications in an online context.

The literature also reflects disparity between the institutionally led context and scope or freedom for individuals to engage in independent, collaborative and experimental learning to achieve new insight or change (Pinnington, 2005, p.618; Parsonage, Fadnes and Taylor, 2007, p.4), recommending that organisations encourage an environmental or situated context allowing improvisational behaviours. Brown and Duguid (1991, p.47) suggests the need for innovative forms of education to ensure active and participatory, rather than purely transmissive forms of learning. Brown and Duguid further outline the concept of "periphery of practice, suggesting an approach for educators to encourage student-led learning, via active and collaborative behaviours as a means of encouraging innovation and improvisation (Brown and Duguid, 1991, p.50).

The self-regulated, motivational engagement exhibited by students appears related to concepts such as E-Moderating – a theoretical approach for tutor-student interaction or mentorship as presented by Salmon (Salmon, 2014), with students maintaining contact with the tutor via a continuum of formal, informal, class-based and external contexts, this behaviour whilst clearly institutional in context also demonstrates a considerable self-regulated or self-led context, characterised by personal development of skills, overcoming confidence issues in the use of technologies for tutor communication and at times, adopting strategies to expand or develop interactions with the tutor via digital tools and platforms. Related Theory Bits/Insight include ‘Networking via available communication tools to enhance peer/tutor interaction’, ‘Engaging/skilling with VLE communications tools for tutor liaison’ and ‘Active e-moderating participation with tutor via discussion boards, feedback and other tools’ and ‘Synchronous debate and collaboration between tutor/students e.g. via virtual classroom tool’.

The current study demonstrated significant emphasis by students on processes of navigating diverse systems, Web platforms, computer applications, scholarly resources, equipment or locations. The range and complexity of systems and environments faced by students in contemporary Higher Education is highly diverse and can present complex or challenging interfaces, skills requirements or prerequisite knowledge (e.g. for some complex scholarly databases). Whilst some discussion on information literacy strategies or challenges is evident (e.g. Erfanmanesh, Abriza and Karim, 2014; Arnold-Garza, 2014; Head, 2013), the literature typically fails to address this context in significant detail or in relation to improvisational student strategies in response to these diverse systems or environments.

The role of self-led distributed approaches for learning, encompassing diverse systems, platforms, media is often only tentatively explored in the literature, whilst studies have explored the institutional-led integration of diverse media (Heinze and Proctor, 2004; Bonk and Graham, 2006; Logan, Allan, Kurien, and Flint, 2004), these often fail to explore how students select, acquire, manage, or navigate diverse systems, applications, Web platforms, mobile devices across a range of physical locations. Similarly, the role of flexibility or self-led engagement across diverse locations in a situated context for study (Dabbagh and Kitsantas, 2012; Dabbagh and Kitsntas, 2011; Bueno-Alastuey and López Pérez , 2014) often fails to fully explore how students navigate or facilitate study or collaboration whilst travelling, whilst overseas or at work.

In contrast to established perspectives on primarily institutionally-led models of E-Moderating, including constructivist approaches characterised by student interaction and peer collaboration (Heinze and Procter, 2004), it can be seen that the study

demonstrated considerable self-management for enhancing, adapting and extending tools, facilities, networks and stakeholders.

xiii. Discussion on 'Resolving and Negotiating WWW usage issues'

The Developed Theoretical Code 'Resolving and Negotiating WWW usage issues' is an Early Theoretical Code within the Developed and High Theoretical Code 'Navigating diverse platforms, equipment, locations', this theoretical outcome refers to a range of concerns, strategies and behaviours for use of Web based sources, including issues related to dealing with large volumes of Web sources, preferences and strategies for accessing Search Engines such as Google in contrast to some institutional Library platforms and behaviours related to appraisal and skills development for using Web based sources.

Web based learning is broadly reflected in the High Level Theoretical Code, 'Navigating diverse platforms, equipment, locations', demonstrating diverse behaviours and strategies of participants to navigate between Web based sources such as the VLE, external WWW sources and scholarly resources and databases, this behaviour included self-skilling to improve effectiveness in the use of these resources and to overcome difficulties accessing or effectively using institutional platforms such as the Library Catalogue or developing skills and developing self-confidence in accessing required readings located outside the VLE platform. Further behaviours included developing skills in evaluating WWW content and potential scholarly sources and use of Web 2.0 tools for managing diverse WWW and scholarly sources effectively, such as Web favourites/bookmarking or link sharing platforms. These behaviours indicate patterns of behaviour and conceptual

perspectives regarding participants' resolving concerns and challenges in the use of Web based systems, in the self-management and organisation of Web based resources and use of strategies to navigate and access diverse sources, such as us of effective annotation for Web sources or effective file movement for downloaded media.

Theoretical perspectives relating to Web based tools and platforms provided by third party providers are also reflected in the Early Theoretical Code 'Resolving and Negotiating WWW usage issues', including Theory Bits/Insight related to use of Web based tools such as social bookmarking, social networks and Web based portals for scholarly information such as Google Scholar (e.g. 'WWW bookmarking to resolve e-resources') and the Theory Bit/Insight entitled 'Resolving full text e-resource problems via Google/Scholar ', related to the Early Theoretical Code 'Supplementing and Innovating Literature Searching Approaches'.

The literature also refers to the role of distraction and anxieties related to Web based resources and multimedia use in the recent blended learning context. Osgerby's study of student perceptions of blended learning at University of Winchester (2013), the research identified student concerns for potential distraction issues, related to use of social media and mobile devices, also anxieties related to use of multimedia and 'flipped' style teaching methods. These outcomes reflect distractions related to the workplace and family life shown in the current study, reflected in theoretical perspectives (Theory Bits derived from memoing) such as 'Prioritising tasks, aims and objectives', 'Integrating work and study context to develop lifelong learning' and 'Managing demands for study participation'. Osgerby's study however, perhaps reflects more recent trends for mobile devices, apps and related potential sources of

distraction which were less prevalent during the practical research phase of the current project in the late 2000s.

Critical appraisal or evaluation of Web based resources for improvisational learning is raised by Berk and Trieber (2009, p.33). This kind of behaviour, reflecting the need to appraise or evaluate diverse systems, networks, locations, resources in the situated and experiential context is reflected in the Early Theoretical Code 'Resolving and Supplementing Information Literacy for Effective Research', with properties including skilling to avoid plagiarism and grade detriment, development of skills for use of Library databases, sourcing specialist e-resources and maintaining up to date readings via diverse search strategies. Theoretical Codes arising from the study suggesting evaluation or critical appraisal are reflected in the Early Theoretical Code 'Acquiring and Supplementing Study Skills' and dependant Theory Bits/Insight such as 'Skilling in information literacy, e-resource/WWW credentialising for study '. These kind of behaviours are also reflected in the Early Theoretical Code 'Resolving and Negotiating WWW usage issues' and dependant Theory Bits/Insight such as 'WWW evaluation strategies for authoritative use of sources', 'Overcoming WWW authority issues via Library links/platforms', and 'Selection and refinement of learning resources to avoid information overload via adoption of key resources such as the VLE'. These perspectives reflect Berk and Trieber's discussion on the role of appraisal or evaluation in the broad, situated context for distributed and blended learning, however, these Theoretical Codes arising from the practical research also reflect the need to synthesise, integrate and meaningfully facilitate these resources, systems, networks in a format which lends to enhanced study practices and fulfils the requirements for academic engagement. These behaviours also reflect a high level of self-regulated or motivational behaviour via reflective, evaluative or apprising

behaviours, such as self-skilling to improve information literacy and WWW usage or using Web based tools/information to maintain up-to-date awareness for scholarly sources. These behaviours also reflect disparity between institutionally led platforms and students imperative to expand or enhance the study experience, seen in behaviours such as supplementing scholarly sources in the VLE or engagement in self-led training to improve skills using databases.

The literature does address strategies of students in blended and related learning contexts for information literacy, retrieval, search strategies and related skills for managing scholarly resources (e.g. Erfanmanesh, Abriza and Karim, 2014; Arnold-Garza, 2014; Head, 2013). However, the literature typically does not explore improvisational behaviours for resolving these concerns in significant detail.

xiv. Further Observations on the Literature in Relation to Findings

The discussion in relation to the literature reveals that whilst many technical, institutional and theoretical models extant in the literature are reflected in the current study, the theory of ‘Improvised Learning’ does reveal a significant original contribution to knowledge in revealing the role of adaptive, extending, supplementing and related behaviours in a self-regulated context, situated across a range of institutional, informal and physical contexts, systems and locations.

The above discussion presents gaps and omissions in the extant literature within each facet or property of ‘Improvised Learning’, however we can also observe wider gaps and omissions across the literature in the broad area of E-Learning and related areas, such as improvisational theory.

Improvisational behaviours within Higher Education (and closely related sectors) are very rarely explored in the literature. There is a clear lack of peer reviewed scholarly papers, PhD theses or other texts which explore improvisational behaviours in the blended learning or related Technology Enhanced Learning context, suggesting that improvisation within Higher Education in particular is still largely an unexplored or poorly researched area. Similarly, whilst on-demand or just-in-time learning is prevalent in the literature (e.g. Madhavand Joseph, 2017; Zurita, Baloian and Frez, 2014; Nguyen, Barton and Nguyen, 2014;), there is almost no discussion within the literature on the role of improvisational behaviours in Higher Education in the on-demand context, again, suggesting this represents a largely unexplored area of research. The coverage of learning styles in relation to improvisational behaviours for Higher Education is also clearly an unexplored area of research.

Similarly, inductive, interpretative approaches are often absent in the literature, where studies do refer to the use of Grounded Theory these are often hybrid studies incorporating mixed methods such as pre-defined surveys and often suggest highly selective use of coding or related approaches (e.g. Langan et al., 2016; Bruff, Fisher, McEwen and Smith, 2013; Lee and Branch, 2017). There appears to be a significant gap in purely inductive based (i.e. the Glaser model) of Grounded Theory focused on the blended learning and related models for Technology Enhanced Learning.

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The literature does explore processes concerning individual practitioner and group-based improvisational behaviours, specifically in relation to organisational planning and change (Pinnington, 2005; Moorman and Miner, 1998; Eisenhardt and Tabrizi, 1995), however the literature typically does not address this context in Higher Education or for blended learning or related models for Technology Enhanced Learning nor is this issue raised significantly in the recent literature, suggesting a significant gap in the literature to address the role of improvisational behaviours for individual or group related student behaviours, for improvisational-derived insight or knowledge and for the dissemination or sharing or this knowledge within communities of practice.

A range of doctoral level theses were surveyed within the literature review, focused on perceptions of participant grounds related to the substantive area of study (low contact, blended learning related student experiences in the Higher Education or closely related sectors). Almost without exception, the theses surveyed used a mixed methods approach, typically framing a pre-defined theoretical perspective for the participant group, most theses also tended to employ a constructivist, post-modernist or other form of experiential theoretical perspective to assess student perceptions. These approaches typically presented a model or perspective in the form of a hypothesis or pre-defined theoretical model (Saumure, 2010; Morley, 2016; Feeler, 2012; Chametzky, 2013). The theses surveyed also used semi-structured or structured data collection approaches such as surveys, approaching usually small numbers of students, often no more than 20 in total.

The theses surveyed therefore did not present similar Grounded Theory based studies, where the methodology, for inductive generation of original theory was prevalent. None of the blended learning related theses surveyed cited the Glaser derived approach for approaching data, but cited the Strauss or related approaches, reflecting an abductive, pre-defined approach for theory generation.

In summary, it is felt that the present study offers an original research project, with greater scope (over 100 discussion sessions with over 500 comments), furthermore, the use of an holistic, Glaser derived approach for generation of theory, via iterative, inductive coding and analysis, suggests a Grounded Theory which is original and grounded in participant responses, rather than derived from pre-defined hypothetical perspectives.

Part 3: Findings in Context to Recent Trends

i. 'Improvised Learning' in Context to Collaborative Learning Technologies

Recent commentators have noted increasing prevalence or popularity for democratic sharing and collaboration applications such as Wikis, Blogs, Microblogging (such as Twitter), social bookmarking and related applications, including self-reflective blogging and e-Portfolios (Lane, 2014; Dabbagh and Kitsntas, 2011).

These behaviours are evident in the High Level Theoretical Code, 'Motivational adaption and improvisation via Online Learning' and the Developed Theoretical Code, 'Socialisation of Learning'. These perspectives reflect a range of improvisational behaviours focused around tools such as social media use within study activities and group collaboration, use of Wikis within the Virtual Learning Environment for collaborative document development and use of additional tools and features within the VLE such as discussions, group file sharing, and collaborative document development via Blackboard VLE file sharing tools.

Recent studies examining the role of polling, quizzes and related 'apps' for use in a blended learning and conventional lecture delivery context have highlighted a range of benefits for learners such as increased levels of collaboration and student-tutor interaction, however, studies have also described issues such as potential for distraction and technical problems which can arise (Shon and Smith, 2011; Stowell, 2015).

ii. ‘Improvised Learning’ as a Perspective for Mobile/ Personal Learning Technologies

The role of applications for mobile learning and related technologies have previously been discussed in context to recent studies and theoretical perspectives such as "personal learning technologies" (Lagan et al., 2016), suggesting potential benefits for integration of mobile devices within formal teaching practices and in context to wider institutional learning systems (Diemer, et al., 2012; Viberg and Grönlund, 2015). Aspects of mobile device use are evident across theoretical perspectives in the current study, including the Developed Theoretical Code, 'Adaptive Virtualisation of Learning' and the Early Theoretical Code, 'Virtualisation of Learning to accommodate Remote Study'. These theoretical perspectives suggest an additional perspective of virtualisation and improvisation for the use of mobile technologies, to enhance existing blended learning practices and allow for flexible learning across a range of situated contexts. Whilst mobile devices was less in evidence, greater reliance was noted for laptop devices and VLE based applications, in this sense, the study suggests the need for appraisal and further research into student perceptions of mobile computing in a situated, flexible learning context.

iii. ‘Improvised Learning’ as a Perspective for Cloud Based Technologies

'Cloud Computing' has been discussed above and in earlier sections of the thesis, outlining Internet-based technologies which can be used on-demand and in a remote context to access services, systems, media, documents or application-specific data (Dabbagh and Kitsantas, 2012; Chang et al., 2016). Cloud based technologies

evident in the current practical study reflected the Theory Bits/Insight such as 'Mobile/ overseas study via VLE, email, synchronous tools', 'Use of VLE as a mobile/cloud solution for accessing content across diverse locations' and 'Extending VLE via informal resource sharing and communication via social media, cloud computing for group work'. These theoretical perspectives and related Theoretical Codes arising from the study reflect significant use of cloud type tools and features such as file sharing, often within the VLE, but also use of social network sites such as Facebook, MySpace and others for engagement in discussions to facilitate collaborative projects.

iv. 'Improvised Learning' as a Perspective for Video/Lecture Capture/Flipped Classroom

The uses of digital video via original teaching methods such as the flipped classroom - directing students to view video and related multimedia when away from the class context has been discussed previously during the thesis, raising benefits of these approaches for flexible, situated and on-demand learning models and for student-tutor interaction in context to discussion and reflection (Arnold-Garza, 2014; Roach, 2014; Williams, Aguilar-Roca and O'Dowd, 2016). Theoretical perspectives arising from the study have closely reflected these recent models for use of video in a context of student-tutor interaction; related theoretical perspectives arising in the practical research included the Theory Bits/Insight such as 'Asynchronous tool use for time/schedule study effectiveness' and 'Accessing support, training materials, video just in time to need/activity'. These theoretical perspectives complement recent literature in identifying the role and applications for video and remote access to

technologies to support on-demand learning, but also suggest additional insight in presenting these behaviours in a highly self-regulated context, characterised by adaptation, extending and related behaviours.

v. ‘Improvised Learning’ as a Perspective for Information Literacy

A range of perspectives and studies have been considered focused around information literacy, these studies cite student "anxieties" (Erfanmanesh, Abriza and Karim, 2014) and wider challenges for students' skills development in this area, such as use of scholarly databases, dealing with high volumes of information, evaluation of Internet based content and related challenges (Arnold-Garza, 2014; Head, 2013). Theoretical perspectives related to information seeking behaviours and anxiety or difficulties accessing information can be seen via the practical research, including the Early Theoretical Code, 'Physicalisation of Virtual Learning' and dependent Theory Bits/Insight such as 'Reliance on VLE for prioritised/optimised study routine' and 'VLE/online tools avoidance via reliance on core handbook or selected print materials'.

Theoretical perspectives arising from the practical research reflected strategies to manage information sources across diverse locations, to ensure effective management of large volumes of information or scholarly material or to manage or refine search strategies and evaluation of search results, within scholarly databases and Web based content. These theoretical perspectives reflect motivational and self-regulated behaviours to supplement or extend information sources/scholarly sources. These behaviours also offer additional insight alongside the current literature in presenting the High Level and Developed Theoretical Code, 'Navigating

diverse platforms, equipment, locations', offering an holistic, grounded and transcendent theory for information traversing and navigation and for improvisational behaviours inherent in this theoretical perspective.

vi. 'Improvised Learning' as a Perspective for Game-like/ Gamification Learning

Whilst the practical research did not reveal direct use of game-like or "gamification" tools (Qian and Clark, 2016) or similar features via study approaches, there were examples of learning activities in the blended study context related to use of interactive tools and features reminiscent of electronic gaming. The 'Virtual Classroom' allowed for tutors or students to engage in synchronous communication via a range of tools and features within the classroom, offering collaboration, media sharing and other interactive tools such as an 'Interactive Whiteboard' (allowing the tutor or participants to draw or create diagrams directly on-screen for viewing by participants in real time). Further game-like behaviours evident in the practical research included engagement by students in multiple choice and related quiz/assessment or survey style activities, including interactive options to supply equations on-screen, complete/supply missing text or perform exercises to match textual options. Behaviours evident in the practical research also indicated self-regulated or motivational engagement by students with tutors for attempting quiz activities, for accessing results in an online 'gradebook' and for engaging with tutors via synchronous and asynchronous communication tools such as messaging for assessment feedback.

vii. ‘Improvised Learning’ as a Perspective for Peer Facilitated Learning

The role of peer mentoring, raised in recent literature for use of students to support peers via discussion boards/VLE tools (Hew, 2015) was not directly raised in the practical research, however there was indication of self-led behaviours characterised by student engagement with peers to encourage or facilitate networking or collaborative activities via a range of VLE-based and external applications and Web based platforms such as social networks. Related Theoretical Codes included Theory Bits/Insight such as 'Informal use of VLE discussions to network with peers' and 'Applying informal networks and socialisation with peers/tutors to embed learning in these contexts', Whilst the generation of insight or knowledge arising from improvisational activity can be transitory or difficult to retain for organisations, Miner, Bassof and Moorman (2001, p.304) and Hutchins (1991, p.38) have suggested that sharing of new insight can disseminate within participant groups or communities, having a cultural impact on wider organisational experience. These perspectives indicate shared activity across many participants, engaging in innovative solutions or systems to enhance the learning experience. Behaviours such as use of social networks or cloud based solutions indicate wider adoption across the student community, indicating sharing of improvisational strategies and wider impact on the student community.

Wider impact on organisations and the students’ own professional experience, beyond the class or study context is shown in a range of behaviours to improve skills and knowledge for use of technologies, scholarly sources or software, additionally, the Early Theoretical Code ‘Managing and Negotiating Work-Study Relationships’ includes Theory Bits/Insight related to the students’ own workplace and development

of vocational or professional skills such as ‘Integrating work and study context to develop lifelong learning’.

viii. Significance of ‘Improvised Learning’ for the Globalisation Context

The significance of globalisation and the expansion of commercial forces in the development of technology enhanced learning is reflected in the prevalence of the VLE commercial platform (Blackboard) widely discussed in the practical research phase as the principal model or approach for the institutionally led Managed Learning Environment. The prevalence of the VLE as a platform for virtualised educational participation is reflected in the Developed Theoretical Code ‘On-Demand Exploitation/ Improvisation’ and in Theory Bits/Insight such as ‘Reliance on VLE as intermediary for e-resources’, ‘Exploitation of VLE as supplement to class attendance issues’ and ‘Maximising/ optimising online tools/VLE in mixed physical/online-dependent context’. Whilst the study did not identify any externally sourced use of commercially provided teaching or support, the practical research phase of the study did reveal significant dependence on the commercial VLE model for delivery of E-Learning, accompanied by a range of concerns, behaviours and strategies to integrate this platform into individual learning. Another significant theoretical perspective on VLE use included behaviours, concerns and strategies to navigate diverse systems, resources and communication tools within the VLE platform and via links from the VLE to non-VLE based content or systems. The High/Developed Level Theoretical Code ‘Navigating diverse platforms, equipment, locations’ refers to a number of related theoretical perspectives.

ix. ‘Improvised Learning’ for Insight into Critical Perspectives

The High/ Developed Theoretical Code ‘Transitional Physicalisation of Online Learning’ reflected a number of behaviours and strategies to reduce or avoid extended use of ICT facilities and technology assisted educational practices, these reflected a sense of preference for in-person and class-based activities, preference for hardcopy materials and preference for reliance on transmitted study materials rather than use of wider materials available via the Library or externally. Concerns expressed regarding Web usability and difficulties navigating diverse resources, including issues for Single Sign On, having too many logins and difficulties navigating between institutional and external Web resources/platforms are suggested in the Early Theoretical Code ‘Developing Confidence in Technologies and Low Contact Study’, also Theory Bits/Insight such as ‘Resolving IT support limitations’ and the Early Theoretical Code ‘Resolving and Networking for Acquisition of ICT Support’. These theoretical perspectives offer additional insight into critical commentary on technology facilitated learning from the perspective of students and also offer insight into strategies and processes engaged, often in a highly self-regulated manner, to overcome confidence issues, technical challenges, compatibility and interoperability issues.

x. ‘Improvised Learning’ as a Perspective for the Role of Tutors and Mentors

The theory of ‘Improvised Learning’ and its dependant variables present additional questions for ICT based mentorship models such as “E-Moderating” (Salmon, 2004, p.5). In this context ‘Improvised Learning’ could be said to present new demands on

mentors or E-Moderators - especially in terms of disparities between institutional management of ICT based learning and self-led behaviours.

The emerging substantive codes also sometimes illustrated disparities between instructor or student peer engagement with the VLE; it would appear possible that some of the innovations exhibited by students such as peer networking via Facebook could represent disparity between student aspiration for ICT based study and instructor training or skills.

Improvisation and motivational or self-regulated learning were shown to be closely related, e.g. the study demonstrated mobile activities mainly via laptops when travelling for career purposes. This indicated high levels of motivational learning but also reflected improvisation.

xi. The Role of 'Improvised Learning' for Open Educational Resources

The prevalence of Open Educational Resources (OERs) and similar resources was apparent during the practical phase of the study as shown in the access of external WWW sources, often made available via the WWW in an open access format and usually external to the institutional context or VLE provided for taught programmes. A wide range of theoretical codes reflected access of external WWW study-related materials, including Theory Bits/Insight such as 'Sourcing specialist e-resources or databases', 'Overcoming confidence issues using/evaluating/trusting WWW content', 'Extending VLE via informal resource sharing and communication via social media, cloud computing for group work' and 'Augmenting database limitations via Google'. These theoretical perspectives confirm insight beyond established perspectives on Reusable Learning Objects, revealing significant self-led approaches in accessing

these materials beyond the institutional context, which is the prevalent view in the literature (i.e. in opposition to the institutional role in developing, selecting and integrating OERs and related scholarly or study materials into the formal, directed curriculum).

Part 4: Holistic and Transcendent Characteristics of 'Improvised Learning'

i. The Theory of 'Improvised Learning' as a Facet of E-Learning

The Core Category 'Improvised Learning' offers an additional facet alongside established models or definitions of E-Learning and Technology Enhanced Learning, providing an holistic conceptual explanation for student behaviours engaged in blended and remote study via learning technologies - comprising processes of adaptation, exploitation and innovation in the use of E-Learning tools, platforms and software to enhance the learning experience.

Theoretical Codes derived from the practical research phase of this PhD study, included the High Level Theoretical Code 'Motivational adaption and improvisation via Online Learning', reflecting a range of behaviours to enhance the learning experience via systems tools, facilities and stakeholders, also reflecting the Developed Theoretical Code, 'Adaptive Virtualisation of Learning', reflecting engagement with a range of systems and platforms such as the VLE to access learning resources and communications in an ubiquitous and asynchronous format suiting the students' own timescales and communications needs.

ii. ‘Improvised Learning’ as a Model for Student Engagement with E-Learning

The Developed Theoretical Code, ‘Network Building/ Engaging’ - reflected student aspirations to develop or enhance their networking with staff and other stakeholders and to better adapt services for their own needs. Theoretical perspectives on students’ engagement and exploitation of infrastructure such as IT services suggest a conceptual perspective of students’ engagement with these facilities, including strategies and adaptation to overcome difficulties such as personal confidence in using platforms and systems or improving general skills to improve study effectiveness via interfacing with support services. High Level Theoretical Codes such as ‘Adaptive Virtualisation of Learning‘ also complement Piskurich’s (2003) explanation for E-Learning as a constantly evolving medium. Theoretical perspectives and dependent Codes/properties provided by the Core Category offer additional insight into the motivations of participants in adapting or exploiting learning technology, wider facilities and infrastructure to enhance their own learning as autonomous and independent learners, with themselves driving innovation and change in the use of learning technologies.

iii. The Role of ‘Improvised Learning’ for Virtual/ Online Learning

The properties of online and virtual learning – referring to patterns of largely distance based models of learning via technology, whilst not the primary focus of the study, could be observed in terms of learning approaches across participant concerns. Example codes include the Theory Bit/ Indicators ‘Lone & self led studying at a distance from peers/tutors’ also, ‘Overcoming confidence issues for low contact

context' and 'Overcoming confidence issues for group work via online tools'. Whilst many of these theoretical perspectives refer to coping or other strategies for engaging in learning remotely via learning technologies, other codes refer to wider infrastructure, stakeholders or facilities drawn upon to ensure effectiveness for remote learning via technology, such as 'Developing peer, family, work networks to support ICT issues/use'. Early Theoretical Codes such as 'Virtualisation and Engagement for Online Feedback and Assessment' and 'Virtualisation of Learning to accommodate Remote Study' reflect strategies to actively engage in approaches for learning via technology which effectively virtualised the learning experience, allowing for the transfer of class or face to face interactions in an online and digital context.

iv. 'Improvised Learning' as a Perspective for Self-Regulated Learning

At the most fundamental level, the Core Category of 'Improvised Learning' reflects broad self-engagement and adaptation to extend or enhance learning experiences, with self-led strategies across a range of behaviours and interactions to improve confidence in the use of both digital and physical resources and facilities, across a wide range of adaptation, supplementing, extending and other innovative practices. The High Level Theoretical Code 'Navigating diverse platforms, equipment, locations' reflected a range of concerns, behaviours and strategies to extend, exploit or otherwise engage with a diverse range of digital, online and physical platforms, developing approaches to effectively navigate and traverse these diverse resources, including resolution of challenges in the use of scholarly content and the organisation of learning assets within students' own digital sphere.

The concept of 'motivational adaptation' also provides original insight in contrast to

established models of self-regulated learning, reflecting a synergy between adaptation and improvisation and individual need - offering a conceptual explanation for self-led behaviours, in response to perceived deficits, omissions or gaps in the institutional Managed Learning Environment, either in reference to physical resources or digital or scholarly materials.

v. 'Improvised Learning' as a Perspective for Behaviourist Learning via Technology

Behaviourist perspectives on technology assisted learning can be identified in the findings from the practical phase of the study, reflecting behaviours and strategies to develop personal confidence and build experience in the use of platforms such as the VLE and in meeting the demands of technical and other ICT issues encountered. Experiential aspects of learning via technology, reflecting strategies to develop awareness and skills in the use of platforms and development of familiarity with these resources, facilities and support is demonstrated in a wide range of codes within the related Early Theoretical Category 'Resolving and Supplementing Information Literacy for Effective Research', including a range of strategies to develop information/ scholarly resourcing skills, with dependant Theory Bits/Insight such as 'Skilling with challenging databases to enhance research' and 'Assimilating prior online resource behaviours with current facilities'. These behaviours reflect Ertmer and Newby's continuum for learning via instructional design (Ertmer and Newby, 1993), indicating a sense of increased effectiveness when developing familiarity with platforms. These behaviours appear closely related to gratification theory, suggesting the perception amongst participants that an effective or enhance

learning experience is reliant on a wide range of platforms and systems to facilitate learning remotely or in blended learning context.

vi. Individual Learning Approaches/Styles Arising from 'Improvised Learning'

Theoretical perspectives illustrated in the literature concerning "learning styles" or "learner diversity" (Dimitrova, Sadler, Hatzipanagos and Murphy, 2003) are reflected in the practical research outcomes, reflecting diverse individual and often self-regulated approaches for customising, extending or adapting the institutional learning environment. The following learning approaches could be summarised from emergent theoretical perspectives presented in the current study:

The Transitional Learner - as evidenced in the High/ Developed Level Theoretical Code 'Transitional Physicalisation of Online Learning' and dependent Theory Bits/ Insight such as 'Reliance on facilities for study space/ quiet' or 'Reliance on VLE for prioritised/optimised study routine'. This perspective outlines a tentative, transitional stage for the learner in engaging with technology assisted learning platforms, the blended learning model for study and wider Managed Learning Environment. Whilst participation is in evidence, including behaviours seeking also to improve personal use of the VLE via attending training or engaging more fully with the platform, there is a clear indication that the learner is reluctant to engage fully with either digital platforms or wider scope of technology facilitated communications or related facilities, with behaviours to physicalise and limit the role of technology in studies.

The Virtualising Learner – this perspective stands in contrast to the ‘Transitional Learner’, exhibiting self-regulation and motivational characteristics to extend the learning experience via a range of digital platforms, communications systems and scholarly sources. The Virtualising Learner often engaged in integrating or synthesising these systems in study patterns and across diverse systems or locations related to study. Related theoretical perspectives are indicated in the High Level Theoretical Code ‘Motivational adaption and improvisation via Online Learning’, including the dependent Developed Theoretical Code ‘Adaptive Virtualisation of Learning’ and related Early Theoretical Codes such as ‘Virtualisation and Engagement for Online Feedback and Assessment’, ‘Virtualisation of Learning to accommodate Remote Study’ and ‘Engaging with and Negotiating Online Communications’. Example related Theory Bits/Insight include 'Networking via available communication tools to enhance peer/tutor interaction', 'Synchronous debate and collaboration between tutor/students e.g. via virtual classroom tool', 'Mobile/ overseas study via VLE, email, synchronous tools', 'Using removable media to facilitate mobile computing across locations' and 'Ubiquitous learning via range of devices & locations to accommodate lifestyle '.

The Traversing Learner – reflecting a facet of the Virtualising Leaner, including behaviours related to exploiting, extending, adapting or supplementing study via a diverse range of digital platforms, software, facilities and stakeholders, across both the institutional and non-institutional context, reflecting considerable self-regulation and motivational characteristics in use of non-institutional scholarly sources and facilities and characteristics related to integration and synthesis of these diverse resources within the student’s own study and “personal learning environment’. The

High Level/Developed Theoretical Code ‘Navigating diverse platforms, equipment, locations’ reflects a range of behaviours to engage with and acquire skills to exploit a diverse range of digital platforms, software, facilities and stakeholders, reflected in dependent Early Theoretical Codes such as ‘Engaging with and Negotiating Digital Platforms’, ‘Resolving and Negotiating WWW usage issues’ and ‘Integrating and assimilating University platforms and sources into existing practices’.

The Ubiquitous Learner - reflecting an on-demand/ just-in-time and multi-platform, multi-systems perspective for study, including behaviours for engagement in the blended learning and remote study context via mobile devices and desktop computers or laptops in diverse locations, when travelling, when located at the education provider, in the workplace or home. The High Level Theoretical Code ‘Motivational adaption and improvisation via Online Learning’ includes a range of related theoretical perspectives, including the Developed Theoretical Code ‘Self-Regulated Engagement’ and related Theory Bits/Insight such as ‘Lone & self led studying at a distance from peers/tutors’, ‘On-demand self-led learning due to time constraints attending training’ and ‘Self-regulated development of learning skills via diverse research/assimilation, evaluation’. The Early Theoretical Code ‘Virtualisation of Learning to accommodate Remote Study’ particularly illustrates behaviours in facilitating remote and ubiquitous modes of study, with related Theory Bits/Insight such as 'Mobile/ overseas study via VLE, email, synchronous tools', 'Facilitation of overseas engagement via VLE', 'Mobile/ overseas study via VLE, email, synchronous tools', 'VLE reliance as distance learning study tool' and 'Ubiquitous learning via range of devices & locations to accommodate lifestyle'.

The Networked Learner - illustrating a range of behaviours to more fully exploit, supplement or otherwise engage with electronic, particularly networked tools and systems, such as video conferencing/chat and VLE based tools such as the interactive online ‘whiteboard’, group file storage and sharing , email and social networks/social media and related platforms. These behaviours can be linked to individual study, group work, information seeking behaviours for scholarly sources and interaction with the educational institution/tutor. Behaviours concerning development of skills in use of networked systems are also shown in the Early Theoretical Code ‘Developing Confidence in Technologies and Low Contact Study'. The use of networked facilities for group work is reflected in the High Level Theoretical Code ‘Network Building/Engaging’ and dependent Early Theoretical Code ‘Engaging with and Negotiating Remote Group Working’. The High/Developed Theoretical Code ‘Navigating diverse platforms, equipment, locations’ also reflects extensive behaviours in use of networked platforms for study and group working, reflected in Early Theoretical Codes such as ‘Engaging with and Negotiating Digital Platforms' and 'Engaging with and Negotiating VLE and course content'.

The Improvising Learner – reflects the Core Category ‘Improvised Learning’, including behaviours of adaptation, expansion or extending the limitations of the immediate study environment – both digital and physical in scope, also reflecting behaviours of adaptation and exploitation for facilities available across diverse systems, facilities, locations and stakeholders, with examples such as use of both institutional tools provided in the VLE (but not necessarily embedded formally in course design), use of external, non-institutional digital platforms and software and

use of facilities in locations such as the workplace to facilitate study. These behaviours are also characterised by supplementing activities, especially in the use of non-institutional scholarly sources, necessitating the development of self-regulated skills in areas such as use of the Internet and Search Engines, critical evaluation of sources and skilling for use of diverse scholarly Web based platforms. Challenges faced during the blended learning and remote study context include behaviours related to overcoming skills issues, low confidence in the use of Web based platforms, equipment/ facilities and networks/stakeholders, challenges related to use of system interfaces and software and issues related to peer motivation. The key High Level Theoretical Codes related to this approach for study included 'Transitional Physicalisation of Online Learning', reflecting attempts to manage the blended or digital based learning experience, including limitation of exposure to technology demands and virtualisation of some aspects of study such as use of printed resources or in-person preferences for interactions, also the High Level Theoretical Code 'Motivational adaption and improvisation via Online Learning', reflecting a range of concerns, behaviours and strategies to engage with the blended learning context, across spheres such as self-led skilling for use of facilities and resources, supplementing of scholarly resources, overcoming ICT challenges, developing networks and socialisation to facilitate study, group work and stakeholder support, developing strategies to manage commitments and adapt the study environment via strategies such as virtualisation, i.e. use of networked systems for remote study and group work, also reflecting behaviours to engaged in learning on-demand to accommodate lifestyles and study patterns. The High/ Developed Level Theoretical Code 'Navigating diverse platforms, equipment, locations' reflected a range of behaviours and strategies to effectively navigate, access or manage diverse

systems, software, facilities, stakeholders and physical resources. This theoretical perspective provides a unified explanation for study behaviours in the, at times challenging context for blended, remote and wider technology-assisted models of learning, offering an original and novel paradigm of study and learning in the modern, technology enhanced blended class context but also potentially relevant for wider, related models of online study.

vii. 'Improvised Learning' as a Perspective for Active and Transmissive Learning

Sullivan similarly outlines the role of active, participatory engagement by students in contrast to transmissive forms of learning (2010, p.67), reflecting the High Level Theoretical Code '/Developed Theoretical Code 'Transitional Physicalisation of Online Learning', the Early Theoretical Code 'Acquiring and Supplementing Study Skills' and 'Self-regulated development of learning skills via diverse research/assimilation, evaluation'. These behaviours suggest the ability or facility for student engagement in a highly self-regulated, self-led approach for adaptive use of systems such as VLE chat/messaging and discussion tools to facilitate group work, demonstrating the provision of both a structured learning experience via the Virtual Learning Environment and online modules, but also demonstrating scope for student engagement in collaborative study via institutional and external systems, including adaptive and innovative use of platforms to extend or enhance the study experience and related networking/communications with peers and tutors.

There may also be original insights offered via 'Improvised Learning' for considering deep and surface approaches to learning described by Marton and Säljö (1976),

Prosser and Trigwell (1999) and Ramsden (2003). It is possible that for professional-related programmes, characterised by busy, often working students, there may be challenges for adoption of deep learning characteristics such as use of prior and current learning, utilisation of theoretical insight from previous experience or development of an evidential approach to comparing perspectives.

viii. 'Improvised Learning' as a Perspective of Adaptive Learning

The prevalence of the VLE, providing structured online course materials to allow for alternative, i.e. online, remote and ubiquitous methods for study, closely reflects the theoretical perspective of 'adaptivity' theory and related adaptive perspectives. The High Level Theoretical Code 'Transitional Physicalisation of Online Learning' reflects a broad range of behaviours related to engagement in the institutionally planned VLE with its associated features and content. For some participants, the VLE provided an holistic learning environment providing all required resources for studies, this is shown in Theory Bits/Insight such as 'Reliance on VLE for prioritised/optimised study routine' and 'VLE/online tools avoidance via reliance on core handbook or selected print materials'. The findings prevalent in the current research however, also provided additional insight into behaviours surrounding the management of learning via technology to reduce stress, confusion or improve confidence in approaching digital systems or resources. Participants broadly indicated self-regulated or self-led approaches at managing issued such as the proliferation of learning resources, systems, platforms or communication features; these behaviours are reflected in a wide range of theoretical perspectives associated with coping strategies or approaches via acquisition of skills in managing diverse platforms, information

sources and diverse sources for study materials. The relevance of these findings in context to perspectives such as ‘calm computing’ therefore suggests broad synergy in terms of general satisfaction for some students with core institutional facilities - with some students purposely avoiding extended interactions with wider digital facilities or resources; additionally, for some students, there is a significant role for self-regulated or self-led management of wider resources, including resources and facilities within the VLE and institutional context; this aspect provides an additional self-led context to established perspectives on institutional planning in delivering the Managed Learning Environment.

ix. ‘Improvised Learning’ as a Perspective for Longitudinal Insight and Development

Longitudinal characteristics of improvisational behaviour is discussed by Pinnington, (2005, p.618), suggesting the role of behaviours to develop new insight or effect change in a wider context to the individual learner. These kind of outcomes are suggested in Theoretical Codes arising from the practical research, including the Developed Theoretical Code ‘Multi-tasking Commitments’ and Theory Bits/Insight such as ‘Taking increased responsibility/ motivation for self-led study due to low class contact’, ‘Dealing with varying levels of expectancy fulfilment and adopting consequent coping behaviours’, ‘Facilitating lifelong learning via studies’ and ‘Flexible locating to overcome opening/facility limitations’. These theoretical perspectives suggest similar longitudinal and wider impact of improvisational behaviours, such as integration of study within professional continuing development or workplace development, long term management of study in the context to family

and external commitments and long term planning in context to taught studies for developing individual career pathways. These perspectives offer additional insight into the longitudinal characteristics of improvisational behaviour, suggesting these approaches enhance or allow for individual planning, development and career progression. Similarly, a range of studies and theoretical perspectives have been discussed exploring distraction related issues for students, where social media, mobile "apps", personal email and mobile devices can represent a negative diversion or distraction from educational activities (Fiaidhi, 2011; Winter, Cotton, Gavin and Yorke, 2010).

The Core Category ‘Improvised Learning’ could be said to provide an original conceptual model for understanding student experience and self-regulated management of distractions and boundary management as defined by Winter, Cotton, Gavin and Yorke (2010, p.72). It can be suggested that processes of adaptation, substitution, supplementing allows for greater cognitive self-reliance and development of greater skill in navigating and engaging in the distributed learning context. Winter, Cotton, Gavin and Yorke comment that “...effective e-learners are often those who demonstrate goal-setting, information-processing, cognitive skills, deep processing skills and decision-making skills.” (Winter, Cotton, Gavin and Yorke, 2010, p.72).

Theoretical perspectives on the role of organisations in effecting change in contrast to innovation or insight as a consequence of individual improvisation is discussed by Eisenhardt and Tabrizi (1995, p.84) and by Brown and Duguid (1991, p.40). Theoretical Codes arising from the practical study reflect the roles of the organisation and individual in achieving insight and wider change. Theory Bits/Insight such as ‘Reliance on VLE for prioritised/optimised study routine’ and ‘Avoidance of unfamiliar

technologies and related training, utilising familiar technologies' reflect reliance of some users on institutional platforms and the provision of a Managed Learning Environment (MLE) for facilitating taught programmes.

The use of participant strategies for relying on the Managed Learning Environment can be contrasted with strategies for expanding or enhancing individual learning and wider personal engagement with the learning experience. These behaviours can be seen in the Theory Bits/Insight such as 'Use of a range of library/online providers for sourcing materials' and 'Overcoming/supplementing limited database coverage', reflecting approaches for extending the scope of learning resources.

Similarly the Early Theoretical Code 'Acquiring and Supplementing Study Skills' reflect similar strategies for individual improvisation - extending the normative learning environment by developing further skills for study and individual learning.

Whilst the role of situated learning, describing the characteristics of learning via range of locations and online contexts has been discussed earlier in this chapter (Keskin and Metcalf, 2011, p.203; Bonarini, 1997, p.281), the role of a specific or unique situated context is described in terms of opportunity or circumstance which can itself give rise to innovation, adaptation and improvisation (Pinnington, 2005, p.627). Theoretical perspectives arising from the practical research reflect the development or facilitation of improvisational behaviours in the blended/distributed learning context, often arriving at innovative or adaptive solutions to address a need of some form. The above Theoretical Codes reflect actions to address some need or student demand, such as intense use of online communications to overcome remote communication needs in a group working context or seeking online support materials when based remotely to address a technical need when this arises.

x. ‘Improvised Learning’ as a Model for Distributed Learning

The present study provided a range of theoretical insight into the established paradigm of distributed learning; the High/Developed Level Theoretical Code, ‘Navigating diverse platforms, equipment, locations’ included properties (Early Theoretical Codes) such as ‘Engaging with and Negotiating Digital Platforms’ and ‘Organisation of Learning Assets’.

. It can also be seen that improvisation often represented a response to resourcing or cost issues; this can be evidenced by comments reflecting use of virtualised communications or virtualisation of resources such as seeking digital text equivalents - to avoid either library travel or purchase of resources. These theoretical perspectives also indicated strategies to critically appraise and select valid or useful resources from across the diverse range of institutional and external sources, via development of skills in critical appraisal for digital content and evaluation of authoritative context for sources.

Improvisation and adaption can be said to be a driver toward greater reliance and engagement with wider Distributed learning processes - described by Kochtanek and Hein, (2000, p.282) in contrast to processes inherent in the Blended Learning environment, with students engaging in social networks, group tools and synchronous communications beyond the strict confines of the VLE to extend their learning experience.

Whilst Heinze and Proctor (2004) have described the VLE as a catalyst to develop motivational learning amongst students, it can be demonstrated that students sought continually to expand and exploit resources, systems and networks beyond the VLE. The study also reflected trends toward peer communication for group work and

mutual support networks; these reflected the transfer and sharing of tacit knowledge (Langley, 2007, p.159; Logan, et al., 2004, p.3) via engagement in social networks and communities of practice beyond the institutional managed learning environment.

xi. ‘'Improvised Learning’ As a Perspective for Self-Regulated, Hybrid Learning

The Core Category ‘Improvised Learning’ may be considered in terms of a hybridised paradigm for learning, combining and complementing many established theories for learning and teaching. In addressing the nature of ‘Improvised Learning’ and its relationship to established theories of teaching and learning, we can say that this paradigm significantly reflects constructivist and self-managed theories of learning, emphasising the creation of personal experiential learning approaches: “It presumes that students who are active and take control of their own learning at any age level or in any learning situation perform better and achieve better results.” (Wilson, 1997). This is also reflected by the six point scheme for self-regulated learning (Linder and Harris, 1993), including: “A. Epistemological Beliefs... C. Metacognition...D. Learning Strategies...E. Contextual Sensitivity... F. Environmental Utilization/ Control...” (Linder and Harris, 1993, p.641).

The attempt to integrate diverse platforms and facilities, including informal Web based tools is evident in Theory Bits/Insight such as ‘Integrating learning into social space via networks/ email’ and ‘Extending VLE via informal resource sharing and communication via social media, cloud computing for group work’. These theoretical perspectives confirm processes to integrate and work seamlessly between diverse platforms and systems of both an institutional and external or personal context (as seen in the use of social media for group communications and project work),

reflecting a considerable self-regulated aspect in contrast to an institutionally managed hybrid learning context.

xii. 'Improvised Learning' as a Perspective for Instructional Design

Improvisation also called into question the relevance of instructional design theory and practice as this had been applied to Blended Learning and systems such as the VLE; in some cases, VLE-based tools were not in apparent use, but the same functionality had been supplanted via individual improvisation or adaption, such as use of Google Spaces for group working.

The model of VLE-based Blended Learning also appears to have been extended in physical terms by students - via use of a wider range of locations for study such as the workplace and use of external systems and platforms; this kind of motivational or personal learning (Dabbagh and Kitsntas, 2011, p.1) also reflects a high degree of improvisation in extending or supplementing static or "transmissive" experiences available via the conventional Blended Learning context (Dabbagh and Kitsntas, 2011, p.1). These kind of innovations or improvisations reflect a trend toward the development of 'Personal Learning Environments' in contrast to the environment offered via Blended Learning, reflecting a high degree of improvisation and autonomy: "...PLEs can be perceived as both a technology and a pedagogical approach that is student-designed around each student's goals or a learning approach ..." (Dabbagh and Kitsntas, 2011, p.2).

Memo comments and emergent Substantive descriptive codes were highly characteristic of coping strategies, processes and challenges; these often reflected technical or usability problems and could be accompanied by comments that the

student was aware of the need to engage further with institutional systems or platforms. This kind of behaviour illustrates organisational theories of innovation and change mentioned in Chapter 5: Discussion in Relation to the Literature, e.g. “the engaging organisation” (Brown and Duguid, 1991, p.51) and potential disparities between institutional Blended Learning implementation and the aspiration of students.

xiii. ‘Improvised Learning’ as an Perspective for Situated Experiential Learning

Dewey’s perspective on situated learning is also reflected across a number of theoretical perspectives arising from the practical research including Theory Bits/ Insight such as ‘Using removable media to facilitate mobile computing across locations’, ‘Use of VLE as a mobile/cloud solution for accessing content across diverse locations’, ‘Ubiquitous learning via range of devices & locations to accommodate lifestyle’ and ‘Distributed Learning via multiple e-learning formats, tools, media’. These theoretical perspectives indicate behaviours reflecting use of a wide range of environments, digital sources and adaptive or improvisational approaches to enhance study practices, including use of workplace, educational and other physical locations.

Self-led, self-regulated and personalised learning can be demonstrated across many of the theoretical perspectives presented in the practical phase of the study, reflecting wide reference to non-institutional technologies and platform used for a wide range of communications, information seeking, support and related functions. In a related context, constructivist approaches were apparent in the integrated approach adopted for use of diverse systems and platforms to create group work

and achieve study outcomes, this is reflected in the High Level/ Developed Theoretical Code ‘Navigating diverse platforms, equipment, locations’ and in the dependent Early Theoretical Code ‘Organisation of Learning Assets’ - concerning behaviours to access and manage diverse sources of content via digital tools and Operating System features, reflected in Theory Bits/Insight such as ‘Digital document/ excerpt and notes management for effective file handling’, ‘WWW/ E-resource sorting, labelling and storing for efficient media retrieval’ and ‘Selection and refinement of learning resources to avoid information overload via adoption of key resources such as the VLE’.

Part 5: Further Potential Research Suggested by Research Outcomes

The discussion of research outcomes in relation to the literature suggest a range of potential further questions or areas of research which could be addressed within the substantive area chosen.

Transitional Physicalisation of Online Learning

The High Level and Developed Theoretical Code, ‘Transitional Physicalisation of Online Learning' reflected a range of potential areas for further study, including potential research to identify physicalisation behaviours such as excessive printing or reliance on print media and in-person tutor/peer interaction, avoidance of unfamiliar or wider institutional technology use, or behaviours reflecting dependence or reliance on core platforms or services. Further research could assess factors inherent in this behaviour or student perceptions of the benefits or challenges for wider engagement with educational technology. Further research could also explore differences in

student perceptions or behaviours characterised by adoption or wider engagement with learning technologies for some students.

Motivational Adaption and Improvisation via Online Learning

The High Level Theoretical Code 'Motivational adaption and improvisation via Online Learning' reflects a range of potential further areas for research, including self-regulated behaviours for supplementing and sourcing scholarly materials, aspirations exhibited for students concerning skills development for study, information literacy, Information Technology or related issues such as VLE tools and features. This theoretical perspective may also prompt further research on the relationship between self-regulated skills development and institutional structures or resources to facilitate this self-led skills behaviour, further research in the field of student anxieties or confidence building for engagement across a range of educational, communications and other technologies for low contact study.

Navigating diverse platforms, equipment, locations

The High Level Theoretical Code 'Navigating diverse platforms, equipment, locations' reflects indicates opportunities for further study, reflecting behaviours for managing or navigating diverse platforms, systems or scholarly resources across diverse networks or locations (such as the workplace). Areas for further research could include students' improvisational strategies for resolving scholarly resource access problems, strategies for managing diverse information portals/interfaces or the role of externally sourced scholarly materials - including workplace-based materials and how these are integrated or assimilated with formal studies.

Improvisation via Motivational and Self-Regulated/ Managed, Coping Behaviours

The practical research may also prompt additional research related to students' highly self-regulated behaviours for managing coping or anxiety concerns, including behaviours related to development or aspirations for improving skills across a range of issues, such as information literacy, Information Technology or VLE and systems use, or behaviours for coping with issues such as scholarly literature searching or sourcing, or for resolving on-demand technical problems.

Improvisational Behaviours – Supplementing, Adapting, Enhancing, Exploiting

Behaviours demonstrated in the practical research for extending, adapting, innovating or exploiting of institutional systems and platforms may prompt further research, reflecting these behaviours related to extending or adaptive use of the VLE or other aspects of the Managed Learning Environment, workplace facilities or external systems, networks or stakeholders. Further research could examine in further detail how students adapt prior systems at a lower level or tier of improvisation and how novel or original innovation occurs at a higher level, including selection of externally sourced or personal systems and how these are integrated within study approaches.

Longitudinal Strategies for Improvisation

Many theoretical perspectives arising from the practical research, often related to the Developed Theoretical Code, 'Self-Regulated Engagement' reflect concerns, strategies or behaviours for developing skills or managing training or technical needs over time, often also reflecting career development or lifelong learning aspirations.

These behaviours can reflect long term planning or identification of long term solutions or approaches to adapt, extend or enhance learning experiences. Potential further research could consider these long term strategies or behaviours, the impact on long term student perceptions or the relationship between institutional provision or guidance in relation to long term student development.

Passive and Active Improvisational Behaviours

Theoretical perspectives arising from the practical research demonstrated passive or transmissive behaviours - reflected in the High Level and Developed Theoretical Code 'Physicalisation of Virtual Learning' and active or self-regulated behaviours, reflected in the High Level Theoretical Code 'Motivational adaption and improvisation via Online Learning'. Passive behaviours reflected behaviours such as reliance on core systems or features in contrast to active behaviours reflected in a wide range of improvisational strategies to extend, adapt, innovate or exploit institutional and externally sourced platforms, systems, networks or other resources, for study, tutor interaction or collaboration. Future potential research could consider the motivations, environmental factors or other influences on passive or active improvisational behaviours, including the role of institutional training, systems or tutor support.

Transcendent Characteristics of 'Improvised Learning'

The Grounded Theory of 'Improvised Learning' reflects a wide range of generic issues related to concerns, strategies or other behaviours for extending, adapting or innovating to enhance or develop networking and collaboration, to develop personal skills or mentor interaction, to supplement or extend information sources or to manage or balance personal responsibilities and study commitments. Further

potential research could consider the theory and its properties/ component theoretical perspectives for other sectors, including statutory education, Further Education or wider sectors in industry, the arts, government or state sectors.

The Theory of 'Improvised Learning' as a Facet of E-Learning

The Grounded Theory of 'Improvised Learning' offers a perspective for the role of improvisational behaviours, such as adapting, extending, innovating and exploiting in a blended learning context, with potential wider implications for Technology Enhance Learning and related models for remote or online learning via technology. Further research could consider the extent to which 'Improvised Learning' constitutes a facet or element of E-Learning in a broader sense, assessing the role of improvisational behaviours in other comparative blended, online or other models of remote learning, such as use of MOOCs.

'Improvised Learning' as a Model for Student Engagement with E-Learning

The High Level and Developed Theoretical Code, 'Transitional Physicalisation of Online Learning' reflected behaviours related to passive or transmissive learning behaviours; in contrast, self-regulated, motivational and active behaviours are demonstrated widely across other theoretical perspectives presented, demonstrating improvisational behaviours to extend, supplement or innovate for wider engagement with the blended learning context. Further research via methods such as action research, exploring the resulting theory and outcomes with students could investigate the potential for 'Improvised Learning' as a model for student engagement, exploring the extent to which improvisational behaviours for extending,

adapting, innovating and supplementing can enhance the learning experience.

'Improvised Learning' as a Model for Negotiation of the E-Learning Environment

Student approaches for navigating or managing a diverse range of systems, platforms and scholarly resources are demonstrated in the High Level Theoretical Code 'Navigating diverse platforms, equipment, locations' and related theoretical perspectives/properties. These perspectives reflect behaviours for developing confidence and self-led skills development for managing these platforms or systems. Further research could explore the role of improvisational behaviours for navigating and managing diverse resources, exploring student strategies for supplementing, assimilating or resolving navigation of diverse systems.

The Role of 'Improvised Learning' for Virtual/ Online Learning

The Grounded Theory of 'Improvised Learning' was explored via a relatively defined blended learning environment, however, many theoretical outcomes or Theoretical Codes comprising the theory can be seen to offer insight into a range of wider concerns, motivations, strategies or behaviours for engagement with Technology Enhanced Learning, communications technologies, use of mobile devices or study approaches, for ubiquitous or situated learning across diverse systems or locations. Further research could consider the research outcomes and wider Grounded Theory of 'Improvised Learning' for application in a purely online context for distance-based learners studying via educational technologies such as the VLE, cloud based applications and other information systems.

'Improvised Learning' as a Model for Engagement with Synchronous and Asynchronous Communication Tools

The Grounded Theory of 'Improvised Learning' raised the role of asynchronous communication tools such as VLE-based discussion boards, email, social networks and messaging within the VLE or via external sources. Synchronous communication tools included VLE-based chat or 'Virtual Classroom' communication (with wider graphical and collaborative functions) and use of further/external video conferencing applications such as Skype. Further research could consider the role of improvisational communications strategies employed by students, examining how far this behaviour is integrated or assimilated within formal study, including institutional support for applications used and for facilitating these kind of improvisational solutions.

'Improvised Learning' as a Student-Led Model for Ubiquitous, Mobile and On-Demand Learning

The Grounded Theory of 'Improvised Learning' also raised behaviours of self-led or self-regulated engagement with the blended learning experience via range of institutional and externally sourced platforms in an ubiquitous and on-demand context. The practical research demonstrated study approaches for use of mobile computing/devices, accessing study platforms or collaboration applications whilst travelling or overseas and from diverse physical locations. The research also indicated a range of on-demand or just-in-time behaviours for supplementing scholarly resource sources, obtaining on-demand support for study or Information Technology issues and related needs. Further research could consider the role of improvisational behaviours in an on-demand context, exploring the range of

strategies employed by students, use of systems, Web based resources, networks, stakeholders or other external sources of information or support to meet these needs.

'Improvised Learning' as a Model for Integration of Distributed Learning Across Institutional and External Context/Resources

The research outcomes presented a range of often self-led or self-regulated behaviours related to distributed learning approaches, characterised by use of a diverse systems such as the Library OPAC, Web based platforms such as the VLE and a range of externally sourced systems such as social networks, personal email and workplace based systems. These behaviours are reflected in the Developed Theoretical Code, 'Adaptive Virtualisation of Learning'. These behaviours were also characterised by highly self-regulated selection, supplementing, extending or innovating for meeting study, collaboration or related needs. Further research could consider these behaviours in terms of the distributed learning model, exploring the potential for improvisational support or guidance within the planned distributed learning approach.

'Improvised Learning' as a Perspective for Personalised Learning Environments

The Grounded Theory of 'Improvised Learning' reflected a range of personal learning approaches, characterised by individual selection, adaptation or preference for specific tools and features for assimilation or integration within the blended learning experience. Examples of these behaviours included selective use of VLE based tools such as file sharing, group discussion and messaging or externally sourced

applications to facilitate study and collaborative group work. Further research could explore the role of improvisational behaviours for the theoretical perspective of the Personalised Learning Environment, examining self-led, self-regulated and improvisational behaviours, via use of mobile and situated learning and diverse physical locations.

'Improvised Learning' for Insight into Critical Perspectives on Technology Enhanced Learning

A range of critical perspectives for Technology Enhanced Learning can be identified or suggested via the Grounded Theory of 'Improvised Learning', including physicalisation behaviours or preferences for controlled or limited VLE use, reliance on print resources or in-person interaction, also concerns for skills development, limitations for peer or tutor interaction/ collaboration and aspirations to widen or expand engagement with tutors, peers and study via a range of improvisational systems, platforms, networks or resources. These behaviours reflect disparities between student expectation and institutionally led engagement for educational technologies. Further research could explore these critical aspects for Technology Enhanced Learning from the perspective of improvisational behaviours, examining student or staff perceptions on potential disparities between institutional and externally sourced resources or solutions for study.

'Improvised Learning' as a Perspective for Student-Led Collaborative Learning

The Core Category, 'Improvised Learning' reflected a range of behaviours for collaboration, peer interaction and group study. These behaviours indicated significant self-regulated development, planning and maintenance of collaborative

processes, including behaviours for encouragement of peers and in some cases, self-regulated behaviours for engagement with tutors for feedback, assessment and related collaboration. Further research could also examine the role of tutors/lecturers and the relationship of students with institutionally led frameworks or guidance for collaborative work and to what extent self-regulated behaviours and improvisation impact collaboration, group work and related peer interaction.

'Improvised Learning' as a Perspective of Student-Focused Constructivist Approaches for Learning

The Core Category 'Improvised Learning' highly reflected constructivist approaches or theoretical perspectives of learning, reflecting a wide range of interactions, behaviours and strategies for self-regulated engagement with the blended learning context, with tutors and peers for study and collaboration. Behaviours were demonstrated reflecting self-regulated engagement with tutors for study and group work, via use of communication tools, assessment feedback features in the VLE, VLE messaging and externally sourced applications, such as Skype. Further research could consider the extent to which these behaviours contribute to constructivist style learning processes, scenarios or approaches within blended learning or further models for Technology Enhanced Learning.

Individual Learning Approaches/ Learning Styles Arising from 'Improvised Learning'

Previous sections of the thesis have explored the recent literature on learning styles as a form of explanation for individual student preference or approaches for study and related behaviours. The thesis has also discussed possible learning styles

arising from the practical research, such as “The Transitional Learner”, reflecting tentative or partial engagement of students with the blended learning context. Further research on learning styles raised via the practical research could include examination of these individually, e.g. “The Virtualising Learner”, exploring student behaviours or perceptions for adaptation of study processes for virtual, online or digital access.

‘Improvised Learning’ as a Perspective for Adaptation of Existing Practice or Knowledge

The thesis has reviewed extant literature on improvisational practices across a range of sectors, commenting on the generation of organisational memory or knowledge as a consequence of improvisational behaviours, for the individual but also in the group context. The practical research demonstrated longitudinal behaviours for skills development, lifelong learning and for integration of improvisational practices or solutions to concerns, anxieties or challenges within study or collaborative practice. Further research could examine the role and dynamics of shared or disseminated knowledge or insight via improvisation in greater detail, in the context of Higher Education, for blended or other modes of study via educational technology, or for wider sectors.

‘Improvised Learning’ as a Perspective for Institutional Management of E-Learning

The theory of ‘Improvised Learning’ and its dependant variables challenge the nature of E-Learning and ICT administration as an operational practice in post-statutory education – e.g. for administrative functions described by Keller (2007, p.300).

These perspectives suggest scope for further research for understanding the relationship between individual student aspirations, concerns, anxieties or strategies for enhancing learning via educational technology and the role of the institution or educational provider in delivering Technology Enhanced Learning, in meeting student aspirations or challenges and in supporting improvisational behaviours related to fulfilment of these perceived needs.

'Improvised Learning' as a Perspective for Information Literacy in a Blended and Online Context

The High Level Theoretical Code, 'Motivational adaption and improvisation via Online Learning' reflected a range of concerns, anxieties and corresponding strategies or behaviours for self-regulated management or resolution of needs related to scholarly sources. These behaviours also reflect strategies for self-led development of information literacy skills, supplementing information sources to acquire recommended or core readings, overcoming confidence issues when accessing scholarly databases, developing support networks for use of scholarly sources and development of skills for evaluation or appraisal of scholarly or study materials. Further research could consider the extent or role of self-regulated information literacy behaviours, such as development of personal information searching/retrieval skills via online guidance or strategies for integration and management of diverse information sources/database.

Part 6: Concluding Statement

The discussion above, presenting the research outcomes in relation to the literature has demonstrated a wide range of additional findings and wider theoretical perspectives, building on the Theoretical Codes emergent from the practical research. These theoretical outcomes have arisen from a comparison of resultant Theoretical Codes in contrast with both wider literature and prior theory or studies and in contrast to extant literature on the topic of improvisational behaviours, as a concept drawn from a range of industrial, scholarly and other fields. Examples of theoretical findings discussed in context to prior theory and research have included the presentation of the Grounded Theory of 'Improvised Learning' as a facet or component for the wider understanding of E-Learning or learning via educational technologies, the student-led context and relevance of the theory 'Improvised Learning' for ubiquitous, on-demand, constructivist and distributed models of learning, the relevance of 'Improvised Learning' for understanding critical perspectives on learning via technologies and original insight into learning approaches (learning styles) in context to 'Improvised Learning'. Examples of theoretical findings discussed in context to extant concepts or discussions on improvisational behaviours have included an original perspective on the role of improvisation for situated and group based learning, including the role of self-led, self-regulated behaviours in developing, sustaining and facilitating learning and emergence of knowledge or insight, findings in relation to the relationship of participants to the wider organisation and how improvisational behaviour in the context of blended learning can impart insight or new knowledge for wider communities of practice, original insight into the role of 'Improvised Learning' for

understanding active and transmissive models of learning and the role of ‘Improvised Learning’ for understanding longitudinal patterns of learning, including personal continuous development and lifelong learning.

CHAPTER 6: CONCLUSION

Part 1: Introductory Statement

This chapter will summarise the original aims or rationale for the practical research and wider research project and will summarise findings and outcomes, focusing on theoretical perspectives and high level concepts arising from both the practical research and theoretical perspectives suggested by gaps in the literature surveyed.

Part 2: Summary of the Research Aims

The current research project comprised a Grounded Theory based study, with an empirical ontological approach for addressing a participant group, with a primarily inductive approach for generation of theory. The research was undertaken in accordance with Grounded Theory methods for open coding and was characterised by avoidance of pre-conceived theory or hypotheses. The Grounded Theory methodology prompted the selection of a substantive area (North East Wales Institute of Higher Education, later re-named Glyndŵr University) to determine participant concerns and reported behaviours in the form of open memos for initial descriptive and conceptual annotation, to be compared, aggregated and refined to suggest higher levels of theoretical or conceptual understanding to explain participant concerns, challenges, strategies and behaviours.

Part 3: Summary of Research Outcomes

i. Concise Summary of the Core Category ‘Improvised Learning’

The Core Category, ‘Improvised learning’ was the most important finding or output, providing a conceptual explanation complementing all subsidiary theoretical and descriptive codes. The Core Category demonstrates the role of improvisational behaviours for blended learning and for potentially wider models for learning or wider sectors. The Grounded Theory of ‘Improvised Learning’ demonstrated a wide range of concerns, anxieties, aspirations or motivations and corresponding strategies or behaviours to fulfil perceived needs; example behaviours included adaption, extending or innovation for use of diverse systems or externally sourced applications, to exploit support networks within the social or family sphere, to exploit university or other local services such as local libraries or to supplement resources for study such as scholarly resources via institutional and external sources.

ii. Summary of Properties of the Core Category ‘Improvised Learning’

The High Level Theoretical Code ‘Transitional Physicalisation of Online Learning‘ reflected concerns, strategies and behaviours of students when seeking to control or manage their learning experience in a blended learning context and when exposed or engaged in learning via educational technologies. This theoretical perspective is termed ‘transitional’ since students can be seen to have sought an intermediate, tentative or partial mode of study via the VLE and related tools and systems, such as Library digital resources; these behaviours reflected attempts to reduce, minimise or

otherwise control the scope, exposure or level of engagement with the VLE and related technologies via behaviours such as reliance on the VLE as sole channel or route for access to course materials and scholarly resources, reliance on institutional equipment and facilities during blended learning teaching or study hours in contrast to wider, situated external learning opportunities or locations, reliance on print resources or printing of digital content and avoidance of online VLE tools, platforms or features beyond those directly required for study purposes.

The High Level Theoretical Code 'Motivational adaption and improvisation via Online Learning' reflected the most diverse range of behaviours to extend, adapt, supplement or otherwise exploit systems, platforms, locations, stakeholders and networks to fulfil study objectives, to enhance or extend the scope for use of technologies for engagement with peers or tutors, to effectively manage or coordinate commitments via self-led strategies such as balancing work, personal and study needs or ensuring continuing development and behaviours to adapt or innovate for wider use of systems, platforms or facilities in a virtual context, for remote study, collaboration, tutor interaction or peer engagement. A dependent Developed Theoretical Code 'Self-Regulated Engagement' reflected concerns, perceived needs and corresponding strategies to resolve or supplement information or scholarly resource needs, including skills needs and to engage in a highly self-regulated context for developing search strategies or sourcing resources beyond institutional provision. Further dependent theoretical perspectives included motivations and strategies for acquiring and supplementing study skills needs such as evaluation or appraisal of scholarly sources and Web content, a further dependent theoretical perspective comprised engagement for development of

Information Technology skills and anxieties to facilitate learning via technology and a further dependent theoretical perspective comprised behaviours to resolve and supplement solutions for Information Technology problems, including development of networks for obtaining support. A further dependent Developed Theoretical Code, 'Socialisation of Learning' comprised a single Early Theoretical Code, 'Socialisation of Learning for Group/Peer Working' which reflected a range of strategies to facilitate collaborative learning via improvisational behaviours, such as integration of social media with formal study, use of wikis, blogs and similar collaborative platforms within the institutional VLE and via externally sourced or Web based platforms, reflecting a high level of self-regulated behaviour to engage with peers and tutors in a remote group working and assessment context. Another Developed Theoretical Code 'Multi-tasking Commitments' included two Early Theoretical Codes, including 'Self-Management of Study Regime and Programme' and 'Managing and Negotiating Work-Study Relationship', these comprised behaviours reflecting high levels of motivational activity for balancing work, study and personal responsibilities, engagement with institutional systems and training for effective study, taking responsibility for lifelong learning and career progression and taking responsibility for study in a remote, low-contact context. A further Developed Theoretical Code, 'Adaptive Virtualisation of Learning' reflected three Early Theoretical Codes comprising behaviours to widen or extend the blended learning experience and institutionally managed or delivered teaching via this approach, to facilitate greater levels or opportunities for remote and online engagement with tutors and peers and for mobile, situated learning via a range of locations at work, overseas, whilst travelling and via a range of devices and systems. The Dependent Early Theoretical Code, 'Virtualisation and Engagement for Online Feedback and Assessment'

reflected self-led strategies for networking and engagement in online communications with tutors and peers, including tutor mentoring via VLE based tools such as synchronous char and engagement by students in the use of assessment feedback features. A dependent Early Theoretical Code ‘Virtualisation of Learning to accommodate Remote Study’ reflected student-led behaviours to engage with the VLE and via externally sourced applications or Web based platforms for remote study and group working, including access of the VLE whilst studying overseas or travelling, use of mobile devices for accessing study materials across diverse locations or equipment, use of removable media such as USB disks or cloud based storage to access media in a mobile, situated context or use of VLE based storage such as file sharing tools. Another dependent Early Theoretical Code, ‘Engaging with and Negotiating Online Communications’ particularly reflected student-led engagement with facilities such as email, social networking or VLE discussion boards, including motivational behaviours to engage with or encourage peers for collaborative study. A final Developed Theoretical Code, ‘On-Demand Exploitation/ Improvisation’ comprised two Early Theoretical Codes, ‘Supplementing and Innovating Literature Searching Approaches’ and ‘Exploiting Facilities and Services’, representing concerns and corresponding strategies for sourcing/locating information resources, development of skills for effective use of institutional databases, supplementing information needs via Web based sources and ensuring effective use of institutional facilities, equipment and online sources, including the VLE for supplementing class attendance difficulties.

The High Level Theoretical Code ‘Navigating diverse platforms, equipment, locations’ reflects high level conceptually explained behaviours which allow this

perspective to be ranked equally highly to the previously discussed perspectives. This perspective concerns navigation and negotiation of diverse learning systems or environments, including the VLE, VLE tools and features such as communication, discussion or assessment features, Library databases and Web based sources, social networks or social media and external applications for communications, ensuring study skills for accessing and effective use of these diverse platforms, integration or assimilation of diverse systems within study processes and organisation of learning assets for effective management, retrieval and integration of resources for study. A dependent Early Theoretical Code ‘Engaging with and Negotiating Digital Platforms’ comprised a range of behaviours reflecting motivational and self-led strategies to improve or enhance the students’ approach or management of the institutional Managed Learning Environment, but also approaches for effective use of externally sourced applications and integration of these within study practices. Example behaviours included development of confidence and skills for use of VLE tools and features, developing personal strategies or approaches for navigating to and accessing diverse scholarly sources such as licensed databases, open access scholarly content or VLE-based study materials, developing strategies for sourcing required readings via Web based/open access sources and developing skills to overcome more complex systems such as licensed databases. Another dependent Early Theoretical Code ‘Engaging with and Negotiating VLE and course content reflected behaviours to develop skills for use of VLE tools such as discussion forums, file sharing, group tools and assessment tools; other behaviours included use of VLE tools for collaboration and identification of suitable communication tools for group working. A further Early Theoretical Code, ‘Resolving and Negotiating WWW usage issues’ reflected self-led and motivational

strategies to develop and enhance use of the World Wide Web and Web based scholarly sources of information, including developing skills for evaluation of Web content, developing strategies for bookmarking useful content and use of Web sharing/ recommendation platform.

iii.Summary of Further Insight Arising from the Core Category 'Improvised Learning'

Perhaps the most salient characteristic alongside improvisational behaviours within the emergent theoretical perspectives/ properties of 'Improvised Learning' can be seen in self-led, self-regulated or motivational behaviours, often seeking to extend, enhance or exploit a range of systems or situated learning opportunities – via the VLE or externally sourced platforms for remote and collaborative study. Many of these behaviours can be seen to reflect coping behaviours to manage anxieties, confidence issues or improve skills for engagement with study.

Another prevalent series of behaviours or characteristics of 'Improvised Learning' comprised behaviours related to improvisational skills such as supplementing (e.g. for information sources or Information Technology support), adapting (e.g. for use of VLE tools to support group work or use of work related facilities such as specialist databases for academic study) and related behaviours reflecting strategies to enhance study practices via the VLE and related learning or communications technologies.

'Transitional' improvisation behaviours reflected a tentative or partial form of engagement with these technologies, primarily comprising the VLE and other core institutional systems such as university email. These behaviours reflected some

students' attempts to reduce or control engagement with learning technologies, communication tools, online or remote collaboration and related online or digitally focused activities – characterised by reliance on the VLE for scholarly/study materials and avoidance of wider use of scholarly digital resources, reliance on print resources or printing or digital content and reliance on physical services, locations and institutional facilities. This perspective stands in contrast to strategies for virtualisation or wider engagement with digital or online platforms to enhance remote or collaborative study.

The Grounded Theory of 'Improvised Learning' also suggests a range of behaviours related to long term planning, development of skills for study, information retrieval and development of competencies which can be seen to support career and lifelong learning aims; the Early Theoretical Code 'Self-Management of Study Regime and Programme' comprises a range of theoretical perspectives related to integration of study skills development within wider skills development and lifelong learning.

The practical research indicated on-demand behaviours such as locating scholarly e-resources or textbooks via alternative sources such as Google Scholar or developing search strategies/approaches for locating scholarly resources via a range of institutional and external sources. On-demand behaviours also included behaviours reflecting support or training needs for use of scholarly databases or VLE tools and features, involving independent development of skills via online training materials.

The practical research demonstrated behaviours which could be described as either passive – reflecting transmissive type learning approaches, including behaviours such as reliance on core institutional platforms for course materials, communications or interaction with tutors/peers and supplied scholarly resources, in contrast to active behaviours – reflecting higher levels of self-led, self-regulated engagement with

institutional platforms, scholarly resources and communication systems and with wider external resources, systems and networks. To this extent, it is possible to group or classify Theoretical Codes arising from the practical research according to passive or active types.

The Grounded Theory of 'Improvised Learning' can also be seen to provide an holistic theory or paradigm for learning in the blended learning context – comprising a wide range of related high level conceptual insights within a unified theoretical perspectives (seeking to explain or offer insight into self-regulated learning, approaches for collaboration and tutor engagement, innovative use of institutional and external systems or resources); however, the Grounded Theory of 'Improvised Learning' also offers this holistic perspective in a wider context as a paradigm for learning across a range of educational and wider sectors, characterised by wider, experiential and situated learning via Internet based applications, social media, Web based platforms, synchronous communications and related systems via external public agencies and providers.

Many of the dependent theoretical perspectives inherent in the Grounded Theory of 'Improvised Learning' can be said to represent highly generic behaviours which can be applied or compared both within the substantive area of study (blended learning in a low contact, professional and part-time study context) and wider areas of activity, sectors or fields of human behaviour. Student concerns for issues such as balancing commitments, ensuring engagement of peers, ensuring sufficient skills for effective engagement, ensuring sufficient resources were accessible or developing networks for support and training are all highly generic properties of the Core Category. These generic properties are also arguably inherent in High Level and Developed Theoretical Codes related to learning behaviours, including adaptive or

extending behaviours to ensure access to networks, resources or training in a remote context and behaviours for supplementing extant (institutionally-led) resources with wider sources, systems, platforms or networks to ensure effective collaboration, networking and group working. Examples of highly generic or transcendent Developed Theoretical Codes include: 'Network Building/ Engaging', 'Socialisation of Learning', 'Multi-tasking Commitments', 'On-Demand Exploitation/ Improvisation', 'Navigating diverse platforms, equipment, locations'.

Thus, the Grounded Theory of 'Improvised Learning' provides a highly conceptual perspective of participant engagement within wider behaviours such as engagement with learning technologies, self-led or self-regulated skills development and behaviours for adapting, extending, exploiting or innovating to overcome a range of needs for learning, networking, skills/support acquisition, resource acquisition and peer or tutor interaction.

It may be possible to describe the series of theoretical perspectives and their dependent properties in terms of a continuum. Whilst this thesis has primarily discussed the emergent Grounded Theory of 'Improvised Learning' in terms of a series or hierarchy of cascading, dependent theoretical perspectives, with dependent properties (dependent theoretical perspectives arising from descriptive/substantive codes and theoretical insight), it may also be useful to consider the entire series of theoretical perspectives as continuous series of theoretical perspectives, each complementing related codes or properties but contributing to a single continuum, cumulating in a unified perspective to which all component codes or perspectives relate or are dependent.

iv. Summary of Findings in Context to Prior Theory and Studies

The Grounded Theory of 'Improvised Learning' reflects a range of established theoretical perspectives identified in the literature such as experiential learning (Dewey, 1938 ; Lipponen, 2002; Rae and Taylor, 2003) - reflected in the practical research via student engagement with a range of learning resources, networks and stakeholders; behaviourist perspectives on learning via technology are also reflected in motivational, student-centred and self-regulated learning demonstrated in the practical research. The learning model prevalent in the substantive area of study, blended learning, also provided insight for behaviourist theories such as gratification theory (Mondi, Woods and Rafi, 2007) – illustrating student concerns, anxieties, expectations and challenges for engagement with a diverse range of educational systems, platforms, databases, networks and stakeholders, and corresponding needs for institutional awareness of ensure these expectations, perceived needs and anxieties when planning, designing, supporting and facilitating Technology Enhanced Learning.

Adaptive learning theories concern approaches to provide learning environments which accommodate participant expectations, learning styles or approaches and preferences, including individual preferences within these platforms and scope for adaptability of systems in response to student interaction or choice (Tsai, 2011; Burgos, Tettersall and Koper, 2007). The practical research demonstrated a range of behaviours where selection, adaptation or exploitation of systems and platforms was evident, including selective use of VLE tools for collaborative and group work and tutor engagement and use of these features in a mobile, situated context, with configuration or selective use of specific features within these tools for effective

study purposes (e.g. configuration of file sharing options within the Blackboard 'Group' series of tools and features).

The current study and Grounded Theory of 'Improvised Learning' presents the role of motivational, self-regulated behaviours within the blended learning context, for personal engagement with learning processes and for wider engagement via collaboration and experiential learning via engagement and improvisational behaviours across diverse systems, platforms, locations networks and stakeholders. Theoretical perspectives presented indicated the role of self-regulated behaviours for balancing workplace, family and study commitments, for developing training and support skills and networks, for facilitating, encouraging and maintaining peer collaboration and for ensuing effective study across diverse systems, platforms and scholarly sources.

Student behaviours demonstrated in the practical research indicated significant engagement, selection, supplementing and maintenance of collaboration via institutional and externally sourced platforms and systems, including social networks and other applications for chat, messaging, video conferencing, file sharing and collaborative document authoring. These perspectives offer additional insight for collaborative theory as identified in the literature, indicating the role of student-regulated behaviours and improvisational strategies for extending, supplementing or exploiting systems, platforms or resources to facilitate peer collaboration.

Constructivist approaches for learning have been explored elsewhere in this thesis, including perspectives presented for integration of experiential learning derived from the learner's community, workplace and via peer collaboration beyond the class context, these perspectives outline role of students in developing insight, knowledge and learning experiences via active engagement with learning resources, networks

and via collaboration, in contrast to passive or transmissive learning characterised by received study content or reliance on limited class-based resources (Salmon, 2004; Keller, 2007; Jonassen and Land. 2000).

Early theoretical categories such as “Socialisation of Learning for Group/Peer Working”, seem to confirm a number of potential new learning styles or emphases, following taxonomies of styles of learning suggested by Dimitrova, et al. (2003). These could be summarised as “The Transitional Learner” – reflecting tentative, progressive use of ICT and other innovative digital resources; “The Virtualising Learner” – reflecting a tendency to construct or transform experiences, interactions or study behaviours into digital or online experiences; “The Traversing Learner” – utilising a diverse array of online or physical resources, digital technology, online platforms and learning systems to achieve learning outcomes; “The Ubiquitous Learner” – engaging in use of diverse resources, systems and physical resources via a range of digital devices and locations; “The Networked Learner” – emphasising use of electronic communications such as email and use of social networks to engage in collaborative activities; “The Improvising Learner” – engaging in constant adaption, substitution, supplementing, virtualising, physicalising and engaging in a diverse range of strategies and processes to overcome technical, personal or environmental challenges.

v. Summary of Findings in Context to Literature on Improvisation

The literature as indicated by Xambó (2013 and Wright and Kanellopoulos (2010) and others, drawing on the earlier work of Dewey (1938) suggested the role of situated learning in an experiential context for group study and for emergence or

development of original insight or knowledge outcomes. The practical research for the current study indicated a wide range of theoretical perspectives related to situated learning in the group context, comprising behaviours for extending, adapting or exploiting systems, platforms, locations and resources for study and peer collaboration indicates additional or original perspectives for situated learning in the group context.

Adaptive behaviours which refer adaptation of prior practices or knowledge to enhance current practices or learning is outlined in the literature on improvisation by researchers such as Bastien and Hostager (1992) and Moorman and Miner (1998). Theoretical perspectives suggested by the Grounded Theory of 'Improvised Learning' refer to adaptive behaviours which can be seen to generate or enhance knowledge within student communities of practice and potentially wider scope for peers within the study body. Behaviours related to innovation for extending, supplementing or otherwise enhancing the study experience can be shown to exhibit new approaches or practices for study, including use of non-institutional systems, platforms or applications for study and collaboration. Students exhibited adaptation of known or prior systems, such as adaptive or extending use of VLE tools and features to facilitate study or collaborative work.

The Grounded Theory of 'Improvised Learning' concurs with literature on improvisation as presented by Moorman and Miner (1998) and Eisenhardt and Tabrizi (1995), suggesting differing tiers or levels of improvisation in organisational or group activity, represented as a continuum between behaviours for adaptation of prior knowledge or systems. The Grounded Theory of 'Improvised Learning' similarly suggests a range of adaptive, extending, exploiting and innovating behaviours, ranging from adaptation of VLE tools and features, toward greater levels of

innovation such as selection of externally sourced applications, use of workplace systems or equipment, use of mobile technologies for engagement during travel or absence from study or use of cloud based solutions for remote, collaborative authoring of group work.

The literature of improvisation for organisational change (e.g. Miner, Bassof and Moorman, 2001) outlines the role of on-demand improvisation in an operational or organisational context. Many theoretical perspectives arising from the Grounded Theory of 'Improvised Learning' reflect just-in-time or on-demand concerns, strategies and corresponding behaviours to address operational or organisational related needs. This perspective indicates behaviours for exploiting networks, stakeholders, institutional and external services, family members and peers to overcome resourcing, technical and related issues when studying in the blended and remote study context.

Brown and Duguid presented the perspective of the "discovering organization" (1991, p.51), lending toward an environment where innovation, experimentation and related improvisational behaviours can occur in contrast to structured, planned and strategic practices for change. The Grounded Theory of 'Improvised Learning' suggests a further perspective for the relationship between individual participants and planned or structured practices, indicating the role of participants beyond the organisational context for improvisational behaviours and for generation of new insight or knowledge. The current study therefore offers additional insight for the theory of the "discovering organisation" as presented by Brown and Duguid (1991) and related theory or perspectives on the relationship between planned or structured organisational processes and individual or collaborative innovative behaviours.

Dewey (1938), Moorman and Miner (1998) and Hutchins (1991) suggest the role of improvisational behaviours in an experiential context, characterised by learners, typically in a formal or class-based context and via mentor or tutor guidance, with integration of diverse experiential or personal influences, resources or networks. The Grounded Theory of 'Improvised Learning' raises a similar experiential context, with students demonstrated to engage in learning via assimilation or integration of diverse systems, platforms, networks or resources, including integration of institutional and externally sourced resources, such as workplace derived electronic resources or externally sourced scholarly resources. These perspectives offer additional insight for the literature, suggesting a greater role for self-regulated engagement in experiential models of learning, with improvisational behaviours for extending, adapting or exploiting these resources in a highly self-led context. Theory or perspectives such as the "conversational" perspective (Moorman and Miner, 1998) and related perspectives on group processes such as complex interaction or individual specialisation for improvisational behaviours (Vendelø, 2009; Brown and Duguid, 1991; Hutchins, 1991) are closely reflected in the Grounded Theory of 'Improvisational Learning'. The current study indicated behaviours for collaboration, networking and group work characterised by improvisational strategies such as use of personal communications technology/applications and strategies for encouraging wider engagement by peers for remote collaboration via VLE tools or externally sourced systems or applications. These behaviours demonstrated behaviours for leading, maintaining and developing group study processes or activities, via innovative use of platforms or systems. The Grounded Theory of 'Improvised Learning' therefore provides additional insight for the literature of conversational collaboration and related theory, indicating the role of self-regulated

behaviours for extending, adapting or exploiting a diverse range of platforms and systems beyond the institutional context.

The Grounded Theory of ‘Improvised Learning’ can be shown to demonstrate hybrid or mixed models for student engagement within the blended learning study environment. Students demonstrated behaviours to control or limit engagement in these technologies, with some attempts to physicalise the learning experience via reliance on printed or hardcopy texts, reliance on the VLE as a sole source for learning materials or avoidance of wider information sources or systems. The role of improvisational behaviour for both these student types (or learning styles) presents an original perspective for understanding the institutional Managed Learning Environment, including factors such as student aspiration for extending or controlling engagement in learning via technology.

vi. Findings in Context to Recent Trends for Learning Technologies

Recent theories of student-centred learning include the “Student Centred Learning Environment” (Lee and Branch, 2017), defining a learning environment focused around constructivist approaches for student learning and engagement, for development of student-led outputs and knowledge. These perspectives reflect prior theories of student-focused learning such as Salmon’s “E-Moderating” and adaptive theories of learning for instructional design (Burgos, Tettersall and Koper, 2007; Fiaidhi, 2011; Heinze and Procter, 2004).

The use of collaborative technologies such as wikis, blogs, cloud-based collaborative working and related technologies has been previously explored in the thesis, demonstrating an increasingly prevalent role of these technologies within the VLE

and wider Managed Learning Environment (Lane, 2014; Dabbagh and Kitsntas, 2011).The presence and use of wikis, blogs, collaborative document authoring and related behaviours are reflected across a wide range of Theoretical Codes arising from the practical research, such as the Developed Theoretical Code, ‘Socialisation of Learning'.

Behaviours related to mobile and personal learning technologies included use of mobile computing devices such as laptops and notebook computers when travelling or overseas, use of cloud-based storage for file management or collaborative shared authoring of documents or use of removable media/storage across diverse locations such as the home or workplace. VLE tools and features such as file sharing and related group tools within the Blackboard environment were evident for mobile related study and collaboration. The Grounded Theory of Improvised Learning may offer additional insight for the literature in relation to self-led, motivational and improvisational behaviours inherent in mobile and personal learning technologies selected, adapted or exploited to engage in effective study behaviours.

Distraction, boundary management and related theory has been explored in the literature, suggesting challenges for students in avoiding distraction via personal learning/ mobile devices, Web based platforms such as social media and other prevalent social, entertainment or related systems (Fiaidhi, 2011; Winter, Cotton, Gavin and Yorke, 2010) . Further theoretical perspectives shown in the current study indicate concerns, anxieties or strategies for effective self-led management of factors such as time, personal commitments and balance of these with study requirements, e.g. the Developed Theoretical Code, ‘Multi-tasking Commitments'.

Recent studies and perspectives on innovative use of video comprise use of streaming technology, on-demand provision of teaching via video and related

multimedia, lecture recording and use of “Flipped Classroom’” style teaching for video or multimedia access outside the class environment and refection, tutor interaction or collaboration during lecture time (Arnold-Garza, 2014; Roach, 2014; Williams, Aguilar-Roca and O’Dowd, 2016).

Many related Theoretical Codes arising from the practical research reflect behaviours for developing skills and competencies for information literacy, for developing awareness of bibliographic and scholarly sources, for assimilating or integrating these sources and technologies within established practices (such as skilling for search techniques and Web based content evaluation in the use of Search Engines). 'Physicalisation' strategies such as reliance on shelf collections, printing digital resources or relying exclusively on provided readings within the VLE (rather than sourcing via diverse sources) provide additional insight alongside current literature for understanding avoidance, anxieties and related motivations and behaviours, particularly in relation to adaptive physicalisation of learning via technology.

The role of game-like components or interactions for instructional design has been discussed extensively in the literature, suggesting the familiarity of recent student generations for game-like interactivity - derived from digital entertainment and mobile “app” technologies (Qian and Clark, 2016; Winter, Cotton, Gavin and Yorke, 2010; Sullivan, 2010). Behaviours visible in the current study reflected a range of activities related to game-like digital media, platforms or systems, these included engagement in quiz-type and related interactive assessment activities within the VLE, use of interactive discussion tools such as the Blackboard ‘Virtual Classroom’, use of sequential learning materials within the VLE and sourcing external materials for study, scholarly and training purposes.

Whilst peer support was not identified as an formally planned function in the blended learning environment, related perspectives for peer collaboration arising in the current study included the Developed Theoretical Code, ‘Socialisation of Learning', and dependent Early Theoretical Code, 'Socialisation of Learning for Group/Peer Working'. These perspectives can be shown to demonstrate an additional self-regulated and improvisational element or perspective for the literature on peer facilitated learning approaches, in particular suggesting the role of peer support, networking or collaboration in an informal and self-regulated context.

vii. Original Approaches for the Generation of Grounded Theory

The use of an Excel workbook for qualitative data is described by (Meyer and Avery (2008, p.91) but likely remains a fairly unexplored technique for providing both a basic sorting environment and for recording data and emergent categories. The use of the Excel workbook as a packaged approach to managing the Grounded Theory project, including data input and codification, across multiple distinct “worksheets” to manage distinct phases of the research (such as Open Coding, developed Substantive coding, selective sampling and Theoretical Sensitivity transformation of literature to data) also provides a novel aspect to the management of Grounded Theory derived qualitative data, albeit given the common use of this software for management of qualitative data.

Similarly, there is little evidence in extant literature on the use of Microsoft Office tools such as use of the hierarchies feature for creation of relationship structures to illustrate the interchangability of indices (codes and dependant codes) for Grounded

Theory. These methods also provide an original contribution to the management and visualisation of Grounded Theory development.

The use of Microsoft Office Word for sorting virtual ‘cards’ using text boxes and tables also represents a novel and apparently original approach to sorting emergent descriptive and theoretical codes; advantages of this approach included low cost (no necessity to license expensive software), low ICT skills requirements to create the sorting template and considerable flexibility offered by adaption of the table, as seen in the unified sorting table for the Core Category and higher level theoretical codes (see Appendix 14, Table 4).

Control Terms listed in Excel were subjected to statistical analysis such as frequency or frequency distribution via Excel formulae, this allowed for analysis of Control Term frequency and percentile weighting across all interview sessions when sorting to create Substantive Codes (categories). Control Terms were also used for the initial sorting of Theory Bits, directly sorting original Theory Bits or Insights derived from multiple sources such as Memo comments or Theoretical Sensitivity within the worksheet. It would have also been possible to apply frequency formulae to the Theory Bit Control Terms to similarly assess the prevalence, or weighting of occurrences across all interviews. These approaches also present an original approach for the development of Grounded Theory codes and present an original factor in the development of the Core Category, ‘Improvised Learning’.

viii. Additional Implications for Research and Practice in the Substantive Area

The below section outlines further areas which may offer development or expansion for the Grounded Theory of 'Improvised Learning' for the Higher Education sectors (and possibly related sectors such as Further Education):

- What further challenges for the Higher Education sector (including current visible trends) could pose implications for improvisation? Some of these challenges or trends could include increasing commoditisation of educational provision, rise of Digital Rights Managed (DRM) or restricted scholarly materials, increasing complexity or diversity of systems and platforms, increasing Internet Control for some world regions facilitated by online/ distance learning.
- What problems may arise from improvisation - e.g. we saw commentary in previous chapters/sections on the potentially problematic or negative impact of improvisational behaviours in an increasingly autonomous and self-led student body. If improvisational behaviour is an increasingly prevalent factor or approach for study within a trend for remote or online learning, does improvisation represent a positive or negative characteristic?
- In another perspective, reflecting perspectives for increasingly systemised or TEL-reliant models of learning (Noble, 1997; Preston and Cuthell, 2012; Kress and Pachler, 2007), it may be necessary to consider the role of improvisational behaviours for learning in an entirely TEL based model. For example, do online students engage in improvisational behaviours in this highly-self led study model, potentially characterised by lack of access to

campus facilities, reliance on personal ICT or equipment and potential difficulties for remote access to university networks/resources, such as increasing Internet control/ restrictions for some world regions.

- Does improvisation ultimately present advantages for learning processes in contrast to potential benefits for immediate study support, scholarly resource acquisition or resolution of concerns, anxieties and resourcing needs demonstrated in the current study? Further research could examine the role of improvisational behaviours for wider study behaviours, for synthesis of learning experiences or integration of improvisational-derived study aids or processes in a form which enhances learning processes and outcomes.
- What are the pedagogic implications for improvisational behaviour, can improvisation inform learning or teaching practices or models for instructional design? On a related note, should improvisational skills be integrated into induction or training for remote or online study skills? Should improvisational skills be considered a core skill alongside time management, information literacy or academic integrity?
- The literature often reflected comparison between perceptions of blended learning and levels of student satisfaction in contrast with study outcomes and longitudinal development (Newbury, 2013; Osgerby, 2013) the current study was driven by an inductive methodology, this approach was not able to focus outcomes on student satisfaction, but instead reflected behaviours, strategies or concerns; future research could perhaps examine or contrast student perceptions of blended learning with study outcomes and the role of longitudinal development.

ix. Additional Implications for Research and Practice Beyond the Substantive Area

Areas of further research for the Grounded Theory of 'Improvised Learning' could include the following:

- What is improvisation? How can we confirm the characteristics or properties of improvisational behaviours? Can we define positive and negative properties or characteristics to these behaviours?
- Does improvisational behaviour require teaching or training or is it preferable not to provide this kind of intervention? Can improvisation be taught or learned – if so what are the dependant factors for successful training for improvisational skills?
- What pre-requisite skills or resources are required for improvisation to succeed? Is improvisation limited or enhanced by prior skills, knowledge or available resources to the individual? Are certain pre-requisite skills or competencies essential or beneficial for improvisational skills, such as social, cultural or information literacy skills?
- Do individuals need to be aware of improvisation and should this practice be considered a formal skills in which individuals take conscious part?
- Does the context for improvisation matter (e.g. online or class-based learning or training) and can the context, circumstances or environment provide impetus for improvisation?
- Reflecting perspectives for improvisational behaviour as a driver for new insight or knowledge and organisational memory or retention of this

knowledge (Moorman and Miner, 1998; Weick, 1993; Hutchins, 1991), how can improvisation be exploited more efficiently by organisations for development of new insight, change or enhancement of processes, services or performance? How can new insight or knowledge be shared by practitioners and retained for wider application within organisations?

- Evaluation of the improvisational learning behaviours of Further Education Students in a Blended Learning context./
- Do educationalists within Higher Education or other sectors engage in improvisational behaviours to support or enhance learning processes, outcomes, assessment or interaction with students? How can improvisational skills for teaching be supported, developed or assessed?
- Previous chapters/sections of the theses have considered the role of improvisational behaviours for organisations. How can managers, leaders or organisational planners achieve insight into organisational or sector change arising from improvisational behaviours by practitioners? How can this insight be retained, evaluated, disseminated or operationalised?
- What are the implications for other skilled individuals, such as technicians or skilled manual workers where the tacit (socially-derived) knowledge and practical experience is important? How can new knowledge or beneficial processes be retained, disseminated or impact wider practice?
- What are the implications for improvisation behaviours in technical or scientific areas of activity, how can improvisational behaviours be retained, discussed, evaluated or disseminated for wider discussion?

Part 4: Summary of Potential Gaps or Omissions Raised by the Literature

The Literature was found to present discussion on student engagement with Technology Enhanced Learning, however these sources often failed to address transitional models of engagement, to address behavioural patterns as a more complex continuum or to assess wider patterns of engagement from a student perspective; additionally, there is typically little discussion on the improvisational practices of students when studying via a blended or online context.

The current study also demonstrated significant emphasis by students on processes for navigating diverse systems, computer applications and scholarly resources; the literature often fails to address improvisational student strategies in response to these diverse systems or environments.

Improvisational behaviours within Higher Education are rarely explored in the literature, suggesting that improvisation within Higher Education in particular is still largely unexplored. Coverage of learning styles or approaches in relation to improvisational behaviours for Higher Education is also poorly reflected in the literature.

Part 5: Summary of Original Aspects of the Thesis and Contribution to Knowledge

A range of original insight or perspectives are presented via the Grounded Theory of ‘Improvised Learning’, most substantially via the generation of an original, holistic or multi-faceted conceptual explanation or perspective for learning via educational technology in a blended learning context. The emergent theory is derived from

inductive data analysis and therefore presents a novel or unique perspective in terms of both the theory generated and methodology used. The emergent theory also offers significant insight for improvisational behaviours across a range of factors or circumstances for the substantive area of study, such as remotely managed peer collaboration, remote interaction with tutors for feedback or assessment or resolving Information Technology challenges via improvisational behaviours in a remote context. The following section will seek to elaborate on previous areas of this chapter and the thesis at large to reflect or summarise some of the key aspects for contribution of the thesis to the literature.

The outcomes of the project often suggest disparities between Student Aspirations for ICT based Learning and Institutional provision, he study provided many original insights in the form of dependant variables of the Core Category, 'Improvised Learning'. The theory particularly provides evidence of the disparity between student aspirations for ICT based learning and institutionally-led deployment of E-Learning as a managed or structured organisational activity. Similarly, the current study also reflected trends toward self-regulated peer communication for group work and mutual support networks; these reflected the transfer and sharing of tacit knowledge via engagement in social networks and communities of practice beyond the institutional managed learning environment.

Improvisation also called into question the relevance of instructional design theory and practice as this had been applied to Technology Enhanced Learning and systems such as the VLE; in some cases, VLE-based functionality had been supplanted via individual improvisation or adaption, such as use of Google Spaces for group working. The institutionally-led or planned model of VLE-based Blended Learning also appears to have been extended in physical terms by students - via use

of a wider range of locations for study such as the workplace and use of external systems and platforms; this kind of motivational behaviour also reflects a high degree of improvisation in extending or supplementing static or transmissive learning via the intuitionally-led context. The study also suggested disparities between formal, sector-led recommendations regarding innovative technologies such as 'mashups' (Craig, 2007, p.155), packaged learning objects, student portfolios and synchronous communication tools in contrast with student constructed models of learning. The implementation of innovative applications such as synchronous communication tools were not widely evidenced in the relatively static, VLE based Blended Learning model, there was however improvisation in evidence within student communities of practice, often based around popularised media such as social networks, effectively serving many of the functions typically inherent via institutional systems such as the VLE and Student Portal.

The Grounded Theory of 'Improvised Learning' also presented implications for Tutors and Mentors, including original insight for established ICT based mentorship models such as "E-Moderating" (Salmon, 2004, p.5), in this context student trends toward 'Improvised Learning' in a blended or related Technology Enhanced Learning context could be said to present new demands on mentors or E-Moderators - especially in terms of disparities between institutional management of ICT based learning and self-led behaviour.

The Grounded Theory of 'Improvised Learning' also suggested original insight for existing theoretical models or perspectives for motivational or self-regulated learning. The study demonstrated mobile activities, mainly via laptops when travelling for career purposes, these self-led approaches indicated high levels of motivational behaviours but also reflected improvisational behaviour in this context. Additionally,

improvisational behaviours often appeared to act as a driver or catalyst toward greater engagement or exploitation of wider distributed learning approaches, with students engaging in social networks, group tools and synchronous communications beyond the strict confines of the VLE to extend their learning experience, it can be demonstrated that students sought continually to expand and exploit resources, systems, networks and stakeholders beyond the VLE.

The Grounded Theory of ‘Improvised Learning’ also suggested original insight for self-led acquisition/ sourcing and management of resources, including scholarly resources, computing equipment and resources sourced via disparate locations or online systems. It can also be seen that improvisational behaviours often represented a response to resourcing or cost issues; this can be evidenced by comments reflecting use of virtualised communications or virtualisation of resources, such as seeking digital text equivalents (of print resources) - to avoid either library travel or purchase of resources.

Transitional Models of Blended and Distributed Learning also offer original insight into stages or levels of self-led, motivational engagement with Technology Enhanced Learning. Improvisational behaviour was reflected in some comments regarding avoidance or control of exposure/ engagement with digital or online systems, or was reflected in preferences to print or rely on physical scholarly resources. Insight into transitional behaviours may be useful for understanding how students develop longitudinally in terms of engagement with Technology Enhanced Learning and how improvisational behaviours are acquired to widen or enhance levels or stages of engagement.

The Grounded Theory of ‘Improvised Learning’ also presents an original perspective in the context of globalisation and distance-based learning via educational

technologies; whilst the current study substantively addressed students within a Blended Learning model. It is clear that use of externally sourced tools indicated by the students as a supplement to institutional platforms - such as social media or synchronous communication tools - could also potentially supplement conventional/ institutional systems for remote-based online learning; similarly, improvisational behaviours for communications - such as expanding or enhancing tutor or peer collaboration, sourcing scholarly resources or engaging with support networks all offer potential insight for wider application of 'Improvised Learning' for online study.

The Grounded Theory of 'Improvised Learning' also offers an original, inductive based paradigm for learning via Technology Enhanced Learning models (such as Blended Learning and Online Learning), but also a more broadly defined paradigm for learning in the modern, technology enabled educational environment. Whilst existing research or papers have considered aspects of innovation in terms of organisational or institutional-led approaches to learning, the theory of 'Improvised Learning; provides a series of induction-derived narrative and conceptual models or paradigms of Distributed Learning which seek to aggregate all sub-variables or dependant factors in a unified model.

The Grounded Theory of 'Improvised Learning' may also be considered in terms of a paradigm for hybrid learning, combining and complementing many established theories for learning and teaching. In addressing the nature of 'Improvised Learning' and its relationship to established theories of teaching and learning, we can say that this paradigm significantly reflects constructivist and self-managed theories of learning, emphasising self-regulated experiential, improvisational learning approaches – in contrast to institutionally led constructivist or experiential learning.

The properties of 'Improvised Learning' also seem to confirm a number of potential

new learning styles or approaches, following taxonomies of styles of learning suggested by Dimitrova, Sadler, Hatzipanagos and Murphy (2003); these could be summarised as ‘The Transitional Learner’ – reflecting tentative, progressive use of ICT and other innovative digital resources; ‘The Virtualising Learner’ – reflecting a tendency to construct or transform experiences, interactions or study behaviours into digital or online experiences; ‘The Traversing Learner’ – utilising a diverse array of online or physical resources, digital technology, online platforms and learning systems to achieve learning outcomes; ‘The Ubiquitous Learner’ – engaging in use of diverse resources, systems and physical resources via a range of digital devices and locations; ‘The Networked Learner’ – emphasising use of electronic communications such as email and use of social networks to engage in collaborative activities; ‘The Improvising Learner’ – engaging in constant adaption, substitution, supplementing, virtualising, physicalising and engaging in a diverse range of strategies and processes to overcome technical, personal or environmental challenges.

Another original aspect of the study can be seen in the emergence of several original types of Grounded Theory data or codes related to student perceptions or behaviours conveyed, including ‘active’ and ‘passive’ behavioural related codes (and potentially a further ‘aspirational’ code). It could be argued that two principal types of descriptive code had emerged in terms of participant narratives; one type of behaviour related code could be argued to comprise passive behaviours, emphasising transmissive processes or experiences such as reliance on core institutional platforms, reliance on received study materials via the VLE or passive student commentary or perceptions related to learning challenges or resourcing problems. Another type of behaviour related code reflected active or participatory

behaviours, or strategies employed by students to achieve objectives to extend or optimise their learning experience or study environment. Arguably, we could say there is a third form of code in terms of students who expressed a narrative around ‘aspiration’ to improve skills, develop better study habits or intention to utilise a particular resource more in the future, such as the VLE.

The Grounded Theory of ‘Improvised Learning’ provides a theoretical outcome strongly reflecting the original aims and motivations of the research project, namely to investigate the perceptions of low contact or part time students engaged in professional related programmes via the Blended Learning model in Higher Education. The Grounded Theory of ‘Improvised Learning’ therefore presents an original, holistic theoretical model or paradigm for learning via a low-contact, Technology Enhanced Learning context - demonstrating highly self-led, motivational strategies to function in this environment, characterised by a range of challenges, concerns, anxieties and corresponding self-regulated approaches to continually resolve study needs, aspirations and expectations.

Part 6: Concluding Statement

In conclusion, it can be seen that the Grounded Theory of ‘Improvised Learning’ presents a wide range of inter-related and inter-dependent theoretical perspectives, derived from inductive and ontological practical research to generate an holistic conceptual understanding or model for student behaviours in a low-contact, blended learning environment, with potential implications for wider fields or sectors. The properties or dependent theoretical perspectives of ‘Improvised Learning’ present a wide range of conceptual insights for student approaches to study in the Blended

Learning environment, such as collaborative processes and as a perspective for prior theoretical perspectives such as Blended Learning or Online Learning.
The Core Category ‘Improvised Learning’ emerged as an holistic, generalised theory of learning; the theory and its dependent properties can be seen to widely reflect the qualities of a transcending Grounded Theory, demonstrating descriptive level student behaviours alongside theoretical perspectives for student challenges, anxieties, concerns, strategies and related behaviours which constitute a general theory of participation in the modern Technology Enhanced Learning environment.
The Grounded Theory of ‘Improvised Learning’ therefore offers an holistic and inter-relating paradigm for learning, which can be seen to represent conceptually an explanation of fundamental concerns, strategies and behaviours for participants - transcending individualised concerns and presenting a theoretical perspective of self-regulated, motivational, virtualising and navigating processes for wider application beyond the field of study.

The Theory of ‘Improvised Learning’ can be summarised as follows:

Improvised Learning’ is the adaptive, innovative process inherent in student and learning behaviours to exploit the planned and informal environments for fulfilment of study aims.

Methods used for the generation of the Grounded Theory of ‘Improvised Learning’ may also offer insight or original approaches for the application of the chosen methodology, offering a highly structured implementation of original Grounded Theory principles and a practical approach for Grounded Theory processes,

including data collection, sorting and analysis, for systematic sorting, comparison and other techniques via selective use of software applications and features.

A note should perhaps be added regarding potential improvements which could have been implemented for the current research project. Potential weaknesses could include the participant group/location; the practical research could have been extended for instance across other similar Higher Educational institutions - for a wider sample and comparison with experiences of students within other institutions. The project could have potentially benefited from use of a qualitative analysis application, whilst some applications such as NUDIST were previously explored, these were not considered flexible enough for some aspects of the methodology; however, use of a qualitative analysis application may have reduced the need for the diverse range of software/Excel and digital sorting approaches used. Additionally, arguably, the implementation of the methodology could have been further strengthened via use of a formal, interpretative guide for implementing Grounded Theory, rather than the approach used (derived from principles and approaches obtained from the original textbooks by Glaser); use of an interpretive guide could arguably have supported approaches used for sorting and other methods. A further weakness of the study comprised the retrospective analysis following a break from study, this limited the scope for further verification of theoretical perspectives, relying instead on an iterative process of comparison via sorting, comparison, frequency distribution and related techniques.

This research project, has therefore succeeded in addressing its original aims and objectives, namely, to address or investigate the perceptions of Higher Education students engaged in a learning context of particular significant for recent times, i.e. the environment for blended approaches of Technology Enhanced Learning, with

close proximity or relevance for related models of learning, such as Online Learning or Massive Open Online Course-based learning. The research has resulted in the generation of theoretical or conceptual insight via an holistic approach, comprising Grounded Theory methods to address the substantive area of study and to develop an original theory of engagement with learning, via inductive, interpretative and ontological approaches, balancing the role of the literature and preconception for professional interest or knowledge.

It can be demonstrated that the Grounded Theory of ‘Improvised Learning’ provides an original, inductive-based paradigm for self-regulated learning - principally for the Blended Learning context, but offering potentially wider application for sectors or industries beyond the substantive area of study, as previously outlined with regards to the transcendent qualities of its properties or component theoretical perspectives.

The Grounded Theory of Improvised Learning demonstrates that students in a modern, technology-enhanced learning environment engage in ad-hoc, innovative and unplanned behaviours to enhance, supplement and develop their learning and academic outcomes, revealing a series of inter-related behaviours and strategies reflecting self-regulated engagement with a range of digital resources and facilities which adapt and extend the formal, institution-led blended learning environment, allowing students to overcome difficulties related to technical problems, skills development, resourcing, management of information and personal difficulties, resulting in a highly self-led, situated and collaborative study experience to achieve learning outcomes and potential.

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APPENDIX 1: UNPUBLISHED PAPER FOLLOWING THE ANNUAL GROUNDED THEORY SEMINAR

An early narrative of the Grounded Theory process used to deliver a series of seminars on the PhD research project at MMU and Glyndŵr University during 2007-08.

An overview of Grounded Theory following attendance at the London Grounded Theory Conference with Barney Glaser, 24 – 26th April 2006

Paul Catherall

Introduction

I was first alerted to Grounded Theory by one of my research supervisors where I recently registered to conduct a PhD at Manchester Metropolitan University [1]. In an attempt to develop an original study, I had explored several specific research topics within the broad area of online learning in Higher Education.

I had actually begun background studies on online learning systems, approaches and related technical issues as far back as mid 2004, when I was asked to research and write a text on delivering e-learning systems [2] for Information Services in Higher Education [3]. Having developed a broad interest in online learning, I found it difficult to refine my area of study.

I had read some third party Grounded Theory literature based on the writings of Straus and Corbin [4]; my reading led me to believe that Grounded Theory could be used to provide a method for conducting the practical research element of my research plan, however I later discovered that Grounded Theory provides a fundamental approach to research which more properly defines the methodology of the entire study.

Key features of Grounded Theory that interested me included the focus on a 'substantive area' as opposed to a research question or hypothesis and the faculty to develop a theory from raw data; these elements seemed to offer a suitable approach to facilitate my study, which now considered 'Student perceptions on skills and learning challenges in the use of educational technology in a part-time, distributed and professional study context.' [5].

The emphasis on 'distributed' study was intended to suggest a broad scope or context incorporating aspects of pedagogy, self-directed study and online learning skills.

Background to Grounded Theory

Shortly before attending the London Grounded Theory conference, I found that Grounded Theory had been developed cooperatively in the late 60s by Barney Glaser and Anselm Strauss (The Discovery of Grounded Theory, Glaser & Strauss, 1967). Following early publications (e.g. Awareness of Dying), a split had emerged between these two researchers, with quite different approaches to what had originally been termed *Grounded Theory*.

Crudely summarised, Grounded Theory according to Glaser emphasises the ‘emergence’ of categories (also called conceptual codes) out of data, it is up to the researcher to constantly compare field notes (or ‘memos’) to identify ‘indicators’ which reveal the concerns of participants; the researcher compares categories to reveal an underlying core category or concern which represents a theory explaining the behavioural process at work within the given context.

The technique developed by Strauss and Corbin [4], follows these same grounded principles as Glaser but applies a greater degree of evaluative method to the development of categories, with a more complex and subjective approach in the discovery of data, for example, Straus’ *axial coding* suggests that categories should be developed under headings such as ‘conditions, context, action/interaction strategies and context’. In his book *Basics of Grounded Theory Analysis* (1992) Glaser refutes the developments by Strauss and Corbin, stating that their heavily structured method pre-empts the data:

> “Gone in Strauss’ method was our initial clear approach in *Discovery of Grounded Theory* to the systematic generation of theory from data! Strauss’ techniques are fractured, detailed, cumbersome and over-self-conscious. They interfere with the emergence and discovery which comes from the constant comparative method of coding and analysis.” (p. 60).

Emergence vs. Forcing

For Glaser, the fundamental issue is 'emergence' of data over ‘forcing’, i.e. the importance of refraining from bringing a preconceived theory, ideology or concept to

the substantive area. There are several important implications for professional researchers, most notably what Glaser calls ‘the research question’ (p. 23), emphasising the need to refrain from allowing a professional interest or area of debate to pre-empt the research process at the data collection or conceptualisation stages.

The issue of emergence vs. forcing is central to the manner in which a Grounded Theory study is carried out from the beginning, addressing a ‘substantive area’ rather than a research problem; the intention of Grounded Theory is to interrogate a participant group within a known context and behavioural cycle, approaching the social context with an open mind and listening to the concerns of participants in order to define their concerns conceptually. Examples of substantive areas at the Grounded Theory conference included :

- Children undertaking psycho therapy.
- Nurses working with difficult patients.
- Distance learners.
- Doctors in Denmark during a period of systematic change.

Glaser says ‘a missed problem is a problem whether or not the researcher discovers and attends to it or not..’ (p. 22). The emergence of a Grounded Theory may therefore reveal a previously unknown participant concern or illustrate a new form of behavioural cycle in responding to the concern.

The Conference

For Glaser, traditional qualitative research invariably pre-empts the concerns of the social context under study; during the London Conference, I had the opportunity to discuss my own research proposal, a traditional research plan with defined aims and objectives; Glaser suggested that a research proposal of this kind is contradictory to Grounded Theory, since research aims merely pre-empt or preconceive emergent data in the substantive area. Another issue of concern to Glaser was the use of the term 'distributed learning' which Glaser thought could imply evaluation of an established theoretical model of study, hence focusing on this theory as opposed to interrogating the concerns of participants in the chosen context. However, I felt the use of the term 'distributed learning' was justifiable under a Grounded Theory study, since the term is anecdotal and simply describes a known context, i.e. combined class-based and online learning. Another aspect which emerged at various points in the conference was the issue of the literature search, which Glaser suggests can obscure the researcher's view of the substantive area against the backdrop of established theories, descriptive literature etc. However, Glaser did endorse third party literature, suggesting that this should feed into the research on the same level as other data, i.e. comprising data which can be compared with participant responses and processed in the same way. This kind of information is paramount to the development of what Glaser has termed 'Theoretical Sensitivity', i.e. developing a broad awareness of the wider context surrounding the substantive area, this awareness increases the researcher's sensitivity to developing theoretical categories which interrelate and explain patterns in those categories (see next section for further details on *theoretical coding*).

An attempt to Describe the Grounded Theory Process

Grounded Theory (as described by Glaser) may appear a fairly simple approach for conducting research according to core tenets, expressed in maxims such as ‘all is data’ and ‘trust to emergence’, however, this methodology also provides a coherent framework to implement the general ideas of Grounded Theory.

We have noted how the ‘substantive area’ forms the starting point of a Grounded Theory study (as opposed to a traditional research question or hypothesis) addressing a social context, where a participant cycle or general activity is apparent. We have also mentioned the general interrogation of participants to generate raw data which is then categorised to determine participant concerns as conceptual processes and the identification of a ‘core category’ which interrelates with these concerns. Whilst the ideas of Grounded Theory are discernible from the literature, an understanding of Grounded Theory process can seem more elusive, to this end I have attempted to provide a table illustrating the principal stages for conducting a Grounded Theory project, it should be noted this is only a general approximation of the steps involved and many aspects such as *Constant Comparative Method* are on-going throughout the project.

The Theory

The identification of the ‘core category’ is the goal of the Grounded Theory project, this is the theory that conceptually defines the most important process which participants seek to resolve (often unconsciously) and which is usually related to all the other participant concerns. This conceptual theory is ultimately drawn from raw

participant data and processed in a neutral and objective manner using the categorisation and conceptualisation methods described above.

Purpose of developing a Grounded Theory

Whilst Grounded Theory is obviously rooted in the field of sociology, with terminology borrowed from in this area, it can be seen that Glaser has developed a simple yet fundamental approach to discovering behavioural processes and associated problems.

Perhaps Grounded Theory is better considered as a pure research methodology rather than a research ‘method’ such as action research; Grounded theory comprises a complete methodology framework which may be used for a project in its entirety complete with its own theories concerning truth in data and the role of belief systems. Grounded Theory therefore does not sit well with established theoretical paradigms nor is Grounded Theory appropriate when evaluating pre-defined variables against a known framework of values, Grounded Theory attempts to discover problems from the perspective of participants rather than from the perspective of critical models or ideology-based theories such as Postmodernism, Marxism or Feminism.

It is entirely possible that a Grounded Theory study - potentially discovering an unknown or poorly understood problem could prompt further research in this area, possibly using an evaluative or theoretical-based methodology.

Grounded Theory effectively steps back from preconceived professional values and known paradigms and takes a neutral view of behavioural activity to determine issues of relevance to the participant context itself.

Conclusion (Problems using Grounded Theory in traditional Projects)

It occurred to me that my original research proposal contained too many pre-empted ‘aims’ for a Grounded Theory study; I may need to make a choice in how I use Grounded Theory, i.e. either using only selective Grounded Theory concepts and methods within elements of my research, or more properly as a fully grounded study seeking to approach a substantive area and develop a core theory of behaviour as the goal of the research project.

In retrospect, I think Grounded Theory will provide an underlying methodology upon which I can produce the research, with the delimited ‘aims’ of the project merely informing the generation of categories in the role of third party reading as described by Glaser in *Theoretical Sensitivity*.

I have yet to undertake a practical investigation in student perceptions of distributed study, however, I am confident the Grounded Theory methodology will ensure the emergence of natural and relevant concerns. Please also see the table I have provided below (‘Practical Processes in a Grounded Theory Project’).

I refer the reader to the bibliography for additional reading material on Grounded Theory and to the website of Barney Glaser (and Sociology Press) at: http://www.groundedtheory.com/

Practical Processes in a Grounded Theory Project

1. Identification of **Substantive Area** ('an area containing a life-cycle interest' – [6]). 2. Interrogation of substantive area, usually in the form of interviews but can be done using other methods, e.g. email, participant reports. The main concern of this stage is to avoid preconceiving or 'forcing' issues, concerns or jargon etc. on the participants; it is for this reason that Glaser suggests an initial opening statement to develop a dialogue between the interviewer and interviewee. Some prompting is permitted to prevent the participant moving off-subject etc. 3. Processing of raw data in the form of '**memos**' to identify '**indicators**' which suggest concerns of the participants. 4. The 'substantive' stage for coding includes use of '**Open Coding**' (initial categorisation based on memo indicators) followed by development of higher level ***substantive categories*** and their	**Ongoing Literature Review** - Provides data with which to compare other data (i.e. using 'memos' to note conceptual issues).	**Constant Comparative Method** - Comparing and testing all data as necessary, e.g. comparing substantive categories to produce theoretical categories and eventually the core category, developing memos from the literature to identify concepts for comparison with theoretical and substantive categories.

properties – (e.g. memos may indicate behavioural patterns such as nurses dealing with abusive patients in a variety of ways, an example *category* in this case could be <u>nurses dealing with abusive patients via ignoring strategy</u>, whilst <u>verbal abuse</u> could be a *property* of the category.) It is foreseen that many early categories at the substantive stage will be 'descriptive' codes/categories, describing processes but perhaps suggesting theoretical insight in the form of 'theory bits'. The 'constant comparison' of categories is undertaken to determine a common strand, upon which all the categories are based, this is the **core category** the higher conceptual process or issue that participants continually resolve. The generation of *substantive categories* provides a basic conceptual description of the activities of the participant group. ***Selective coding*** may also		

be used to refine the core category; .e.g. comparison of similar responses may reveal a higher conceptual view of a common concern. 5. In contrast to 'descriptive categories', it is also necessary to develop '**theoretical categories**' (theoretical coding) – these will attempt to define the behavioural process conceptually. A broad awareness of the topic and surrounding topics will ensure 'theoretical sensitivity' to allow the researcher to develop theoretical categories of behaviour from the data; these theoretical categories could be tested or compared against substantive categories to determine if they relate, for example, a theoretical category derived by comparing similar substantive categories could reveal the concept of <u>nurses employing avoidance strategies for abusive patients</u>, whilst this category may have been derived from		

other categories, it can also be tested against re-worked categories and existing literature to support the theory (this is essentially theoretical sensitivity). There are a range of established 'theoretical codes' which suggest theoretical models to explain a range of motives, drives and consequences, e.g. *Causes (sources, reasons, explanations, accountings or anticipated consequences), Context or Ambiance, Contingencies, Consequences (outcomes, efforts, functions, predictions, anticipated/ unanticipated), Co-variances, Conditions or Qualifiers.*		

Notes.

1. Further details of my research is available at: http://draigweb.co.uk/elearning
2. *e-learning* or electronic learning is a general term applied to any form of learning and teaching via computer systems. *e-learning* is used more recently in the context of Web-based systems.
3. *Delivering E-Learning for Information Services in Higher Education,* Chandos Publishing, 2005, ISBN 184334 0887 (paperback) / 184334095X (hardback).

4. Straus, A. and Corbin, J. 1998, Basics of Qualitative Research
5. Distributed Learning - A general description for a study context combining class-based and online learning approaches using Information Technology.
6. Glaser, Barney G. 1998. Doing Grounded Theory: Issues and Discussions. Sociology Press, p. 118
7. The 18++ Theoretical Coding Families of Grounded Theory (May, 2005): http://gtm.vlsm.org/gnm-gtm2.en.html

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APPENDIX 2: ORIGINAL PROPOSAL

Note – this proposal dates from early 2005 and represents the earliest firm proposal for the study.

THE MANCHESTER METROPOLITAN UNIVERSITY

FACULTY OF HUMANITIES, LAW & SOCIAL SCIENCE FACULTY RESEARCH DEGREES COMMITTEE

RESEARCH DEGREE PROPOSAL OUTLINE

Please refer to the handbook "Guidelines for Research Students and Supervisors" before completing this form.

Application for: ~~MA/MSc/LLM/MPhil~~/PhD (delete as appropriate).

Name of Candidate: Paul Catherall

Title of Proposal: Student perceptions on skills and learning challenges in the use of educational technology in a Part Time, blended and professional study context.

Academic aims of the investigation:

This study aims to assess perceptions of educational technology skills [1] and learning method demands amongst first year Higher Education students, undertaking low-contact (i.e. courses designated part-time or less than 15 hours per week)

professional courses in a blended learning [2] context, combining traditional class teaching with remote study. Objectives include:

1) Determine existing pedagogical theories and research related to blended learning skills, including theoretical approaches to teaching and study via educational technology, learner-practitioner interactions and issues influencing blended learning - including socio-cultural, institutional, resourcing and strategic factors relevant to this context.
2) Analyse sector recommendations for blended learning skills requirements in a Higher Education context (e.g. within government agencies and professional bodies regulating professional-related courses) across the Post-Compulsory Education, Information Technology and Information sectors.
3) Distinguish perceptions of blended study requirements within a demand-led [3] Higher Education provider, including pre-entry requirements and expectations for skills development, also including perceptions of practitioners and support service staff.
4) Assess perceptions of blended study requirements amongst first year, low-contact students undertaking undergraduate professional-related courses within a defined Higher Education Institute across differing disciplines.
5) Evaluate existing matrices for assessment of Higher Education skills requirements using findings in Objectives 1-4, establishing how far these could be applied to undergraduate students in a low-contact, blended study context.
6) Contribute to the development of a matrix for assessment of blended learning and study skills requirements. Depending on the outcome of Objective 5, either make recommendations for the modification of an existing matrix or

recommendations for the design of a new matrix suitable for a low-contact blended study context.

7) Make recommendations for blended study training and support (including in-course development and assessment) for undergraduate students in a low-contact blended study context, and for further research.

Description of the research to be undertaken:

In recent years, the Higher Education sector has witnessed significant changes in study patterns, client demand and course delivery methods (O' Donoghue et al. 2003). Key features of this changing climate include increasing digitisation [5] of course delivery and support systems, increased levels of demand for low-contact and remote study, greater alignment with industry and increased diversity within the student body itself (Catherall 2004). Recent government reports and legislation have also brought a new impetus for widening participation [6] and innovation in course delivery (e.g. Dearing 1997, The Learning Age 1998) and closer alignment to the vocational and professional spectrum of industry (e.g. The Future of Higher Education 2004). The ubiquitous [7] and increasing presence of networked electronic systems for course delivery and support has coincided with these changing study patterns, offering an apparent solution to the communication and content dissemination problems of low-contact study (Raymond 2000), characterised by Web-based e-learning [4], information retrieval and related client-side [8] software. Collectively, this approach to teaching and learning has been dubbed ' blended learning'.

However, an emerging body of research suggests that there has been a lack of understanding on the role of interactions and learning methods via educational technology (e.g. Rowland & Rubbert 2001, Newton 2003); other research has considered educational technology from an holistic perspective, considering the views of support staff and students on a range of support, delivery and skills issues, including the Student Online Learning Experiences (SOLE) project (2003) and the JISC User Behaviour Monitoring and Evaluation Framework (1999-2002 p.302) to *"... benchmark development in the provision and use of EIS"* ('Electronic Information Services' Banwell 2003). These studies have largely surveyed authoritative sources, such as educational practitioners and other staff delivering Higher Education via blended study.

This investigation will contribute to existing research, by examining students' perceptions of blended study skills requirements, comparing these perceptions with government, industry, sector and institutional views derived from the literature review and original research elements. Low-contact student groups will be investigated within a selected Higher Education provider, across a range of professional-related disciplines - reflecting the trend towards widening participation and the UK Government's aspiration for a demand-led re-alignment of Higher Education.

It is considered that this study will provide valuable original information on current practices in technology-based teaching, contrasting the perceptions of authoritative sources at the institutional and national levels with those of students, whose expectations and experiences as learners are vital factors in understanding blended study as a pedagogical process.

Methods to be used

Literature review: To investigate pedagogical theories on blended learning (Objective 1), formal skills prerequisites within official bodies (Objective 2) and a selected Higher Education provider (Objective 3). Hardcopy journals such as *Journal of Vocational Education and Training* and online article databases will be consulted, including Swetswise and Ingenta. The literature review will also assist in categorising blended study skills to develop a skills assessment matrix (Objectives 5, 6).

Surveys: 3-5 low-contact, undergraduate student groups of 30-50 persons will be selected for surveying (Objective 4). Each group will comprise a unique professional discipline (e.g. Education, Nursing). Three student surveys will be delivered: one following enrolment, one at mid-academic year and one at the end of academic year, using a controlled environment (e.g. IT lab). Group/ class criteria includes: (a) no age range or gender restriction, (b) maximum 5 hours weekly class contact, (c) course supported by e-learning, (d) standard transferable skills module taught within course delivery.

Interviews: 3-5 academic staff teaching the student survey groups will be selected for interviewing. Semi-structured interviews will be used to investigate staff perceptions of educational study skills (Objective 3), allowing for some open-ended comment. Three interviews will be delivered: one following enrolment, one at mid-academic year and one the end of the academic year. 8-10 support staff will also be selected for interviewing (Objective 3) at three similar stages (academic/ support staff interview designs will differ appropriately). Interviews will last around half an hour per staff member.

Pilot: Pilot interviews for academic staff, support staff and the student questionnaire will be used before deployment.

Synthesis: The practical research will consider perceptions of blended study skills from the perspective of 'grounded theory' (Leedy and Ormond 2005), seeking to establish a theoretical framework for analysis based on trends in the primary data; this approach is considered appropriate due to the original nature of the subject. Primary data will be stored and analysed using the SPSS application, using statistical correlation and analysis tools provided by this software.

Ethical issues: Permission has been given at the North East Wales Institute of Higher Education to conduct surveys.

Resources: Budget for photocopying approximately 300 interview and survey forms. Third party cooperation will include students, academics, and support staff. The researcher has access to staff and student groups whilst working at NEWI.

Action Plan (By year, envisaged to comprise 5-6 years)	2004	2005	2006	2007	2008	2009
Literature review	Ongoing throughout study.					
Method / Research Skills (Review of methodology used as study develops).	■	■	■			
Investigative Research (Sector Perceptions of educational skills etc).	■	■	■			
Student Questionnaire Design			■	■		
Academic staff Survey Design			■	■		
Support Staff Survey Design			■	■		
Practical Research Pilot / Redesign				■	■	
Practical Research Deployment					■	
Practical Research Analysis / Synthesis						■
Write Up Thesis						■

Notes

1. Educational technology skills: Skills facilitating educational activities in a digital context.

2. Distributed learning: A study context facilitated both by learning technology and traditional teaching methods.

3. Demand-led (or 'market-led'): The UK Government's vision for post-statutory education to meet the demands of industry.

4. E-learning: Typified by the VLE (Virtual Learning Environment) facilitating study and collaboration via a Web based interface.

5. Digitisation: The increasing use of Information Technology in the place of traditional hardcopy/ textual systems.

6. Widening participation: The aspiration for greater availability of Higher Education for the general public.

7. Ubiquitous computing: Pervasive behavioural uses and persistent (i.e. 24 hours) availability of networked systems/ services.

8. Client-side: The user software in a user-network relationship, e.g. a Web Browser is a 'client' application.

Key references

- Banwell, L. et al. (2003) The JISC User Behaviour Monitoring and Evaluation Framework *Journal of Documentation* 60 (3), p.302-320
- Catherall, P. (2004) *Delivering E-Learning for Information Services in Higher Education* Oxford: Chandos Publishing
- Department for Education and Employment (1998) The Learning Age. October 2004: http://www.lifelonglearning.co.uk/greenpaper
- Great Britain, Home Office (2003) The Future of Higher Education. London: HMSO

- Leedy, P. D. and Ormond, J. E. (2005) *Practical Research Planning and Design*: Pearson Education
- National Committee of Inquiry into Higher Education (1997) The Dearing Report. October 2004: http://www.leeds.ac.uk/educol/ncihe
- Newton, R. (2003) Staff Attitudes to the development and delivery of e-learning *New Library World* 104 (1193), p.412-425
- O'Donoghue, J. et al. (2003) Higher education - IT as a catalyst for change *On the Horizon* 11 (3), p.23-28
- Raymond, F. B. (2000) Delivering distance education through technology: a pioneer's experience *Campus-Wide Information Systems* 17 (1), p.49-55
- Rowland, F. and Rubbert, I. (2001) An Evaluation Of The Information Needs And Practices Of Part-Time And Distance-Learning Students In The Context Of Educational And Social Change Through Lifelong Learning *Journal of Documentation* 57 (6), p.741-762
- SOLE Student Online Learning Experiences (2003). October 2004: http://sole.ilrt.bris.ac.uk

APPENDIX 3: REVISED PROPOSAL

Paul Catherall - Revised Proposal - Manchester Metropolitan University

Research Student (registered PhD Nov 05.)

Uses of Grounded Theory for research project entitled: Student perceptions on skills and learning challenges in the use of educational technology in a low contact, distributed and professional study context.

Academic aims of the investigation:

This study aims to assess perceptions of educational technology skills (and learning method) demands amongst first year Higher Education students, undertaking part-time or low contact professional courses in a *distributed learning* context, combining traditional class teaching with remote study. The concise proposal is shown overleaf, further information is available at: http://draigweb.co.uk/elearning

Summary of Research Problems and Ideas for Grounded Theory:

The project aims to investigate the integrated learning methods context for students in part-time or low contact, Higher Education study, particularly focused on the use of the *distributed* approach to teaching and learning incorporating conventional class-based teaching with e-learning (web-based approaches) and related educational technology. The views of students themselves will be interrogated and compared

with a wide range of authorities on distributed study requirements / demands; these authorities include national and local organisational sources.

The challenge - beyond the initial literature review (before the substantive research occurs), is to develop a workable methodology based on general techniques as discussed in the proposal and to formalise the methods used to interrogate textual sources and compare these with human sources.

The use of Grounded Theory has presented itself as a highly suitable method for the project, partly due to its emphasis on participant views which forms the focus of the project and also due to the original nature of the study and wide range of variables involved in distributed learning as a process, where many subjective theories or hypotheses could be deduced.

The initial project objective involves ongoing collection and analysis of a wide range of perspectives on distributed study demands, including an ongoing literature review to define statutory recommendations for distributed study requirements, academic or other professional commentary on distributed study demands, institutional requirements and use of semi-structured interviews amongst students and institutional staff within the research context.

Conceptualisation will occur during the actual data collection process to identify underlying patterns in the expression of perceptions and recommendations, allowing for initial *substantive coding* of *categories*; this coding process will involve an *open coding* approach, i.e. delineating data from comparative sources into segments which can then be scrutinised for common categories and *property* attributes, these coding approaches will thereby describe the phenomenon of distributed study demands through a set of defined category themes.

Theoretical coding may also be used to define relationships between interrelated categories, for example - examining conditions giving rise to perceptions/ recommendations, examining context or bias of sources, examining causes/ consequences implied in the views of sources.

Alongside *open coding*, *selective coding* may also be used to refine category themes by combining interrelated categories to present a 'story line' of the process involved in distributed study demands.

The *constant comparative method* will be used to compare and re-assess perceptions/ recommendations from the distinct sources; whilst the focus will be on student perceptions, these will constantly be compared with comparative views of authoritative and external sources.

The *core category* will eventually emerge through identifying repeated patterns which inter-relate most to other categories and which therefore emerges as the core concern to study demands of distributed learning, this will allow for the proposal of a *grounded theory* to explain the phenomenon of distributed study demands in relation to the *core* and *sub-categories*. It is hoped that the general approach outlined above will provide a basis for achieving a grounded theory methodology to facilitate the study.

RESEARCH DEGREE PROPOSAL OUTLINE

Title of Proposal: Student perceptions on skills and learning challenges in the use of educational technology in a part time or low contact, distributed and professional study context.

Academic aims of the investigation:

This study aims to assess perceptions of educational technology skills [1] and learning method demands amongst first year Higher Education students, undertaking part-time or low contact professional courses in a distributed learning [2] context, combining traditional class teaching with remote study. Objectives include:

8) Determine existing pedagogical theories and research related to distributed learning skills, including theoretical approaches to teaching and study via educational technology, learner-practitioner interactions and issues influencing distributed learning - including socio-cultural, institutional, resourcing and strategic factors relevant to this context.
9) Analyse sector recommendations for distributed learning skills requirements in a Higher Education context (e.g. within government agencies and professional bodies regulating professional-related courses) across the Post-Compulsory Education, Information Technology and Information sectors.
10) Distinguish perceptions of distributed study requirements within a demand-led [3] Higher Education provider, including pre-entry requirements and

expectations for skills development, also including perceptions of practitioners and support service staff.

11) Assess perceptions of distributed study requirements amongst first year, part-time students undertaking professional-related courses within a defined Higher Education Institute across differing disciplines.

12) Evaluate existing matrices for assessment of Higher Education skills requirements using findings in Objectives 1-4, establishing how far these could be applied to undergraduate students in a part-time, distributed study context.

13) Contribute to the development of a matrix for assessment of distributed learning and study skills requirements. Depending on the outcome of Objective 5, either make recommendations for the modification of an existing matrix or recommendations for the design of a new matrix suitable for a part-time distributed study context.

14) Make recommendations for distributed study training and support (including in-course development and assessment) for undergraduate students in a part-time distributed study context, and for further research.

Description of the research to be undertaken:

In recent years, the Higher Education sector has witnessed significant changes in study patterns, client demand and course delivery methods (O' Donoghue et al. 2003). Key features of this changing climate include increasing digitisation [5] of course delivery and support systems, increased levels of demand for part-time and remote study, greater alignment with industry and increased diversity within the student body itself (Catherall 2004). Recent government reports and legislation have

also brought a new impetus for widening participation [6] and innovation in course delivery (e.g. Dearing 1997, The Learning Age 1998) and closer alignment to the vocational and professional spectrum of industry (e.g. The Future of Higher Education 2004). The ubiquitous [7] and increasing presence of networked electronic systems for course delivery and support has coincided with these changing study patterns, offering an apparent solution to the communication and content dissemination problems of low-contact study (Raymond 2000), characterised by Web-based e-learning [4], information retrieval and related client-side [8] software. Collectively, this approach to teaching and learning has been dubbed 'distributed learning'.

However, an emerging body of research suggests that there has been a lack of understanding on the role of interactions and learning methods via educational technology (e.g. Rowland & Rubbert 2001, Newton 2003); other research has considered educational technology from an holistic perspective, considering the views of support staff and students on a range of support, delivery and skills issues, including the Student Online Learning Experiences (SOLE) project (2003) and the JISC User Behaviour Monitoring and Evaluation Framework (1999-2002 p.302) to *"... benchmark development in the provision and use of EIS"* ('Electronic Information Services' Banwell 2003). These studies have largely surveyed authoritative sources, such as educational practitioners and other staff delivering Higher Education via distributed study.

This investigation will contribute to existing research, by examining students' perceptions of distributed study skills requirements, comparing these perceptions with government, industry, sector and institutional views derived from the literature review and original research elements. Part-time or low contact student groups will

be investigated within a selected Higher Education provider, across a range of professional-related disciplines - reflecting the trend towards widening participation and the UK Government's aspiration for a demand-led re-alignment of Higher Education. It is considered that this study will provide valuable original information on current practices in technology-based teaching, contrasting the perceptions of authoritative sources at the institutional and national levels with those of students, whose expectations and experiences as learners are vital factors in understanding distributed study as a pedagogical process.

Methods to be used

Literature review: To investigate pedagogical theories on distributed learning (Objective 1), formal skills prerequisites within official bodies (Objective 2) and a selected Higher Education provider (Objective 3). Hardcopy journals such as *Journal of Vocational Education and Training* and online article databases will be consulted, including Swetswise and Ingenta. The literature review will also assist in categorising distributed study skills to develop a skills assessment matrix (Objectives 5 and 6).

Interviews: 3-5 part-time, professional-programmes, including undergraduate and professional development programmes such as CIM or CIPD programmes, student groups of 30-50 persons will be selected for surveying (Objective 4). Each group will comprise a unique professional discipline (e.g. Education, Nursing). Three semi-structured student interview phases will be delivered: one following enrolment, one at mid-academic year and one at the end of academic year, using a controlled environment (e.g. IT lab). Group/ class criteria includes: (a) no age range or gender

restriction, (b) under 15 hours weekly class contact, (c) course supported by e-learning, (d) standard transferable skills module taught within course delivery.

Pilot: Pilot interviews will be used before deployment.

Synthesis: The practical research will consider perceptions of distributed study skills from the perspective of 'grounded theory' (Leedy and Ormond 2005), seeking to establish a theoretical framework for analysis based on trends in the primary data; this approach is considered appropriate due to the original nature of the subject. Primary data will be stored and analysed using a qualitative research compatible application, using statistical correlation and analysis tools provided by this software.

Ethical issues: Permission has been given at the North East Wales Institute of Higher Education to conduct surveys.

Action Plan (By year, envisaged to comprise 5-6 years)	2004	2005	2006	2007	2008	2009
Literature review	Ongoing throughout study.					
Method / Research Skills (Review of methodology used as study develops).	■	■	■			
Investigative Research (Sector Perceptions of educational skills etc).	■	■	■			
Student Questionnaire Design			■	■		
Academic staff Survey Design			■	■		
Support Staff Survey Design			■	■		
Practical Research Pilot / Redesign				■	■	
Practical Research Deployment					■	
Practical Research Analysis / Synthesis						■
Write Up Thesis						■

Resources: Budget for photocopying approximately 300 interview and survey forms. Third party cooperation will include students, academics, and support staff. The researcher has access to staff and student groups whilst working at NEWI.

Notes

1. Educational technology skills: Skills facilitating educational activities in a digital context.

2. Distributed learning: A study context facilitated both by learning technology and traditional teaching methods.

3. Demand-led (or 'market-led'): The UK Government's vision for post-statutory education to meet the demands of industry.

4. E-learning: Typified by the VLE (Virtual Learning Environment) facilitating study and collaboration via a Web based interface.

5. Digitisation: The increasing use of Information Technology in the place of traditional hardcopy/ textual systems.

6. Widening participation: The aspiration for greater availability of Higher Education for the general public.

7. Ubiquitous computing: Pervasive behavioural uses and persistent (i.e. 24 hours) availability of networked systems/ services.

8. Client-side: The user software in a user-network relationship, e.g. a Web Browser is a 'client' application.

Key references

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- Catherall, P. (2004) *Delivering E-Learning for Information Services in Higher Education* Oxford: Chandos Publishing
- Department for Education and Employment (1998) The Learning Age. October 2004: http://www.lifelonglearning.co.uk/greenpaper
- Great Britain, Home Office (2003) The Future of Higher Education. London: HMSO
- Leedy, P. D. and Ormond, J. E. (2005) *Practical Research Planning and Design*: Pearson Education
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- Newton, R. (2003) Staff Attitudes to the development and delivery of e-learning *New Library World* 104 (1193), p.412-425
- O'Donoghue, J. et al. (2003) Higher education - IT as a catalyst for change *On the Horizon* 11 (3), p.23-28
- Raymond, F. B. (2000) Delivering distance education through technology: a pioneer's experience *Campus-Wide Information Systems* 17 (1), p.49-55
- Rowland, F. and Rubbert, I. (2001) An Evaluation Of The Information Needs And Practices Of Part-Time And Distance-Learning Students In The Context Of Educational And Social Change Through Lifelong Learning *Journal of Documentation* 57 (6), p.741-762
- SOLE Student Online Learning Experiences (2003). October 2004: http://sole.ilrt.bris.ac.uk

APPENDIX 4: ETHICAL APPROVAL APPLICATION

NEWI Ethical Approval Application (Section 3 Project Details)

Project Title	Student perceptions on skills and learning challenges in the use of educational technology in a part-time, distributed and professional study context.
1. Background and rationale for study	In recent years, the Higher Education sector has witnessed significant changes in study patterns, client demand and course delivery methods (O' Donoghue et al. 2003). Key features of this changing climate include increasing digitisation of course delivery and support systems, increased levels of demand for part-time and remote study, greater alignment with industry and increased diversity within the student body itself (Catherall 2004). Recent government reports and legislation have also brought a new impetus for widening participation and innovation in course delivery (e.g. Dearing 1997, The Learning Age 1998) and closer alignment to the vocational and professional spectrum of industry (e.g. The Future of Higher Education 2004). The ubiquitous and increasing presence of networked electronic systems for course delivery and support has coincided with these changing study patterns, offering an apparent solution to the communication and content dissemination problems of low-contact study (Raymond 2000), characterised by Web-based e-learning, information retrieval and related client-side software. Collectively, this approach to teaching and learning has been dubbed 'distributed learning'. However, an emerging body of research suggests that there has been a lack of understanding on the role of interactions and learning methods via educational technology (e.g. Rowland & Rubbert 2001, Newton 2003); other research has considered educational technology from an holistic perspective, considering the views of support staff and students on a range of support, delivery and skills issues, including the Student Online Learning Experiences

	(SOLE) project (2003) and the JISC User Behaviour Monitoring and Evaluation Framework (1999-2002 p.302) to *"... benchmark development in the provision and use of EIS."* ('Electronic Information Services' Banwell 2003). These studies have largely surveyed authoritative sources, such as educational practitioners and other staff delivering Higher Education via distributed study. This investigation will contribute to existing research, by examining students' perceptions of distributed study skills requirements, comparing these perceptions with government, industry, sector and institutional views derived from the literature review and original research elements. Part-time student groups will be investigated within a selected Higher Education provider, across a range of professional-related disciplines - reflecting the trend towards widening participation and the UK Government's aspiration for a demand-led re-alignment of Higher Education. It is considered that this study will provide valuable original information on current practices in technology-based teaching, contrasting the perceptions of authoritative sources at the institutional and national levels with those of students, whose expectations and experiences as learners are vital factors in understanding distributed study as a pedagogical process.
2. Aims and objectives of the research and/or the research questions	This study aims to assess perceptions of educational technology skills and learning method demands amongst first year Higher Education students, undertaking part-time professional courses in a distributed learning context, combining traditional class teaching with remote study. Objectives include: 15) Determine existing pedagogical theories and research related to distributed learning skills, including theoretical approaches to teaching and study via educational technology, learner-practitioner interactions and issues influencing distributed learning - including socio-cultural, institutional, resourcing and strategic factors

	relevant to this context. 16) Analyse sector recommendations for distributed learning skills requirements in a Higher Education context (e.g. within government agencies and professional bodies regulating professional-related courses) across the Post-Compulsory Education, Information Technology and Information sectors. 17) Distinguish perceptions of distributed study requirements within a demand-led Higher Education provider, including pre-entry requirements and expectations for skills development, also including perceptions of practitioners and support service staff. 18) Assess perceptions of distributed study requirements amongst first year, part-time students undertaking undergraduate professional-related courses within a defined Higher Education Institute across differing disciplines. 19) Evaluate existing matrices for assessment of Higher Education skills requirements using findings in Objectives 1-4, establishing how far these could be applied to undergraduate students in a part-time, distributed study context. 20) Contribute to the development of a matrix for assessment of distributed learning and study skills requirements. Depending on the outcome of Objective 5, either make recommendations for the modification of an existing matrix or recommendations for the design of a new matrix suitable for a part-time distributed study context. 21) Make recommendations for distributed study training and support (including in-course development and assessment) for undergraduate students in a part-time distributed study context, and for further research.
3. Methods of data collection (Briefly outline how data will be collected and attach a copy of any questionnaires, interview schedules or	Grounded Theory approach to informal interviews, only a very basic question will be used to initiate interviews, these will be recorded verbatim by recording apparatus or annotated by hand if the interviewee prefers not to be recorded..

observation guidelines	
4. Recruitment of participants (give number of participants involved; how they will be identified and invited to participate & how informed consent will be obtained.) Attach a copy of your information sheet, recruitment letters and, if appropriate, your consent form. *	Interviews will be conducted for a pilot study with Part Time NEWI students, students will be approached at study on the NEWI campus and asked if they wish to participate in an informal interview. A research description sheet will be provided and they will be asked to sign a consent form. Approximately 30 interviews will be held for a pilot study over a 2 month period. The main practical research phase will involve around 100 interviews carried out over a twelve month period.
5. Describe any potential adverse effects (i.e. any invasive procedures, potential psychological distress, **anxiety or upset, or any harm or negative consequences which may be induced by the study), and the steps to be taken to address them.**	None
6. Potential benefits of proposed research **(Outline any benefits of the research for participants involved and more generally**)	The use of Grounded Theory to develop results from open interviews promotes development of original conceptual information which could reveal aspects such as: • Understanding of student concerns for the prevalent context of part time study and use of learning technology • use of coping strategies • self-directed study issues • student-tutor communication issues etc.
7. Steps to be taken to ensure confidentiality of data **(Outline steps to ensure confidentiality, privacy and anonymity of data during** **collection, storage and publication**)	Names of students will be taken with their consent, the researcher and interviewee will jointly sign a declaration that the recording and any data will be handled in confidentiality and anonymity. All research output will be anonymised at the data input stage following data collection, also, the list of respondents will be kept separate from the data, all data will be kept under lock and key at a secure NEWI data safe or secure locker.

8. Please indicate source of research funding:	External / MMU

* Where questionnaires and other research instruments require a degree of flexibility (e.g. qualitative research projects) please submit the interview guide or aide memoire to be used in interviews with respondents.

A Grounded Theory method will be used to initiate the discussion, the initial response of the student will determine the development of the discussion, however the following broad areas will be sought (also see attached document entitled 'Aide Memoire'):

- Personal approaches to study methods via learning technology
- Approaches to assessment via learning technology
- Approaches to tutor communication
- Coping strategies for using learning technology (e.g. Blackboard).
- Issues concerning home /external use of systems.
- Depth of ubiquitous / regular use of technology

APPENDIX 5: RESEARCH INFORMATION SHEET

Research Information Sheet

Informal Interview carried out by Paul Catherall
You have received this sheet as you have been asked to participate in an informal interview discussion with the researcher described above.

Description of the Research
This research is part of a postgraduate research degree undertaken by the interviewer. The goal of the research is to investigate perceptions of students studying Part-Time at Glyndŵr University.

- Your identity will remain anonymous all discussion will be carried out confidentially.
- Participation is entirely voluntary and the interview can be as long or as short as you prefer, you can leave at any time.
- Any topics you feel are important may be discussed, the aim is to identify the issues that concern you in your learning and study experience.
- No sensitive or personal questions will be asked.
- The interview may be recorded, but if you would prefer not to be recorded please express your preference and the researcher can take notes instead.

Background to the Research
Studying for a university degree is very different today than only a few years ago, the use of computers, the World Wide Web and the Internet have brought new ways of studying at university and at home but also new challenges for students.

Students studying Part-Time are likely today to spend as much time in lectures as in front of a PC using Blackboard, the Library catalogue, the Internet etc.

This research is attempting to discover your response to this new study environment.

Researcher Information
Paul has worked at Glyndŵr University for around 10 years, firstly as an assistant in the Glyndŵr University library supporting students in the use of IT and later developing the Glyndŵr University Web site.

Paul has also worked as an IT tutor and has written a book describing approaches to supporting the use of IT.

Further details of this research may be found at: http://www.draigweb.co.uk/elearning

APPENDIX 6: AIDE MEMOIRE

The Aide Memoire was requested by the NEWI (North East Wales Institute of Higher Education) Research Committee to provide theoretical basis for leading the student discussions/ interviews. Whilst the Aide Memoire was produced this was not used heavily during the interviews due to the lack of compatibility of the Grounded Theory method with regard to issues of preconception and professional interest.

AIDE MEMOIRE

Informal Interview carried out by Paul Catherall (NEWI staff member, Information and Student Services / Technical Services.)

The following aide memoire attempts to gauge student perceptions of skills requirements for distributed learning, i.e. the gap between the requirements for computer-based learning and the student perception of these requirements in relation to their experience. This is a guide only and not necessarily used in the following order. The interview will run as an open discussion, with feedback recorded using a memo technique.

General Status

1. Is the student an undergraduate or postgraduate student, Part time or Full Time, what is their subject and year of study?
2. Approximately how many hours a week do they spend at lectures?
3. Approximately how many hours a week do they spend studying? How much of this time is spent using computers? How much of this time is spent on the Internet/ World Wide Web? What system(s) or applications do they use most?

General Study Behaviour

1. Does the student study mostly at NEWI, at home or at work? What are the reasons for this?
2. Does the student mostly use NEWI, home or other IT facilities? What if anything is different about using home or NEWI facilities; does the student have a preference and why?
3. How would the student assess their own general IT skills using required software/ systems? Do they think their IT skills have improved since coming to NEWI? Why have these skills improved?
4. What motivates/ de-motivates the student when using computing facilities for

their study?
5. To what extent does the student use software applications, e.g. Office. CAD, SPSS, etc. How comfortable is the student using applications?
6. Do they use the Internet? World Wide Web, Email, discussion boards, chat etc. to what extent are these activities study related? How comfortable are they using Internet for these purposes?

Support issues

1. What kind of computing resources are required to study? Home internet access, broadband, Microsoft Office, expensive applications. Does the student have a problem resourcing these needs? How comfortable are they using these resources?
2. To what extent do lecturers support the student's study in the use of computers? Do lectures include references to IT facilities?
3. How much time per week does the student spend in the classroom, i.e. with lecturers, is this enough time?
4. How useful is the NEWI Web site as a portal to online services? What difficulties if any do they encounter using the site?
5. Generally, how valuable are computing facilities for their study?

Study techniques

1. Is the student expected to use computing facilities for their study? Are they asked to use facilities for a particular number of hours each day/ week?
2. What problems or concerns does the student have for the use of computing facilities in their study?
3. What training was the student provided for the use of PCs, the Internet/ WWW, online databases, library catalogue, Microsoft Office or other software applications/ systems? What other sources of training did they have, e.g. external, work, self taught? Was the training provided by NEWI suitable? What additional IT training would the student find useful for their study?
4. How does the student explain their use of computing facilities for study activities, such as:
    a. literature searching.
    b. article/ document retrieval.
    c. planning, writing and printing written work.
    d. working between locations, e.g. home and college.
    e. referencing articles/ books.
    f. designing/ deployment of projects.
    g. collaborating with other students.
    h. giving presentations.
    i. preparing for assessments/ exams.
    j. working with multimedia or other files.
    k. developing non-textual work, such as software code, design etc.
    l. liaising with lecturers, technicians etc.
    m. Have they used...
        i. World Wide Web search engines such as Google.
        ii. subject based search engines and online portals, such as BIDS,

Intute, SOSIG.
iii. web library catalogue system (OPAC), i.e. searching for library books, checking library account, renewing books, requesting books etc.
iv. Online databases such as Swetswise for online journals/ articles, citations etc.
v. study support material on the NEWI Web site, e.g. online guidelines for Harvard, finding information on their subject, study methods.
vi. online learning system (Blackboard).
vii. online reference systems (e.g. Oxford reference shelf).
viii. which of these services does the student use the most and what are the reasons for this?
ix. which of these services does the student not use, are there any reasons for this?
x. How comfortable are they generally using systems?

E-learning

1. What is the student's general experience of using Blackboard (e-learning system). How comfortable are they using Blackboard?
2. What is the main purpose they log into Blackboard?
3. Has the student undertaken exams or assessments on Blackboard (or another online service)? How comfortable were they using this approach for assessments?
4. What aspects of Blackboard do they find beneficial or problematic?
5. To what extend have they used Blackboard or other systems for:
    a. Submitting assignments/ essays, through email or 'drop box'.
    b. Working collaboratively with other students.
    c. Communicating with other students, e.g. via internal email or messaging.
    d. Communicating with lecturers.
    e. Completing assessments or exams / obtaining assessment feedback.
    f. Reflecting on / assessing their own learning (e.g. Student Perception of Module - SPOM).
    g. Interactive learning activities (e.g. learning objects) or followed structured tasks in Blackboard.
    h. Accessed lecture notes and presentation files (e.g. PowerPoint).
    i. Used discussion forums.
    j. Accessed external Web sites through Blackboard links.
    k. Used interactive chat or whiteboard with a lecturer and/ or other students, e.g. virtual lecture or tutorial from home.
    l. Used reading lists/ bibliographies or interactive library catalogue lists on Blackboard.
    m. Worked on a project, either collaboratively or individually, and...
    n. Posted documents, articles, images or other files through shared areas/ folder on Blackboard.
    o. Used Group features for collaboration/ discussion with other students.
    p. How comfortable was the student using any of these features?

End of interview

- Conclude interview by thanking student.
- Provide information on how results will be anonymised and processed.
- Describe how results will be used to inform skills support at NEWI.
- Provide further information on research project if requested.

APPENDIX 7: MEMO FORM

Memo Sheet for Grounded Theory Interviews

Linked to consent sheet:……..

Substantive Indicator (narrative or tentative code)	**Properties, with Theory Bit/ Insight**
Substantive Indicator (narrative or tentative code)	**Properties, with Theory Bit/ Insight**
Substantive Indicator (narrative or tentative code)	**Properties, with Theory Bit/ Insight**
Substantive Indicator (narrative or tentative code)	**Properties, with Theory Bit/ Insight**
Substantive Indicator (narrative or tentative code)	**Properties, with Theory Bit/ Insight**

APPENDIX 8: PRESENTATION ABSTRACT AT TIRI RESEARCH STUDENT SEMINAR (ON PILOT STUDY)

The following document comprises an abstract for a presentation on the pilot practical research carried out during the latter part of 2007, including a description of grounded theory methodology and rationale for the research project. The presentation was used at a number of venues in early 2008, including:

TIRI Postgraduate Students Presentation on current research - Description: Background to use of E-Learning in Distributed Context; Venue: MMU; Date: 17/02/08.

Event: NEWI Staff Research Colloquium / Discussion - Description: presentations on research by NEWI staff; Date: 21/01/08.

Student perceptions on skills and learning challenges in the use of educational technology in a low-contact, distributed and professional study context

This presentation will provide an overview of the research project to date, which aims to define and interpret student perceptions on their experience as distributed learners, based in a part-time or low-contact study context and undertaking studies related to vocational (professional) areas of activity. The presentation will discuss existing research indicators, theories and schemas for systemised learning which prompted the project, namely the emergence of distributed or blended learning within

the Higher Education sector (combining traditional study approaches with online systems) and the condition of distributed learners as increasingly self-led participants in a tutor-student-system relationship.

Project parameters and objectives will be briefly discussed, including key aims of the literature review, rationale for the study focus (i.e. participant parameters) and explanation of the methodology used (Grounded Theory). The presentation will also discuss a pilot phase of the practical research, outlining how Grounded Theory methodology was used for obtaining student responses to the distributed learning context. Further discussion of the methodology will include an explanation of interview techniques, data processing methods and descriptive categorisation of participant concerns. The presentation will also consider the aim of the methodology for generating conceptual theories of behaviour and the identification of a core category or unified theory for the process of low-contact distributed study.

APPENDIX 9: PRESENTATION HANDOUT AT TIRI RESEARCH STUDENT SEMINAR (ON PILOT STUDY)

Student perceptions on skills and learning challenges in the use of educational technology in a part-time, distributed and professional study context

Rationale for the presentation

Previous talks have discussed the minutiae of issues in learning systems, this presentation attempts to explore larger issue – for more comprehensive coverage of the background to the topic, see previous publications on my Web site http://elearning.draigweb.co.uk

- To provide some information on the research project to date
- To establish the ‘tone’ and ‘stance’ of the project as an enquiry into the research context
- To discuss the special use of the methodology and justify how this has been used
- To unify some the project themes using the above considerations **(to provide a ‘bigger picture’ of where the research is hopefully heading)**.

Part 1 - Background to Project and Literature Review

Part 2 - Pilot Study overview

1. Background Information

Early considerations on e-learning

Began project 2005 after being approached to write on the topic of e-learning.

The resultant text '***Delivering e-learning***' largely completed before I registered for PhD, but since prompted some interesting observations –

- Most obvious observation was this is a 'hype' area of professional interest (as indicated by the book), spawning a plethora of terminology and writing on the topic.
- An area characterised, championed and claimed by various 'camps', including technologists, educationalists, information professionals etc. each with their own understanding of e-learning, sense of ownership, approaches for implementation etc.
- A controversial area -
- Considerable lack of clarity (in the literature) on the nomenclature of e-learning (which is why I won't be providing a glossary!) – closely linked to…
- …a diverse array of theoretical, systematic, cultural and political perspectives on what e-learning is and how it should be implemented.
- The idealised perspectives on e-learning vs. the social, educational, technological and other real-world issues tied to e-learning, including…
- …the reliance and integration of e-learning with the medium of the World Wide Web (e-learning = Web site).
- The growing (and trend for ubiquitous) adoption of VLEs (Virtual Learning Environments) within both statutory and post-statutory education sectors.

- Multimillion/ possibly billion? Industry, attracting corporations such as Microsoft, Thompson Net G. increasing HE adoption for distance learning, international / franchise delivery.
- Sense of exploration and experimentation similar to the Web 2.0 phenomenon.
- Most striking aspect - the student predicament in HE and trend toward low-contact VLE-facilitated study (***Blended learning***) – i.e.
    - growth in demand for technical, business-related and other vocational subjects;
    - growth of the part-time student base;
    - growth in the numbers of non-traditional students (including mature students) requiring support for development of core study skills;
    - increasing legal remit to support students possessing disabilities, including visual and other access requirements;
    - increase in low-contact study, requiring flexible approaches to learning, teaching and communication.

      (Catherall 2005)

The proposal (and some issues)

Sought to approach the condition of the emergent model of part-time, professional study – i.e. the emergent vocationalised/ professionalised context for Higher Education.

Title of Proposal: Student perceptions on skills and learning challenges in the use of educational technology in a part-time, distributed and professional study context.

Since starting a recent practical phase of the research project, several issues have arisen –

- Possibly need to replace the term ‘distributed’ with ‘blended’ since this has recently emerged as a more precise definition of combined class/ online study.
- Need for looser interpretation of ‘professional’ since this implies precise boundaries of hierarchical attainment and status. The original aim of this parameter was to target students who might be studying in a work-related capacity, e.g. chartered status for accountancy or marketing. However, feedback from the recent pilot study would suggest this parameter is problematic, due to breadth of undergraduate and postgraduate work-related programmes.

The complete proposal and further information is available at :

http://draigweb.co.uk/elearning/

Blended Learning – definitions and theory

Blended Learning is learning that is facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning, and founded on transparent communication amongst all parties involved with a course. (Heinze and Procter 2007):

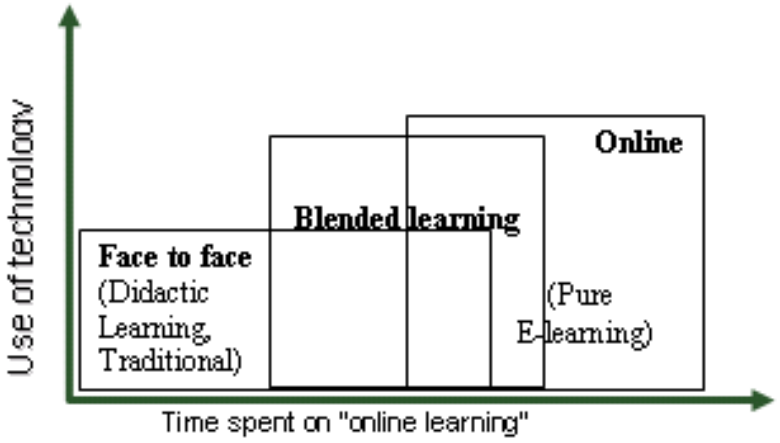


Figure 1. Conception of Blended Learning.

Theories emphasising social and human dimensions of learning

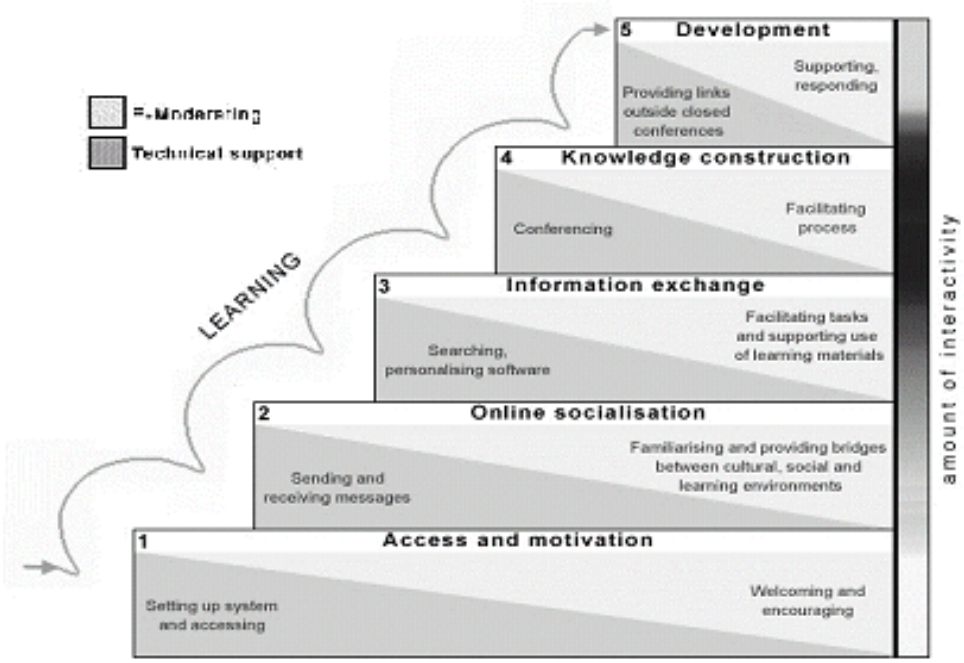
Various branches of pedagogy appear to stress the interactive and necessarily social requirements for learning -

Learning Theory	**Overview**
Situated / Social learning (Lave, Wenger)	Based on case-studies of how newcomers learn in various occupational groups which are not characterised by formal training. Stresses gradual acquisition of skills through participation.
Imitation (Blackmore)	The teacher demonstrates or models (whether or not she is aware of so doing), and the learner imitates. There are no "wrong" answers or dead ends: the quality of the learning is purely in the faithfulness of the reproduction of the action which has been demonstrated. (Blackmore 1999)

Learning Motivation (Atherton)	Motivation is either intrinsic/expressive (doing something for its own sake) or extrinsic/ instrumental (doing something for some other reason). Generally speaking, when people fail to learn something which they have been taught, the failure is attributed to one or more of three factors: • lack of motivation • lack of ability or aptitude (including skills to undertake effective learning.) • poor teaching. • the cost of learning. (Atherton, 1999).
Tacit knowledge and Implicit learning (Polanyi)	Knowledge or skills that cannot be taught, although of course there is obvious evidence that it can be learned or acquired. It may therefore be regarded as "know-how", i.e. a "knack" for doing something. (Atherton, 1999).

The e-moderating model

Gilly Salmon's e-moderating model (Salmon, 2000), indicates the importance activities in a social context.

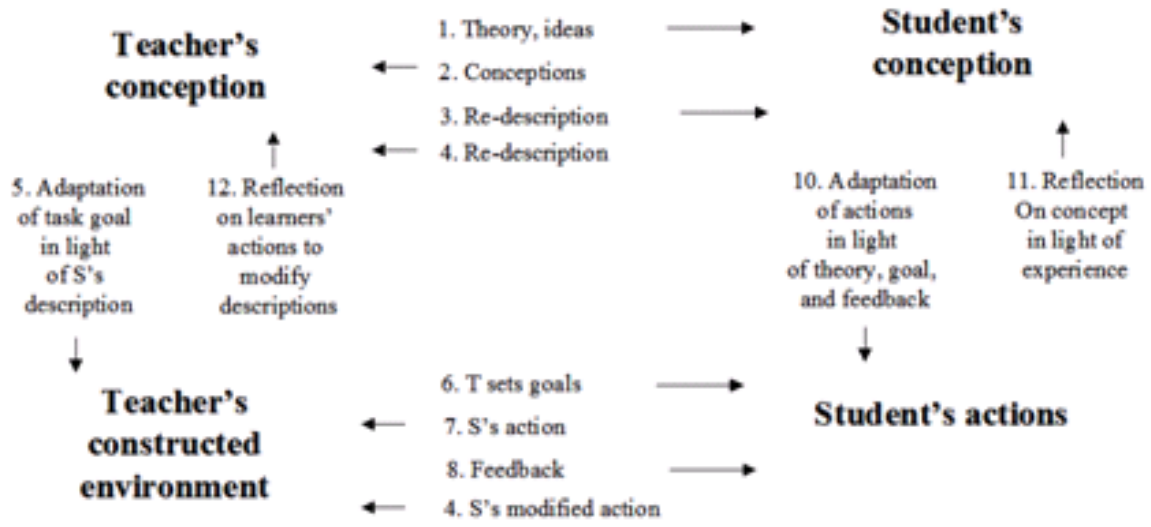


Laurillard's Conversational Framework

The conversational framework depicts the communication process which occurs between the lecturer and student in the development of a student's knowledge

12 stages are recommended to take place when teaching students. This includes three cycles on which a student has the opportunity to communicate with the teacher. The teacher in turn has the opportunity to evaluate students' understanding at an early stage and correct it if there are any misconceptions. Using conversation as the basis for teaching, the learning relationship becomes more transparent and open to both student and teacher. The two important issues emerging from the conversational framework are:

- The iterative dialogue nature of the model, requiring at least three engagements with one topic, meaning that a student will have the opportunity to improve on the same task;
- There is no one right media for delivery, each media has its own drawbacks:



Trends in the adoption of learning systems

Recent emphasis by the UK Labour Government for widening access to post-statutory education and training and use of emerging technologies to achieve these aims. Reports such as the *Dearing Report* (1997), *The Learning Age* (1998) and *21st Century Skills Realising Our Potential* (2003) presented both industry and the education sectors with a number of goals focused on improving educational standards as a vehicle to strengthen the UK economy, the aims of this legislation can be summarised in the following extract from *21st Century Skills*:

> "There are four principles underlying our approach to improved publicly-funded training provision for adults. It should:
>
> - Be led by the needs of employers and learners.
> - Be shaped by the skill needs prioritised in each sector, region and locality.
> - Make the best use of Information and Communications Technology (ICT) to deliver and assess learning.
> - Give colleges and training providers maximum discretion to decide how best to respond to needs..." (p. 87).

More recently, the government paper *Harnessing Technology, transforming learning and children's services* (2005) describes the Government's vision to develop the use of ICTs within all educational sectors.

These reports emphasise the importance of a demand-led approach within the education sectors and the development of links between education providers and industry - prompting a debate on the role of colleges and universities in the wider economy and implications for subject areas within a market-led approach to educational funding. Gibson, Newton and Dixon (1999) comment on this emerging agenda:

> ...sub-degree level courses and flexible structures of certification have become more common. Access to lifelong learning has increasingly been seen by policymakers at all levels as a social and economic priority.

Universities have been encouraged to adopt an inclusive approach to recruitment, i.e. for mature, disabled and ethnic minority entrants; recent statistics suggest an increase in the number of entrants matching these criteria, suggesting a growing trend in mature, part-time study:

> "1,236,300 (66%) of all enrolments are full-time, an increase in numbers of 3% since 2000/01. The number of part-time enrolments also grew by 3% over the same period. (Office of National Statistics, 2003)".

Government advocacy has filtered down to professional bodies and other sources of advocacy, most notably in the JISC vision for electronic libraries, encouraging the development of MLEs (Managed Learning Environments).

Web-based learning systems provide a range of interactive functions, including communication channels, content-publishing and assessment tools. It can be seen that these systems have begun to permeate and impact many aspects of post-statutory education, with recent Web technologies allowing for closer systems integration across institutional systems, including library catalogue, student records and finance systems. In the UK, this institute-wide computing infrastructure is often considered an holistic learning environment:

> 'Managed Learning Environment' (MLE) refers to the whole range of information systems and processes of a college or university… that contribute directly, or indirectly, to learning and the management of that learning. (Erskine 2003).

Whilst terms such as the ‘digital library’ and ‘e-university’ have been used to describe the transformation of traditional library and information facilities toward increasing digitization and database-driven systems, it can be seen that the Web-enabled *MLE* represents a shift from campus-based systems to personalised and ubiquitous access for end-users.

The role e-learning in expanding the distance learning market and delivery of overseas courses has been the subject of much recent debate, offering a range of communication tools and content publishing features to facilitate Web-based interaction and content dissemination for low-contact and distance learning students.

According to the latest sector-wide research, some 95% of Higher Education institutions in the UK have some form of learning system, actively supporting and delivering educational programmes for tens of thousands of students (UCISA 2005).

However, the literature also indicates a considerable gap between the government’s vision for ICT integration and the student experience:

> A number of research and policy papers addressing the issue of the digital divide identify specific groups of people as being especially disadvantaged in their uptake of ICTs. These include: people on low incomes, people with few educational qualifications or with low literacy levels, the unemployed, elderly people, people in isolated or rural areas, people with disabilities, sole parents, women and girls. Because they are often already disadvantaged in terms of education, income and health status... (Cullen 2001, 312)

The interactive, social and mentoring relationship between tutors and students has also been cited as a casualty of e-learning where increasing use of technology rather than class-based methods inevitably exacerbates low contact between teacher and student, having obvious implications for the student experience, the loss of learning insights, non-visual cues and other social aspects of traditional class based study. Berge (1998) comments on a study of academic staff implementing e-learning in the USA:

> Impediments to online teaching and learning can be situational, epistemological, philosophical, psychological, pedagogical, technical, social, and/or cultural...

Other criticisms include the lack of control over academic content by educators, where systems are invariably managed by IT professionals and administrators. Academics can also feel institutional policy is forcing their adoption of systems. Noble (1998) considers the imposition of institutional policy on academic practice:

> Once faculty and courses go online, administrators gain much greater direct control over faculty performance and course content than ever before and the potential for administrative scrutiny, supervision, regimentation, discipline and even censorship increase dramatically.

The widespread adoption of learning systems can also be seen to facilitate a new commercial market - part of the growing *information industry*. These developments reflect the concern of academic staff on the threat of automated systems. This

systemification of learning is suggested as an inevitable outcome for education by Halket (2002):

> There is no need for the creation of courses by those who did not create them before. There is no need for any new institutions. There is every need for existing institutions and existing educators to rise to the new challenge and have the best possible tools put at their disposal.

Noble links the growth of the e-learning industry with increasing commercialisation (commoditization) of post-statutory education, citing the growth of digital industries as a direct result of the collapse of older heavy industries in the 1980s:

> The foremost promoters of this transformation are rather the vendors of the network hardware, software, and "content" - Apple, IBM, Bell, the cable companies, Microsoft, and the edutainment and publishing companies Disney, Simon and Schuster, Prentice-Hall, et al - who view education as a market for their wares, a market estimated by the Lehman Brothers investment firm potentially to be worth several hundred billion dollars. (Noble 1998).

Grounded Theory - reappraising the context

The literature review and early reading indicated a particular trend in Higher Education toward mature, working students, part-time study patterns and increased uptake of professional (or work-related) academic study, accompanied by increasing use of VLEs and related systems.

However, there were key problems in approaching the research –

- Wide range of existing writing on the general topic of e-learning, blended learning etc. reflecting…
- Diverse interpretations, theories, schemas and models for learning via technology – where to start?
- Complex theoretical perspectives on the process, e.g. repeated emphasis on constructivist-based e-learning.
- Difficult to refine my area of study.
- Difficult to relate the broad area of interest with established theory.

I was first alerted to Grounded Theory by one of my research supervisors where I recently registered to conduct a PhD at Manchester Metropolitan University.

Key features of Grounded Theory that interested me included the focus on a ‘substantive area’ as opposed to a research question or hypothesis and the faculty to develop a theory from raw data.

Grounded Theory according to Glaser emphasises the ‘emergence’ of categories (also called conceptual codes) out of data, it is up to the researcher to constantly compare field notes (or ‘memos’) to identify ‘indicators’ which reveal the concerns of participants; the researcher compares categories to reveal an underlying core category or concern which represents a theory explaining the behavioural process at work within the given context.

For Glaser, the fundamental issue is 'emergence' of data over ‘forcing’, i.e. the importance of refraining from bringing a preconceived theory, ideology or concept to

the substantive area. There are several important implications for professional researchers, most notably what Glaser calls ‘the research question’ (p. 23), emphasising the need to refrain from allowing a professional interest or area of debate to pre-empt the research process at the data collection or conceptualisation stages.

The issue of emergence vs. forcing is central to the manner in which a Grounded Theory study is carried out from the beginning, addressing a ‘substantive area’ rather than a research problem; the intention of Grounded Theory is to interrogate a participant group within a known context and behavioural cycle, approaching the social context with an open mind and listening to the concerns of participants in order to define their concerns conceptually. Examples of substantive areas at the Grounded Theory conference included :

- Children undertaking psycho therapy.
- Nurses working with difficult patients.
- Distance learners.
- Doctors in Denmark during a period of systematic change.

Glaser says ‘a missed problem is a problem whether or not the researcher discovers and attends to it or not...’ (p. 22). The emergence of a Grounded Theory may therefore reveal a previously unknown participant concern or illustrate a new form of behavioural cycle in responding to the concern.

The Conference

London Grounded Theory Conference with Barney Glaser, 24 – 26th April 2006

For Glaser, traditional qualitative research invariably pre-empts the concerns of the social context under study; during the London Conference, I had the opportunity to discuss my own research proposal, a traditional research plan with defined aims and objectives; Glaser suggested that a research proposal of this kind is contradictory to Grounded Theory, since research aims merely pre-empt or preconceive emergent data in the substantive area. Another issue of concern to Glaser was the use of the term 'distributed learning' which Glaser thought could imply evaluation of an established theoretical model of study, hence focusing on this theory as opposed to interrogating the concerns of participants in the chosen context. However, I felt the use of the term 'distributed learning' was justifiable under a Grounded Theory study, since the term is anecdotal and simply describes a known context, i.e. combined class-based and online learning. Another aspect which emerged at various points in the conference was the issue of the literature search, which Glaser suggests can obscure the researcher's view of the substantive area against the backdrop of established theories, descriptive literature etc. However, Glaser did endorse third party literature, suggesting that this should feed into the research on the same level as other data, i.e. comprising data which can be compared with participant responses and processed in the same way. This kind of information is paramount to the development of what Glaser has termed 'Theoretical Sensitivity', i.e. developing a broad awareness of the wider context surrounding the substantive area, this awareness increases the researcher's sensitivity to developing theoretical categories which interrelate and explain patterns in those categories (see next section for further details on *theoretical coding*).

The Theory

The identification of the ‘core category’ (or core variable) is the goal of the Grounded Theory project, this is the theory that conceptually defines the most important process which participants seek to resolve (often unconsciously) and which is usually related to all the other participant concerns. This conceptual theory is ultimately drawn from raw participant data and processed in a neutral and objective manner using the categorisation and conceptualisation methods described above.

Purpose of developing a Grounded Theory

Whilst Grounded Theory is obviously rooted in the field of sociology, with terminology borrowed from in this area, it can be seen that Glaser has developed a simple yet fundamental approach to discovering behavioural processes and associated problems.

Perhaps Grounded Theory is better considered as a pure research methodology rather than a research ‘method’ such as action research; Grounded theory comprises a complete methodology framework which may be used for a project in its entirety complete with its own theories concerning truth in data and the role of belief systems. Grounded Theory therefore does not sit well with established theoretical paradigms nor is Grounded Theory appropriate when evaluating pre-defined variables against a known framework of values, Grounded Theory attempts to discover problems from the perspective of participants rather than from the perspective of critical models or ideology-based theories such as Postmodernism, Marxism or Feminism.

It is entirely possible that a Grounded Theory study - potentially discovering an unknown or poorly understood problem could prompt further research in this area, possibly using an evaluative or theoretical-based methodology.

Grounded Theory effectively steps back from preconceived professional values and known paradigms and takes a neutral view of behavioural activity to determine issues of relevance to the participant context itself.

The Grounded Theory

In '*Theoretical Sensitivity*, Glaser defines the requirements for a grounded theory:

It must be :

- Informed by 'as few predetermined ideas as possible', i.e. not a 'prior hypothesis'.
- Must have 'grab' – i.e. generate interest, be memorable and original.
- Fit – i.e. the theory must have 'relevance' to the original data in a recognisable way.
- The theory should 'work' i.e. 'explain what happened, predict what will happen and interpret what is happening in an area of substantive or formal inquiry'.
- The theory should conceptualise the substantive area.
- The theory must be 'modifiable', i.e. the theory should allow for repeated application to new data.
- The theory should ultimately explain the main concern of the participant group and how they are trying to continually solve it.
- The theory should 'transcend' the substantive area being studied.

2. Pilot study using the Grounded Theory methodology

Overview of the Pilot study

The original proposal considered the research topic from the position of established theory and schemes for learning via technology, e.g.

> *Objective 6. Contribute to the development of a matrix for assessment of distributed learning and study skills requirements*

However, the chosen methodology stresses the need to establish only the 'substantive area', removing the distraction of existing literature or 'the professional problem' (Glaser 1992).

Whilst continuing to read and develop my literature review, I needed to keep the Grounded Theory in perspective as the overarching methodology used for the research, which due to the nature of Grounded Theory as a social sciences research method implies a practical research focus.

The issue of the literature review in Grounded Theory

For Glaser, the literature review is simply part of the 'constant comparative method' – but also used to develop 'theoretical sensitivity' to the processes, activities, structures and general issues surrounding the substantive area – i.e. being aware of the subject or area of activity under scrutiny, including comparative theoretical explanations or models – <u>but importantly making connections with the research</u>

results toward the end of the practical phase, referring to such theories as comparative data which may agree or disagree with emergent concepts and theory.

I felt it necessary to begin a pilot study to explore the use of Grounded Theory and to prepare for a main practical research phase later. I also needed to consider how to build other research aims with the methodology, including the literature review.

In order to carry out practical research at my chosen Higher Education institution (the North East Wales Institute of Higher Education), it was necessary to undertake a lengthy ethical approval process. This was approved in early 2007 and included scope for both group-based student interviews, individual ad-hoc interviews and staff interviews as required – the rationale being that the methodology could 'lead' to issues which required staff discussions and analysis.

The pilot study was mainly carried out during 2007 and completed Spring 2008.

The parameters for the pilot research would broadly match the main phase and included –

- Approx 30 pre-arranged interviews held mainly in a mix of group and individual settings with students.
- Several interviews had a group discussion mode due to time and access constrains, i.e. class-based with opportunity to address groups of individuals at the end of a taught session.
- Interviews lasted from 10-20 minutes each.
- Interviews were 'led' by an aide memoir for purposes related to the NEWI ethics procedure (to ensure suitable parameters for the discussion), this was

compiled as a general indicator for the kind of discussions that might ensue, but in practice this was not used during the interviews.

- An information sheet was provided containing a broad description of the research with a URL for further details.
- Participation was voluntary in all cases (various communications were established with students to determine their willingness to participate).
- The interview data would be anonymous.
- The interviews for the pilot were mostly taken with certification/ chartered-status groups, MBAs and similar business related courses, reflecting the research project parameters.
- All of the groups interviewed were part-time, some individuals interviewed ad-hoc were ‘full time’.
- The interviewees were drawn from all years, i.e. 1-3 rather than simply limited to first year students as suggested in the proposal.

The stages of the Pilot

The interview process

The interviewer always introduced himself informally to the sample group before commencing either individual or group interviews, indicating the relationship of the research project to NEWI facilities and how their responses would provide feedback to NEWI academic and support departments.

No remuneration or enticement was offered for the pilot, the uptake of academic staff agreeing to provide access to students (and ad-hoc interviews) proved this was not

necessary, possibly due to the topical and essential nature of the interview for the student, i.e. ICT facilities.

The interview would begin informally with an open invitation by the interviewer to discuss the student's experiences of ICT use or general issues related to their study, this proved enough to steer the conversation around to issues of VLE use and related issues important to the student.

Whilst early interviews tended to be more open-ended, later interviews would be informed by comments from earlier interviews, allowing for 'selective coding' of responses in order to question subsequent students on particular issues, for example, early interviewees frequently mentioned a reliance on the VLE system (e.g. as their first point of contact for completing an assignment), this provided scope for a question which could be re-used in other interviews, leading to confirmation of this as a reoccurring variable.

MEMOING (Descriptive Coding)

The memo process involved use of a record sheet containing a number of rows for recording purely descriptive variables and a section for noting any substantive codes (i.e. conceptual insights).

SORTING

Open / Substantive Coding (generation of 'theory bits')

Once each practical interview had been completed, the data contained in the Memo (and from other sources such as notebooks etc.) was typed up in a basic table format in order to sort the data into categories comprising "Open codes", for example, several interviews involved discussion of the Web as a tool within and external to the VLE, these observations were compared and categorised under a common heading.

The observations from the interviews (memo indicators) were recorded as 'properties' of the Open Codes, thus elaborating on the nature of the defined open category. Very early theoretical insights were then noted as possible 'theory bits' an early form of conceptualising to explain the behaviour, goal-seeking or problem-solving process the students were engaged in.

The Substantive "Open" Codes/Categories, derived from memo indicators included –

- Part-Time study
- Work/ Study/ Life balance
- Using ICT
- Using the Web
- Working remotely
- Using resources (ICT, paper, photocopying, travel expenses).
- Using communication tools
- Group work
- VLE use

- Word-processing / course-work preparation
- Document Management
- Using information sources
- Liaising with employer organisations

Example Open Code – 'Using the Web' -

Developed Descriptive Categories/Codes, (refined from initial Open Codes)	**Properties of Developed Descriptive Category/Code** ***Derived from Open i.e. initial Descriptive Codes developed from memos.***	**Theory bits – early theoretical insight related to Descriptive categories**
Using the Web	Using basic search engines such as Google (few other search engines were mentioned) and Google Scholar, Using institutional Web pages (in some cases, but reported difficult to find) to access evaluated academic information, Using favourites to store	Web credentialising/ evaluating Institutional Web navigating/ awareness building Google-based Web experiencing

	Web links, Using Blackboard (in many cases) to discover links to relevant Web sites, Attempting to use Web resources in an integrated way (but having often to break out of the VLE in order to do so), Difficulties in evaluating Web content.	Web sorting Web resource storing/ retrieving Cross-system Web navigating VLE-based Web browsing/searching **Web space integrating** Web-resource trusting

The following code deals with information sources:

Developed Descriptive Categories/Codes, (refined from initial Open Codes)	**Properties of Developed Descriptive Category/Code** ***Derived from Open i.e. initial Descriptive Codes developed from memos.***	**Theory bits – early theoretical insight related to Descriptive categories**
Using information sources	Using ICT to access information sources, Using hardcopy systems such as library indexes, Using software and Web-based resources such as search engines and portals, Evaluating information sources, Dealing with web-based plagiarism issues. Ensuring citation and quotation of sources is	Digital resource discovery Assimilation of online sources (of information) Credentialising, labelling, storing and retrieving information sources Plagiarism avoiding Integrating professional and study sources (of

	appropriate. Some students already had a professional or work-related knowledge of Web-based resources. Some students reported using e-books delivered via the VLE, indicating use of full-text journals and books in lieu of hardcopy resources, these students commented that whilst the availability of e-books ensured all students had access to reading material, this also posed problems for printing material off (where this was the preferred medium for working). Few students indicated they used the online	information) **Accommodating/ reconciling digital documents** Transforming digital to hardcopy resources Integrating information sources Awareness acquiring of information sources **VLE course resource dependence (as information portal)** Search engine digital

	journal system, with some suggesting they were not aware of any online library resources. Many students indicated that whilst they felt happy using Web-based search engines and online information sources outside the VLE, they would only do so on request from their tutor. Others indicated anxiety regarding citation and authority of online sources (mentioning concerns of tutors or even having been asked never to use Web-based information). Students also described varying levels of comfort using search keywords in search engines and online	resource dependence Search engine results interpreting **Information systems traversing**

	journal systems etc. with many expressing dissatisfaction with keyword searching as yielding too many irrelevant results. Students indicated they would value further support is using keyword searching techniques. Many students said they used ‘Google’ but felt a lack of facility using the internet effectively. Some students expressed difficulty using Athens-based information portals, indicating the process for logging in was too complex and often impossible to use.	

Grouping and Sorting

With only around 30 interview sessions, the sorting process was achievable using the hardcopy memo sheets and other notes taken, transcribed into Word and then grouped under the descriptive codes. For a larger sample, however, it would be manageable to enter all the responses into an Excel document, using the internal filtering and sorting features to deal with a wider range of codes and to easily group similar codes.

Selective Coding

The use of selective coding is intended for the researcher to reflect on responses as categories and focus interview questions on these areas in order to 'saturate' the area of investigation; this process is intended to verify the category and its properties. Some use of selective coding was used in the pilot, for example, the issue of using the VLE as a starting point was raised on several occasions, this provided some scope for further interviews. The process of selective coding is largely transparent.

Theoretical Coding

Theoretical coding using in the write up for the pilot study can be said to represent the third stage in the data process, the first being the recording of responses on the memo form, with observations of theoretical codes in the memo/ notes, followed by Open Coding of memo indicators (see tables above), later stages comprise refinement of Open Codes to form higher level Substantive categories (usually Descriptive aggregations of Open Codes), the emerging codes and their properties

can yield theoretical insight at any stage of the coding process, however as codes are refined, categories can become more conceptual.

I have used Glaser's term 'theory bits' (Glaser 1992) to suggest the generation of early theoretical or conceptual interpretation of the descriptive categories, some examples include:

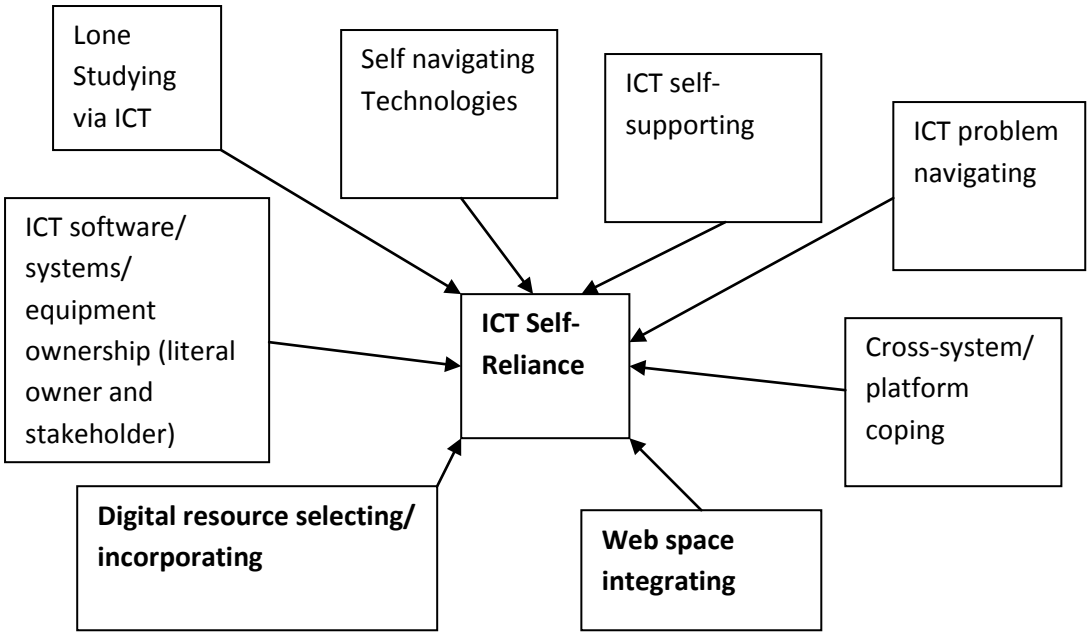
VLE use

- VLE document seeking/ navigation
- Habitual VLE visiting
- Habitual VLE avoidance
- VLE course / course-requirement dependence
- VLE-literature (books) navigation
- VLE styles navigation/ reconciliation
- VLE content deficit reconciliation
- VLE-external systems navigation
- VLE-Web reconciliation
- VLE-course/programme structure reconciliation
- Course content specificity reconciliation/ navigation

Defining High Level Codes and Sub-Codes

All the codes generated can be seen to interrelate and reveal their relationships, the importance or marginality of issues can be confirmed through selective coding during interviews, leading to higher level codes which more precisely reveal the blended learning process.

For example, the following diagram demonstrates the relationship between the codes for the theoretical code '**ICT Self reliance'**

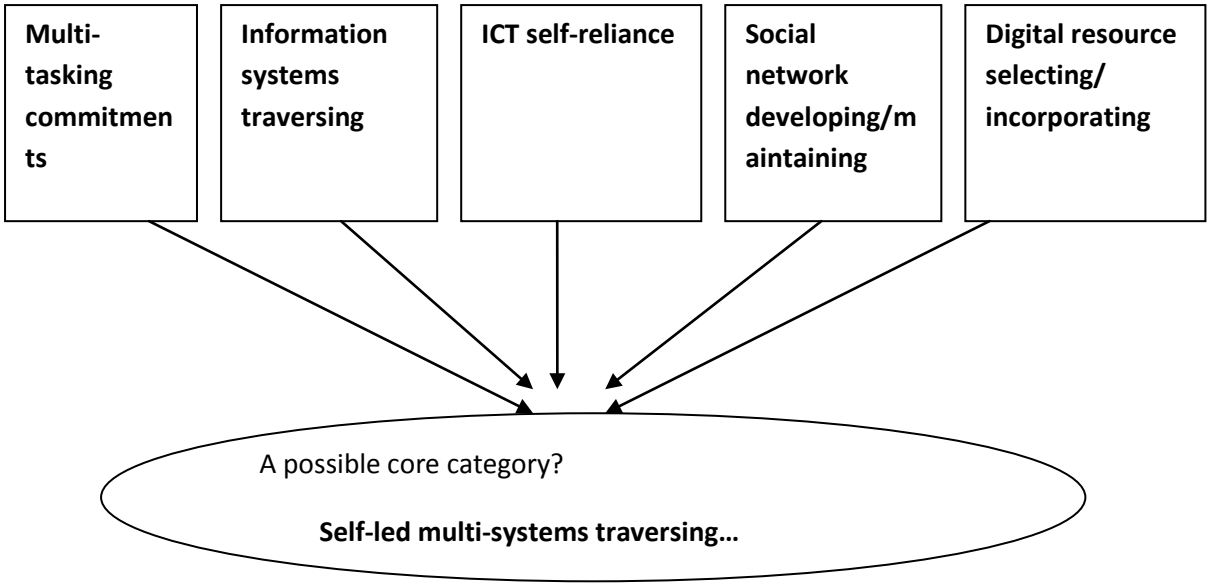


The Tentative Core Variable

At some stage, the core variable is supposed to emerge from the Grounded Theory process, derived from constantly comparing the generated codes.

By comparing the codes in each category, such as 'Web Use', it is possible to determine high-level codes as opposed to more marginal aspects of the process in blended learning; this is possible by using Glaser's constant comparative method – determining overlap, peripherally and by validating the importance of codes via selective coding in interview.

The following codes appeared higher-level than others, whilst this stage of the research is only a pilot phase, it is possible to suggest a 'tentative core variable' from the data by comparing these variables for common traits:



Tentative theory of the tentative code category….

In brief, the core category or process which the participant continually tries to resolve, could be '**Self-led multi-systems traversing'** this basically indicates the primary and core concern of the student is related to managing a disparate array of systems, digital and hardcopy resources, logins, PC-based applications and Web-based systems. Some serious considerations for this tentative core category could include ICT literacy of intake students (i.e. having sufficiently high ICT skills to cope with the breadth of ICT requirements for a Higher Education course delivered via blended learning and associated technologies, and support issues for the training, induction, and ongoing support for users in a low-contact/ part-time context.

The self-led issue is perhaps the most important sub-category, indicating the sense the student has of isolation and demands placed on them to perform a range of basic ICT functions within the VLE and in the use of wider systems.

Next Steps

While the pilot study has revealed interesting pointers, this will only serve as a model for undertaking the process of Grounded Theory. Key aspects absent in the pilot study, but hopefully present in a larger study may include:

- Whilst the pilot was largely limited to business students, the full practical phase will hopefully involve a wider breadth of academic subjects.
- The Grounded Theory may need to take into account variations in either of the above parameters.

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APPENDIX 10: PRACTICAL RESEARCH EXCEL WORKSHEET SAMPLES

Table 1: Worksheet 1 - Memo Data including Descriptive (Indicator) Codes (Categories)

Derived from Excel Workbook Sheet 1 – "Memo Data including Descriptive (Indicator) Codes (Categories)".

Example session from table (from a total of 101 recorded interviews and 512 comments), this table represents a systemised, annotated and anonymised version of the comments:

Comment ID	Session ID	Group or Person Description	Comment (summarised)	Descriptive Code (Indicator) refined as Control Term	Descriptive Code Properties (comma separated list)	Theory Bits, Insights
1	1	FDSc Health & Safety (P)	Undergraduate foundation student studying part time, busy work-life balance with some home working around 7 hours personal study per week	Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities	Prioritising tasks and objectives to achieve wider aims
2	1	FDSc Health & Safety (P)	Around 6 hours classes per week considered	Low Contact Study	Generally under ten hours contact with class per week, Sense of	

			fairly low contact with tutors/peers		isolation from the institution including tutors and peer students, feeling of self-reliance and less scope for obtaining support, lack of social interaction and socialisation with peers or staff	
3	1	FDSc Health & Safety (P)	Some use of the VLE alongside classes	Mixed physical-online resource use	Uses a variety of online tools and class or oncampus support, may use the VLE and associated tools, may also use print texts, may use hardcopy journals alongside e-resources and databases	
4	1	FDSc Health & Safety (P)	Described using the Internet, Blackboard, some library visits for use of hardcopy resources	Mixed physical-online resource use	Uses a variety of online tools and class or oncampus support, may use the VLE and associated tools, may also use print texts, may use hardcopy journals alongside e-resources and databases	Using a variety of online and oncampus services and tools to obtain a more holistic range of sources and services
5	1	FDSc Health & Safety (P)	Used health and safety related databases and Google	Multi-platform/ Internet resource discovery	May use Library databases such as Swetswise or other recommended	

			based searching		platforms/portals such as BIDS or BiZED, may use open Internet sources such as PubMED or the Internet Information Archive, may use open source journals such as the Social Sciences Research Network, may use a variety of Library systems such as catalogue or inter library request Web site, may use a variety of VLE tools and features such as discussions or group tools, may also use WWW search engines and portals to locate information	
6	1	FDSc Health & Safety (P)	Reported issues concerning need to print volumes of course materials	Reliance on use of hardcopies	May rely on hardcopies due to lack of confidence or skills in managing digital documentation, may lack skills in sorting or storing documents online, may have difficulties or access problems viewing digital	

					documents in applications such as Word, Acrobat, may be unfamiliar with features to view digital documents such as zoom or page view, may not be confident using document management applications or computer features such as My Documents in Windows	

Table 2: Worksheet 2 - Substantive Code (Categories) Creation

Derived from Excel Workbook Sheet 2 – "Substantive Code (Categories) Creation".

Substantive Descriptive Code Assimilated/ Grouped from High Frequency Memo Descriptive Codes (and commonly occurring Properties) and based on category sorting	**Memo Codes (Indicators) related to this Substantive Code (paraphrased) with frequency distribution of individual indicators - also see sorting tables**	**Key Shared Properties**	**Further Explanation of Substantive Descriptive Code**	**Sum of all supporting Memo indicator frequency distribution values supporting this code**	**Cumulative Theory Bits, Insights**
Remote Learning Characteristics	Uses a range of locations for ICT 8.91%, Commutes 11.88%, Mobile device user when travels 2.97%, Uses a range of computer systems 1.98%, Comms tools importance 12.87%, Uses VLE communicat	Developing strategies for studying across different locations and using different equipment/ computer platforms, use of electronic communication tools to facilitate contact/feedback etc with tutors and peers for group working,	Students who are part time and studying via Blended learning convey a range of characteristics typical of e-learning but also exhibit behaviours reflecting use of traditional library resources and services,	60.39%	Adaptive use of e-learning communications tools, mobile devices and VLE features to engage with peers, tutors and course content. Some students are apprehensive regarding the use of e-learning and their remote

	ion tools 11.88%, Physical/Online experience 9.90%	using both online and physical study activities	commuting is a particularly important factor for some students. Use of mobile computing is also important for some students		study context, some of these behaviours can be considered strategies to overcome this perceived separation from the physical institution and its facilities, perhaps reflecting the transitional phase of e-learning at this time or fundamental anxieties some students face when studying in a blended learning context.
Skills challenges (Skills problems and concerns raised)	IT skills confidence issues 5.94%, Database skills development issues 1.98%, Referencing support issues 4.95%, IT/study development issues 4.95%, IT	Lack of confidence when using more complex or formal systems and platforms, such as certain VLE features or library databases, sense of lacking sufficient		31.68%	Students may use a range of techniques to compensate for poor confidence in specific platforms by resorting to familiar applications or WWW sources, some students

	skills training access issues 13.86%	skills to fully utilise platforms or computing facilities to study effectively, specific anxieties in areas such as referencing and study methods			resorted to using work derived information sources or government WWW sources due to familiarity, this behaviour exposes a behavioural pattern in avoiding engagement with certain unfamiliar technologies due to skills issues or lack of familiarity. Students also appeared to be avoiding some support services or optional courses available again reflecting this avoidance tendency.
Resource Discovery challenges	Insufficient databases 10.89%, Too many platforms 5.94%, E-resource databases usability issues	Students frequently complained regarding the scope and usability of library databases and core		76.23%	Students appeared to be utilising a wide range of personal, work related and University derived

	8.91%, Multi platform login issues 4.95%, WWW search results issues 3.96%, Database results issues 1.98%, Institutional/ Library Web difficulties 3.96, Database full text access issues 4.95%, Requires multi platform use 30.69%	systems such as Library Web pages or catalogue, students also drew attention to the need to use many different platforms and use multiple logins such as a separate Athens login for some collections and other unique logins, some students also discussed the need to retain both personal, work and University login credentials citing this as a barrier to efficient study. Students frequently indicated unhappines s with resource discovery options within the University and described			sources, including e-resources linked or promoted via the VLE, email and course materials or reading lists, in many cases students described a reluctance to deviate from the VLE to obtain materials but accepted the need to consult wider information sources for effective study, to this extent many students indicated they had used formal Library databases and recommend ed Web portals although many stated their preference was often to attempt initial location of resources

		use of some formal databases alongside WWW sources and some work related sources			via a basic Google search. These characteristics suggest students are navigating a range of diverse platforms and systems to access information and are engaging with less familiar or more formal platforms to achieve effective study outcomes.
Resourcing for Study (Equipment, costs and related resourcing problems reported)	Internet access/cost 1.98%, Obtaining software difficult 5.94%, Digital exam paper issues 0.99%, Insufficient PC availability 1.95%, Printing cost or access issues 3.96%, Library availability issues 3.96%, Insufficient printing	Many students appeared to print hardcopy versions of course notes, WWW content, presentations and other academic matter rather than attempt to manage digital copies within the computer environment, this indicates both		22.74%	Students' anxieties over printing and digital content reveal a study pattern based around physicalisation of e-learning and digital content, perhaps indicating that these students are transitional in terms of skills and attitudes to e-learning approaches.

	facilities 2.97%, Insufficient printed texts in Library 0.99%	anxieties in the sole reliance on digital media and feelings of assurance in obtaining physical copies. Resource and cost implications were often cited regarding the reliance on printing with some students indicating the increased use of the VLE and digital content had exacerbated the need to print due to increased onus for self study and fewer classes.			
Technical Challenges (Technical Problems reported)	Compatibility issues 2.97%, Technical problems 2.97%, Printer/scanner technical issues 1.98%, PCs slow or technical issues 7.92%, IT	May have problems regarding personal PC or other peripherals, may have maintenance problems with work PCs, may have maintenance problems when using		25.74%	

	support difficulties 9.90%	institutional PCs, technical problems can also include specific features not working properly in the VLE due to computer or VLE errors this could include assessment manager not working			
Study and Research Approaches	High Google use 14.85%, Trying to build IT/ study skills 7.92%, Uses content manageme nt skills 3.96%, Relies on Library PCs 3.96%, Relies on VLE for materials 38.61%, Reliance on hardcopies 9.90%	Students often reported relying on Google as a primary research tool for literature review or course work, students also often described attempts to access new or unfamiliar platforms such as specialist databases to improve IT and study competenci es, many students also indicated a heavy reliance on		79.20%	Students exhibited a pattern of attempting to consolidate learning within the VLE, including access to course materials and use of communicat ion tools, this consolidatio n was motivated by time constraints reflected in the nature of their predominan tly part time, low class contact context and working

		the VLE as a central portal to course materials, often indicating frustration that materials were either external to the VLE or they were expected to use library resources oncampus or online. Many students linked time constraints and the need to optimise their schedule with the desire to work as far as possible via the VLE			schedule. Some students used a variety of content manageme nt tools and services on the WWW to enable working remotely, across multiple sites or via removable media such as flash drives, achieving a mobile study approach to facilitate their circumstanc es
Study and Research Challenges	VLE usability/ navigation issues 3.96%, Study training /developme nt issues 7.92%, VLE under-used by programme 9.90%, Group or peer communicat	Students often mentioned difficulties using aspects of the VLE such as assessment or group working tools, some students complained regarding lack of contact or		151.90%	Students exhibited a dependence on the VLE and many appeared to value online communicat ion tools to improve and facilitate their studies as part time students, students often appeared to

	ion issues 13.86%, Low contact study 99.02%, Too many documents in VLE, Digital communication under-used 6.93%, VLE under-used by students 4.95%, Library or IT Lab noise 4.95%	feedback from tutors or peers during group work, some students complained of an actual shortfall in the potential use of the VLE and other communication tools, suggesting this lack of engagement was detrimental to their part time, largely offcampus study context			be investing in the VLE in terms of time spent using this platform, developing personal knowledge of the VLE and coordinating group or peer discussions via VLE and other online communication tools (including social networks). Some students felt they had to make up a shortfall in both tutor/peer engagement with the VLE and shortfalls in training or support. In some respects students were attempting to lead the use of the VLE or promote this amongst peer groups to achieve efficient group working and

					study outcomes.
Personal and Non-study related Challenges	Work related anxieties 2.97%, Uses Library PCs for quiet study 6.93%, Work linked programme 1.98%, Commitment issues 34.65%, Feelings of Isolation as a student 4.95%	Some students reported anxieties regarding work related links with the programme, some students indicated they were only studying due to work demands or were studying to maintain mandated work related skills or qualifications, these kind of demands added to the pressure felt by some students. Some students indicated a sense of isolation as part time students and disconnect from the wider student population, there was a perception that their		51.48%	In some cases students attempted to overcome personal commitment constraints by using VLE or other electronic communication tools to keep in touch with tutors or peer remotely, this kind of motivation appeared to channel the student toward the use of core communication tools and toward use of VLE communication features which may not have otherwise had such a large contribution. Students appear to have attempted to virtualise their social experience with peers and tutors to overcome

		kind of student was being facilitated in a less intensive or supported mode than full time students. Commitment issues featured high in many narratives, including work-related, children or other caring commitments.			these commitment and personal issues related to remote working and to attend a greater sense of engagement with the wider programme activities and engagement with tutors and peers

Table 3: Worksheet 3 - Selective Coding - Selective sampling to validate developing Indicators/ Substantive Codes

Derived from Excel Workbook Sheet 3 – "Selective Coding - Selective sampling to validate developing Indicators/ Substantive Codes".

Memo Comments and <u>developing</u> Substantive Codes (in bold) derived from Full Phase interviews and identified for Selective Sampling in subsequent interviews. Because these early codes were still not fully refined or translated into Control Terms these indicators do not match final Control Terms	**Justification/ Reason for Selective Sampling of this Indicator/ Code**
Role of Communication tools	To ascertain if online communication tools are used alongside static course content as suggested in early pilot interviews.
Use of the WWW	To verify usability issues using formal databases as suggested in early pilot and throughout many interviews in the full phase, also to ascertain user confidence and skills in using the WWW and diverse WWW sources.
Database issues	To confirm problems reported using Library databases as part of the repertoire of WWW/e-resources.
Results issues via Databases	To further confirm problems reported using Library databases as part of the repertoire of WWW/e-resources.
Full text (e-resource) location	To confirm issues reported when using bibliographic databases, also confirming that students increasingly expect bibliographic databases to supply full text rather than traditionally displaying citation details for physical item sourcing
Complaints regarding lack of electronic communications uptake by the programme	To confirm if students have higher expectations of electronic communications use than is currently implemented.
IT skills problems	To ascertain self confidence and a sense of skills development for using

	ICT, early pilot responses suggested students felt challenged when using some systems and platforms.
Problems accessing/utilising IT support	To ascertain if the student experience was negatively impacted by feelings of having insufficient IT support, and any strategies which may be employed to facilitate IT solutions.
Complaints regarding lack of databases/ lack of specialist databases	To further confirm problems reported using Library databases as part of the repertoire of WWW/e-resources.
IT confidence issues	To further ascertain self confidence and a sense of skills development for using ICT, early pilot responses suggested students felt challenged when using some systems and platforms.
Problems using electronic library databases	To ascertain if students felt they could engage with formal library research tools as software as part of their repertoire of study skills and any strategies they may employ to work around perceived lack of skills development.
Use of a range of on-campus and online services and facilities	To confirm early pilot and early full phase discussions concerning a blended approach to study and discover how far students are comfortable using electronic or physical resources and services, if there was any preference or desire to use either format and what strategies may be employed to access these services or use them most efficiently.
Context as a low-contact student, reduced class presence, tutor interaction etc.	To confirm the time spent in contact with tutors and peers in class.
Challenges concerning need to access many platforms and systems	To follow up early pilot discussions concerning access to a wide range of WWW, library databases, WWW portals and University or Library Web pages and how successfully students were able to navigate and cope with use of diverse information sources.
Login issues, particularly related to lack of single sign in	To confirm the fairly widely held view expressed in the pilot and throughout the early full phase interviews that databases can be difficult to access due to multiple login credentials needed.
Problems using/ navigating the VLE interface	To ascertain the extent of issues using the VLE including issues accessing

	specific areas such as the assessment, grades, group and discussions areas.
Content/ file management challenges	To follow up a small number of comments on file management, use of multi-tasking and window management when using PCs, behaviour saving, sorting, labelling and managing files and other digital assets or WWW links.
Use of VLE heavily for weekly assignments, research etc.	To ascertain many early comments that students replied fairly heavily on the use of the VLE as a hub for core learning materials and study.
Engagement with VLE communications tools such as messaging	To ascertain the extent VLE communications tools were being used such as the messenger or group discussion tools.
Using differing operating systems/computers, including diverse locations such as work/home	To ascertain the extent that students function across diverse locations and computer equipment. This appears to be very common for these part time and mostly employed students who may often work using facilities at both the educational provider, work and home.
Working away from the institute	To ascertain the substantive code (early versions included "remote working", "remote study and VLE use" etc.) to establish the pattern of conducting study at diverse locations such as the home for a substantial aspect of the programme.
Problems developing/ accessing training for IT skills	To establish student perceptions of personal skills and shortfall in skills for IT
Problems accessing electronic versions of readings	To ascertain student perceptions of resource location problems via the WWW or library facilities as illustrated in many related memo indicators.
Study and research approaches e.g. Note taking, approaches for summarising readings	To query the kind of methods, strategies and approaches used by the student to optimise their study routine, implement efficiencies or practices to assist their research, writing or other activities.
Problems accessing study support	To establish student perceptions of problems they feel may be having an impact on their study due to shortfall in study and research skills.

Table 4: Worksheet 3a - Coding and Selective Coding from the Pilot Interviews

Derived from Excel Workbook Sheet 3a – "Coding and Selective Coding from the Pilot Interviews".

Pilot derived Substantive Code used for Selective Sampling in later interviews	Justification/ Reason for Selective Sampling of this Indicator/ Code	Associated Tentative Theoretical Codes	Associated Tentative Developed Code
Low contact study (characteristics & strategies)	Whilst the sample groups/ individuals interviewed were mostly on formal part-time courses, some individuals were approached ad-hoc in open learning areas, in some cases these turned out to be full-time students but consistently indicated they were attending class less than 10 hours a week. All the students interviewed (including 'full time' students) indicated low-contact with staff and peers was a factor in their study, including travel times required, need for effective use of time in class and need for excellent ICT facilities on site during visits. Many students indicated they were 'lone' students, with varying levels of contact with peers or staff via ICT.	Lone studying via ICT; Self navigating Technologies; Inter-location studying; Remote peer-communicating; Study-Work Integrating; ICT self-supporting; ICT knowledge sharing; ICT facility discovery; ICT facility exploiting	Multi-tasking commitments

	Many of these students felt they received minimal or no support for issues such as ICT use, software use, learning support study skills, use of the Web and information sources, considering the support staff available in the library were helpful but lacking the intensive support some seemed to require (including induction and ongoing support).		
Work/ Study/ Life balance	Many of the students indicated issues with juggling home, study and work issues, many indicated how their work and study was well complemented, while others indicated little employer support (in terms of time, resources). For some students, ICT was useful in a busy work-life context, for others it added to the study requirements and was something to be ignored as an optional extra they didn't have to do.	Commitment (life, work, study) accommodating; Vocational study avoidance; Vocational study exploitation/ appropriation; VLE workload avoidance; VLE information exploitation; Career studying (voluntary / involuntary)	None
Using ICT	Characteristics of this code included - Using computers, printers, photocopiers, scanners, Using a range of computer software to process information, Dealing with ICT problems such as broken PCs, password problems, Learning to use	ICT familiarising; Goal-based ICT appropriation; ICT problem navigating; Support network developing; ICT software/ systems/ equipment ownership (literal owner and stakeholder); Cross-system/ platform coping; ICT	ICT self-reliance

	systems, software and related facilities, Accessing ICT in order to undertake the coursework and project work. Many prefer to use own laptops saying PCs provided are too few and unsatisfactory (too slow, adverts etc.) Using several different platforms (in some cases, such as Mac).	systems, software, Web resource, VLE navigation	
Using the Web	Using basic search engines such as Google (few other search engines were mentioned) and Google Scholar, Using institutional Web pages (in some cases, but reported difficult to find) to access evaluated academic information, Using favourites to store Web links, Using Blackboard (in many cases) to discover links to relevant Web sites, Attempting to use Web resources in an integrated way (but having often to break out of the VLE in order to do so), Difficulties in evaluating Web content.	Web credentialising/ evaluating; Institutional Web navigating/ awareness building; Google-based Web experiencing; Web sorting; Web resource storing/ retrieving; Cross-system Web navigating; VLE-based Web browsing/searching; ; Web-resource trusting	Web space integrating (Becoming familiar with a wide range of Web platforms as an integral component of their study routine and research)
Working remotely	Many students study from their work-place, small number described studying whilst abroad on work business using laptops, blackberries etc. Some comments that technology is not suitable for easy working away from home (e.g. need for	Overseas VLE studying; Mobile ICT exploiting	None

	bulky laptop to do word-processing).		
Using resources (ICT, paper, photocopying, travel expenses)	Many students described how most course documentation is digital and onus is on themselves to print materials, in some cases they are required to print their own materials. Students studying in a work-related capacity also indicated they used work facilities to print with or without work approval. Some students expressed the demand on them to have certain levels of ICT equipment in order to study, a minority indicated they had to come into the institute more regularly due to lack of own PC etc. Others complained their PCs were not adequate or did not have the necessary software. Others indicated they had shared use of a PC which provided some facilities for the course but could prove inadequate. Some students complained regarding the cost of internet costs.	VLE document managing; Digital transforming (digital copy to hard copy); Work facilitated document transformation; ICT facility dependency; Managing ICT resource availability; Sharing ICT resources (peers, family, friends)	Digital resource selecting/ incorporating

Using communication tools	Attempting to use email despite various email systems and addresses (work, NEWI, Blackboard email system, home & work email systems), Setting preferences within systems to try to use email in an integrated way (e.g. in Blackboard), Vast majority seem to use personal rather than NEWI email, Use email infrequently but more frequently during group work, Most seem to use Blackboard more (i.e. checking for new content rather than communications from tutors).	Email navigating; System referencing; Traditional email dependency; VLE-email interrelating	Tutor network developing/ maintaining
Group work	Many of the students indicated they had been engaged in group work at some point, this often involved developing documentation or presentations collaboratively. In some cases, students felt group work was difficult due to the need to access peers outside formal lecturers linked to the limited time available in class. Students reported exchanging personal emails to communicate and exchange materials for projects (via email). In one class, a business-based group described using a Wiki to develop a	Remote group participating; Shared e-document creation/ development; Group time managing/ prioritising/ coordinating	Social (Peer) network developing/ maintaining

	collaborative document, all group members had participated in the wiki but some had difficulties using the software.		
VLE use	Required for access to course materials, Email, External links, Emphasis on content rather than communication, Regular checking for updates, etc. Some students indicated a dependence on VLE use and habitual use of the system for all aspects of the study, i.e. they would consult the VLE as the first stage in being given any task such as coursework. These students indicated the VLE provided everything required for the course, making books and external materials unnecessary. There was a lack of consistency for many students in the way the VLE was used across different modules, with some lecturers using the VLE as a content repository, others as a communication medium, others infrequently and others not at all. The structure of the	VLE document seeking/ navigation; Habitual VLE visiting; Habitual VLE avoidance; VLE course / course-requirement dependence; VLE-literature (books) navigation; VLE styles navigation/ reconciliation; VLE content deficit reconciliation; VLE-external systems navigation; VLE-Web reconciliation; VLE-course/programme structure reconciliation; Course content specificity reconciliation/ navigation	None

	VLE was also criticised often in terms of the general tabular structure being too poorly integrated (with other systems such as institutional email, Web based library resources, Student Web pages etc.) and the course structures themselves being unstructured and difficult to navigate. Some students felt the depth of information was superfluous within certain course-sites, or was not tailored specifically enough to their course (e.g. for sites devoted to a number of programmes or modules).		
Word-processing / course-work preparation	Managing hardcopy and digital documents, Travelling to location of ICT facilities (in some cases), Negotiating ICT issues such as password problems, faulty equipment. Some students indicated study facilities were an issue, with noisy/ busy home or work environment meaning they felt the institute provided a better study environment, however some students complained that whilst all the open access areas had PCs, there was no 'quiet study' area for reading and other study purposes.	ICT-hardcopy multitasking/ reconciliation (e-studying); Desktop computer problem reconciliation; Quiet-e-studying reconciliation	Multiple location e-studying

Document Management	Many students described issues managing digital and hardcopy resources such as excerpts, photocopies, digital texts, Web extracts etc., expressing difficulties when organising the wide range of materials they had to read. Some students had developed personal systems for organising material e.g. using desktop folders in Windows or use of customised directories using Windows Explorer. Other students found the experience of accessing, internalising and processing documentation was difficult – partly due to the large number of sources (and open ended nature of Web resources/portals) but also due to the amount of material being provided via the VLE. Many students indicated they were inclined to print everything off since they felt unable to cope with the quantity of digital materials, for some this printing issue was a financial & resource problem. Some students clearly had an idea of multi-tasking on a computer environment, others were obviously unable to work with digital	Digital / hardcopy resource reconciliation.; Web resource/ excerpt integration; Digital resource sorting, labelling and situating; Digital document internalising; Digital document processing; Digital document volume reduction/ management; Digital document filtering; Digital document credentialising	Digital document multitasking

	texts in this way.		
Using information sources	Student characteristics included Using ICT to access information sources, Using hardcopy systems such as library indexes, Using software and Web-based resources such as search engines and portals, Evaluating information sources, Dealing with web-based plagiarism issues. Ensuring citation and quotation of sources is appropriate. Some students already had a professional or work-related knowledge of Web-based resources. Some students reported using e-books delivered via the VLE, indicating use of full-text journals and books in lieu of hardcopy resources, these students commented that whilst the availability of e-books ensured all students had access to reading material, this also posed problems for printing material off (where this was the preferred medium for working). Few students indicated they used the online	Digital resource discovery; Assimilation of online sources (of information); Credentialising, labelling, storing and retrieving information sources; Plagiarism avoiding; Integrating professional and study sources (of information); Transforming digital to hardcopy resources; Integrating information sources; Awareness acquiring of information sources; Search engine digital resource dependence; Search engine results interpreting	Information systems traversing; VLE course resource dependence (as information portal); Accommodating/ reconciling digital documents

	journal system, with some suggesting they were not aware of any online library resources. Many students indicated that whilst they felt happy using Web-based search engines and online information sources outside the VLE, they would only do so on request from their tutor. Others indicated anxiety regarding citation and authority of online sources (mentioning concerns of tutors or even having been asked never to use Web-based information). Students also described varying levels of comfort using search keywords in search engines and online journal systems etc. with many expressing dissatisfaction with keyword searching as yielding too many irrelevant results. Students indicated they would value further support in using keyword searching techniques. Many students said they used 'Google' but felt a lack of facility using the internet effectively. Some students expressed difficulty using Athens-based information portals, indicating the process for logging in was too complex and often		

	impossible to use.		
Liaising with employer organisations	Negotiating work-based projects, Dealing with confidentiality issues in coursework.	Employer stake-holding; Employer study internalising	None

Table 5: Worksheet 4 - Early Theoretical Codes (Categories) developed from Theory Bits/ Insights

Derived from Excel Workbook Sheet 4 – "Early Theoretical Codes (Categories) developed from Theory Bits/ Insights etc.".

Example theory bits from table (10 examples from around 180 theory bits):

The Theory Bits were insights obtained from descriptive codes (substantive coding) at the initial open coding stage (to developed Memo Descriptive Indicator Codes) and later developed Substantive Code stage. All Theory Bits were listed in Worksheet 4 and basic sorting was achieved directly in the worksheet using the same Control Term approach used to sort Memo comments into initial Control Terms (open coding). The resultant Theory Bit Control Terms represented the earliest stage of theoretical coding, establishing a standardised taxonomy of Theory Bits, and thus eliminating Theory Bits which represented repeated insight. For a list of all Theory Bits and Control Terms see Appendix 12.

All Informal Theory Bits and Insights listed from Memo Data sheet, Substantive Descriptive Code sheet and Theoretical Sensitivity sheet	Theory Bit/ Insight (refined as Control Term)
Prioritising tasks and objectives to achieve wider aims	Prioritising tasks, aims and objectives
Using a variety of online and oncampus services and tools to obtain a more holistic range of sources and services	Exploiting oncampus and online services
Overcoming lack of computing facilities at home by exploring and developing skills in use of institutional PCs	Skilling and exploiting IT facilities
Overcoming IT issues such as downtime	Overcoming & negotiating IT problems
Overcoming perception that specialist databases are not sufficiently available, Google provides an alternative to locate resources	Augmenting database limitations via Google
Overcoming group working challenges such as logistics and communications to achieve group project outcome	Managing/ coordinating group work
Overcoming proliferation of course materials and documentation in VLE, presenting challenges for management of documentation	Managing high volumes of course material
Using hardcopies to store, view and manage information sources for development of coursework	Physicalisation of digital or online documents
Overcoming expectations for provision of e-resource databases from previous experience	Assimilating prior online resource behaviours with current facilities

Early theoretical codes:

Early Theoretical Code derived from Theory Bits (and commonly occurring Properties) following category sorting	Early Theoretical Code Properties (drawn from Theory Bits) - also see sorting tables	Further Explanation of Early Theoretical Code
Self-Management of Study Regime and Programme	Prioritising tasks, aims and objectives; Managing/ coordinating group work; Remote internet-based studying; Management of family life to facilitate study; Time management for effective study; Flexible locating to overcome opening/facility limitations; Facilitating lifelong learning via studies; Facilitating career development via academic skills progression; Investing resources, time and effort to facilitate study via VLE; Taking increased responsibility/ motivation for self-led study due to low class contact; Dealing with varying levels of expectancy fulfilment and adopting consequent coping behaviours	Students indicated they had a significant remit to self-manage their own study processes and resources, this extended to management of work and family commitments to detailed coordination and facilitation of shared group work. Students also had to manage access and use of diverse computing facilities and workplace support. Another aspect of self-led management of study included a sense of personal career, skills, professional and academic development for lifelong learning and workplace security. Students also indicated varying levels of support/facilities expectancy and indicated methods to source or engage in a variety of strategies, support networks or developmental processes to accommodate the realities of these expectations.
Exploiting Facilities and Services	Exploiting oncampus and online services; Skilling and exploiting IT facilities; Exploiting/skilling via Google Scholar to overcome database issues; Exploitation of VLE as supplement to class attendance issues; Exploiting oncampus computing/software facilities; Maximising/ optimising online tools/VLE in mixed physical/online-dependent context; Exploitation of VLE as supplement to class attendance issues	Students frequently indicated they were seeking to exploit or optimise the use of student services, IT facilities, library services and online/digital resources to benefit their studies and use their time most effectively. Strategies and activities related to exploitation of support and facilities included searching for or mutually sharing advice or guidance on useful online resources, Web site or portals or shared knowledge on

		institutional services. The use of online and campus based services implicated an inclination to use both these contexts optimally, although for some students there could be bias toward either virtualisation or physicalisation in terms of preference for differing contexts and services.
Resolving and Supplementing ICT Problems	Overcoming & negotiating IT problems; Overcoming Library/Lab equipment issues via personal/mobile devices; Overcoming general confidence issues using ICT; Overcoming diverse systems and compatibility problems; Skilling in general IT skills to improve online study effectiveness;	Students exhibited a range of concerns and challenges using ICT services and equipment, including printers, scanners and individual online platforms such as the VLE or Library systems, students also experienced problems accessing or using library databases. Students indicated a variety of strategies to overcome these issues including attempts to improve awareness/ skills for technologies and network with support departments or peers. Students indicated that overcoming poor confidence in the use of ICT was related to these challenges.
Engaging with and Negotiating Online Communications	Negotiating diverse communication tools (VLE, messaging, email, social networks); Reconciling diverse email platforms to ensure effective communication; Resolving VLE communications engagement with tutors or peers; Overcoming low engagement of peers in use of communication tools; Resolving/negotiating low tutor VLE interaction	Students indicated they engaged with a range of online communication platforms and tools including VLE based tools such as group/discussion features, assessed class discussion tasks, use of email to communicate with peers and tutors and informal or external communication technologies such as Skype or social networks such as Facebook. Students indicated problems engaging with some peers and tutors due to lack of engagement and also described usability or technical problems regarding some technologies. Overall, communication technologies represented a positive facilitator for remote study in this

		predominantly low contact environment.
Acquiring and Supplementing Study Skills	Self-development of study skills; Overcoming study confidence issues; Skilling in information literacy, e-resource/WWW credentialising etc. for study ; Rebuilding academic skills; Lone & self led studying at a distance from peers/tutors; On-demand self-led learning due to time constraints attending training; Overcoming/skilling in study competencies to overcome training gaps; Self-regulated development of learning skills via diverse research/assimilation, evaluation etc.	Students indicated a perceived shortfall in availability (and in some cases quality) of support for general study skills including course work development skills and research skills related to information literacy. Students described the need to supplement low contact and infrequent opportunities to engage with supplementary training available via personal attempts to acquire skills in areas such as use of the VLE or databases, for some students there were challenges in the acquisition of skills for core internet tools such as browsing the Web or use of email, these students tended to represent non-conventional mature students returning to education. Students described the need for high quality support materials for research, library systems and learning tools such as VLE assessment features.
Resolving and Supplementing Information Literacy for Effective Research	Assimilating prior online resource behaviours with current facilities; Referencing skilling to avoid plagiarism and grade detriment; Skilling with information sources to enhance research; Skilling with challenging databases to enhance research; Skilling with wider online sources to enhance research; Skilling in use of database sign in to facilitate literature searching; Skilling in referencing to avoid plagiarism and avoid grade detriment; Sourcing specialist e-resources or databases; Overcoming database issues to obtain core reading texts; Overcoming confidence issues using/evaluating/trusting WWW	Students described considerable problems accessing online library databases due to multiple sign in issues, usability issues, limited scope for availability of platforms, lack of specialist platforms and problems navigating systems or interpreting search results, these issues extended to both formal library-sourced Web services and databases but also referred to Internet sources and WWW search engines on occasion. Students frequently referred to facilitation of literature searching via non-conventional or informal methods such as Google to overcome the aforementioned issues, in some case, students actively assessed and selected

	content; Overcoming search results filtering in specialist databases; Maintaining up to date readings via diverse search strategy	resources based on WWW academic portal recommendations (databases such as BizEd) or using links from the VLE or Library. Students also used Google Scholar to refine WWW search outputs or occasionally used advanced options within WWW platforms and search engines. Students described a variety of strategies to develop information literacy skills and improve access or engagement with library and informal WWW search options.
Engaging with and Negotiating Digital Platforms	VLE, Library Platform or WWW page navigating; Overcoming confidence issues using the VLE; Overcoming WWW site navigation/interface issues; Overcoming institutional Web site navigation/interface issues; Supplementing core VLE provision via wider library/WWW portals; Self-navigating/resolving diverse sources/databases unavailable directly in VLE; Overcoming challenges accessing range of database/platforms/WWW sources; Integrating and assimilating University platforms and sources into existing practices	Related to the theoretical code "resolving and supplementing information literacy for effective research", this code represents the ongoing challenges and strategies for students in the navigation of diverse platforms and systems. Many students found the range of online Web sites, databases, student portal, University Web pages, government and standards sources, special interest Web sites, corporate Web sites and work related Web resources difficult to assimilate into their research and academic output. Students described a variety of challenges and corresponding strategies for overcoming the proliferation and diversity of platforms and systems including reliance on the VLE, reliance on core printed texts, physicalisation of key materials into a learning set to avoid digital content negotiation or avoidance of online sources. Other students expressed a variety of strategies to optimise the use of diverse platforms, including use of desktop PC bookmarking tools, Web based bookmarking, hierarchical file management for

		downloaded materials or reliance on hierarchies found in Web portals or the VLE to provide a structured interface to these sources. The negotiation of diverse sources and development of competencies to access and embed these sources into study was acknowledged as a key requirement by many students, despite widespread aversion to the need to navigate, discover, evaluate, interpret and selectively use these resources effectively and in an appropriate context.
Physicalisation of Virtual Learning	Physicalisation of digital or online documents; Reliance on VLE for prioritised/optimised study routine; Reliance on facilities for study space, quiet etc.; VLE/online tools avoidance via reliance on core handbook or selected print materials; Avoidance of unfamiliar technologies and related training, utilising familiar technologies	Students frequently described printing hardcopy resources including presentations, course information, online articles, course handouts or even the display of information shown directly in the VLE, students sometimes described the need for hardcopy resources a key requirement for study, rather than consider use of digital files virtually within a computer environment. This process suggested that some students were undertaking a "physicalisation" of digital assets and online services to undertake course assignments and other academic work solely or largely via printed media. Another aspect of this behaviour included avoidance of the VLE and other online service and tools. Whilst some students admitted to this processing of online systems and digital assets, the same student would often acknowledge the need to improve their management of digital media to reduce print costs and work more rapidly without the need to print.
Virtualisation of	Mobile/ overseas study via VLE,	Many students described

Learning to accommodate Remote Study	email, synchronous tools etc.; Using the VLE to facilitate core programmes information, course requirements...; Asynchronous tool use for time/schedule study effectiveness; Facilitation of overseas engagement via VLE; Mobile/ overseas study via VLE, email, synchronous tools etc.; VLE reliance as distance learning study tool; Using removable media to facilitate mobile computing across locations; Use of VLE as a mobile/cloud solution for accessing content across diverse locations; Virtualisation of study experience via intense online tools use; Choosing to study in part time context to accommodate personal/work commitments ; Ubiquitous learning via range of devices & locations to accommodate lifestyle ; Distributed Learning via multiple e-learning formats, tools, media.; Accessing support, training materials, video etc. just in time to need/activity	processes or strategies to virtualise their experience to accommodate their remote or low contact context, this included management of online sources and digital assets within a computer environment, use of cloud style computing approaches such as Microsoft Live spaces for sharing and networking with peers, use of extended communication tools such as Skype or further use of VLE communication tools beyond regular classroom interaction such as personal messaging in the VLE or use of group features. Use of mobile devices and laptops was also raised a means of working across diverse locations in a virtual and remote context. The virtualisation of learning was important for many students to varying levels, with some students suggesting these approaches should be implemented more fully to allow for more flexible study and increased online learning options.
Learning Resources Capital Acquisition	Seeking autonomy to access software installed in diverse locations; Overcoming deficit of specialist software applications	Some students expressed the need to acquire and install software applications on a range of personal and work PCs, access to this software was considered a key issue for successful study, despite the availability of some specialist software on University PCs. Students described a range of strategies and approaches for obtaining these software applications.
Organisation of Learning Assets	Digital document/ excerpt and notes management for effective file handling; WWW/ E-resource sorting, labelling and storing for efficient media retrieval; Sorting and labelling digital assets using	Some early pilot interviews revealed techniques to store, sort and archive digital assets such as course work or articles downloaded from databases or the WWW, some students used

	folders; Selection and refinement of learning resources to avoid information overload via adoption of key resources such as the VLE	basic folder hierarchies whilst others were most comfortable using the standard 'My Documents' and related folder structure available on Windows computers. Some students used removable media whilst other saved files to their network drive or stored documents in email for access at diverse computing locations. When this code was raised for selective coding many students expressed a lack of familiarity and difficulties managing their digital assets but indicated the organisation of assets was important for effective study.
Supplementing and Innovating Literature Searching Approaches	Augmenting library/database usability via Google; Augmenting database limitations via Google; Reliance on VLE as intermediary for e-resources; Resolving full text e-resource problems via Google/Scholar; Overcoming/supplementing limited database coverage; Resolving WWW e-texts in the absence of print/digital copies; Use of a range of library/online providers for sourcing materials	Students often expressed difficulties using library databases due to multiple sign in, password problems, usability or search results filtering issues, many students indicated they used WWW portals, Google, Google Scholar, work related platforms or other authoritative sources such as major standards Web sites or government/public sector portals to access articles and information. Students expressed a variety of strategies and techniques to access full text documents and indicated this was a key issue for effective study.
Virtualisation and Engagement for Online Feedback and Assessment	Networking via available communication tools to enhance peer/tutor interaction; Engaging/skilling with VLE communications tools for tutor liaison; Assessment/feedback and reflection via VLE, email etc.; Active 'e-moderating' participation with tutor via discussion boards, feedback and other tools; Synchronous debate and collaboration between tutor/students e.g. via virtual classroom tool	Students often expressed the need to communicate electronically with tutors for the purposes of feedback and assessment, strategies for achieving this included use of email, VLE messaging, discussion boards and drop box for document delivery (e.g. commented Word files). Some students also described use of the 'Virtual Classroom' and other VLE features for synchronous feedback. Online VLE-based

		assessment, grading and survey tools were also discussed. The virtualisation of feedback and assessment was considered an important component for effective remote engagement in assessment.
Socialisation of Learning for Group/Peer Working	Facilitating networking/groups via informal social networks; Integrating learning into social space via networks, email etc.; Facilitating networking/groups via informal social networks; Facilitating group document development via formal/informal online tools, wikis etc.; Informal use of VLE discussions to network with peers; Extending VLE via informal resource sharing and communication via social media, cloud computing for group work; Sharing knowledge and group information via VLE tools; Using informal synchronous communication such as Skype for group work and socialisation; Applying informal networks and socialisation with peers/tutors to embed learning in these contexts	Some students expressed the need to use informal electronic communications to facilitate group working and general networking with peers, via tools such as VLE messaging, VLE group tools, file sharing, Microsoft Live Spaces and social media, these approaches represent the embedding of learning within the use of social media and personal online spaces.
Engaging with and Negotiating Remote Group Working	Engaging/skilling with VLE communications tools for group projects; Remote engagement with group projects via VLE tools; Resolving VLE communications tools problems for group work; Balancing/prioritising workload with group networking demands; Overcoming low engagement of peers in use of communication tools	Group working was often mentioned in terms of challenges for facilitating and coordinating shared project development without persistent oncampus presence (virtually all the students interviewed lived off campus); a range of strategies and tools were used to achieve group working, including use of social media, the VLE and email features. Challenges in group working included motivation of peers and balancing group working activities alongside personal commitments.
Resolving and Networking for Acquisition of ICT	Resolving IT support limitations; Resolving VLE support limitations; Developing peer,	Students described a range of strategies to obtain ICT support to resolve technical problems,

Support	family, work networks to support ICT issues/use; Exploiting institutional support networks	these solutions included networking with other students and sharing advice on platforms or consulting family or friends. Students often states that conventional IT support was difficult to obtain or slow in terms of meeting needs during timescales for completion of work (e.g. during weekends).
Engaging with and Negotiating VLE and course content	Managing high volumes of course material; Overcoming difficulties accessing online exam materials	Some students expressed the need to negotiate and mange considerable documentation via the VLE, this has implications for printing and document management. The VLE was cited as the most valuable and relied upon online platform for most students, acting as a hub for course materials and communication tools. The provision of materials in the VLE and effectiveness of course layout and structure was described in terms of significant importance. Students often mentioned the need to navigate the VLE successfully to obtain course materials or engage in discussions etc.
Managing and Negotiating Work-Study Relationship	Integrating work and study context to develop lifelong learning; Managing workplace demands for study participation; Managing workplace sponsored study requirements; Anxieties related to work related fee resourcing; Managing access to study balancing work commitments	Some students had a significant imperative to negotiate or manage work-study relations, with some students facing pressure from employers to participate and complete programmes with others expressing anxieties regarding work related funding for programmes fees.
Resolving and Negotiating WWW usage issues	Skilling/ negotiating WWW search challenges; WWW evaluation strategies for authoritative use of sources; WWW bookmarking to resolve e-resources; Overcoming WWW authority issues via Library links/platforms; Negotiation of diverse WWW sources via favourites or link sharing	The use of the WWW was mostly cited as a positive experience and tool for most students, providing a supplementary resource for obtaining academic or commentary materials, however some students expressed anxieties regarding the evaluation and appropriate use of WWW derived materials,

	platforms	other students expressed difficulties in selecting appropriate resources from volumes of search results shown in search engines. Some students expressed the desire to develop better information literacy skills to use the WWW more effectively. Students experienced challenges in navigating diverse WWW sources, including sources shared via the VLE.
Developing Confidence in Technologies and Low Contact Study	Overcoming confidence issues for low contact context; Dealing with anxieties in online learning; Overcoming confidence issues for group work via online tools	Development of confidence as a part time or predominantly remote based student was cited by many students a challenge, with some students perceiving themselves to be at a disadvantage due to their remote study context.

Table 6: Worksheet 5 - Developed Theoretical Codes (Categories)

Derived from Excel Workbook Sheet 5 – "Developed Theoretical Codes (Categories)".

Data in this table:

Developed Theoretical Code assimilated/ grouped derived from Low Level Theoretical Codes (and commonly occurring Properties) following category sorting	**Early Theoretical Codes related to this Indicator refined as Control Terms using comma separated list**	**Explanation of Developed Theoretical Code**
Multi-tasking Commitments	Self-Management of Study Regime and Programme; Managing and Negotiating Work-Study Relationship	Managing simultaneous commitments via prioritisation across the programme, work and private life.
Self-Regulated Engagement	Acquiring and Supplementing Study Skills; Developing Confidence in Technologies and Low Contact Study; Resolving and Supplementing Information Literacy for Effective Research; Resolving and Supplementing ICT Problems;	Leading aspects of personal study, this relates heavily to perceptions of low contact and class/study support where students develop self-led approaches to managing their work, overcoming skills barriers, developing strategies for overcoming resource or access issues and leading project work.
Transitional Physicalisation of Online Learning	Physicalisation of Virtual Learning; Learning Resources Capital Acquisition	Most students exhibit some level of transitional or traditional approaches to study, the most evident aspect of this behaviour is the heavy reliance on printed media amongst some students, other characteristics include avoidance of wider e-resource/database engagement or poor engagement within group work or associated electronic/VLE communication tools. Students

		may also have anxieties regarding management or storage of digital media and may rely on printed textbooks. Students may also either avoid the VLE where there are options to work around this platform or minimise usage. Students who exhibit these kind of tendencies could be considered transitional in terms of cultural acceptance of digital technologies more generally, their reliance on printed and class-based participation (vs. online or social learning interactions) could be described as physicalisation of remote learning.
Network Building/ Engaging	Engaging with and Negotiating Remote Group Working; Resolving and Networking for Acquisition of ICT Support	Students often developed information or links within their social sphere and the educational institution to obtain a range of support, including support via peers, family, work colleagues or University staff. Networking can also be said to occur at the group or class level where students exchange information, tips or discuss academic work via formal (VLE, discussion board etc.) or informal social media channels.
Adaptive Virtualisation of Learning	Virtualisation and Engagement for Online Feedback and Assessment; Virtualisation of Learning to accommodate Remote Study ; Engaging with and Negotiating Online Communications	Students often exhibited adaptive strategies and behaviours to maximise the use of electronic platforms and communications tools for working remotely, this is often in context to low class contact and low attendance at the University for informal networking and discussion with peers or tutors. The enhanced adoption of communication tools and social media for networking and group work is explained by the need to virtualise this experience. Virtualisation is also noted in

		the diverse use of platforms, databases and WWW portals/ search engines which may be more prolific than conventional oncampus students. These virtualisation tendencies illustrate the characteristics of student interactions in a directed sense when undertaking blended learning, but also illustrate motivations and strategies to expand or push the boundaries of available tools, platforms and systems to facilitate study effectively at a distance.
Socialisation of Learning	Socialisation of Learning for Group/Peer Working	Students sometimes discussed aspects of group work or networking with peers which involved informal channels such as personal email or social media, these channels illustrate the embedding and assimilation of blended learning into existing or adopted technologies accessible to the student and their social sphere. Socialisation of blended learning illustrates student strategies to enhance the learning experience via use of technologies which may extend or build upon those offered in class, such as Skype for video discussions, Live Spaces for document sharing or Wikis for shared document creation.
On-Demand Exploitation/ Improvisation	Supplementing and Innovating Literature Searching Approaches; Exploiting Facilities and Services;	Students exhibited strategies to resolve a variety of technical, informational and resource-based needs in a low contact context, including access to support networks within their social or family sphere, exploitation of University or other local services such as local libraries or improvisation such as use of WWW search engines to locate e-resources or supplement formal

		databases for literature searching. Exploitation and innovation emerged as a highly important strategy and process for literature searching due to perceived problems using databases and platforms provided within the Library.
Navigating diverse platforms, equipment, locations	Engaging with and Negotiating Digital Platforms; Engaging with and Negotiating VLE and course content ; Resolving and Negotiating WWW usage issues; Organisation of Learning Assets	Students also reported the need to become familiar with and overcome challenges in the use of a wide range of WWW portals, government and standards Web sites, public sector Web pages, library platforms, catalogue and databases and other online tools and platforms such as the VLE and informal systems such as Live Spaces. Students also reported using diverse locations for computing and other formal systems such as the Library classification system or work related information sources. Students also reported challenges using equipment, computing facilities and personal or work computer equipment. The navigation of diverse platforms, equipment and locations for remote study was therefore a significant challenge and process observed within this student population.

Table 7: Worksheet 6 - High Level Theoretical Codes (Categories)

Derived from Excel Workbook Sheet 6 – "High Level Theoretical Codes (Categories)".

Data in this table:

High Level Theoretical Code assimilated/ grouped derived from Developed Theoretical Codes (and commonly occurring Properties) following category sorting	**Developed Theoretical Codes related to this Indicator refined as Control Terms using comma separated list**	**Explanation of High Level Theoretical Code**
Transitional Physicalisation of Online Learning	Transitional Physicalisation of Online Learning	Most students exhibit some level of transitional or traditional approaches to study, the most evident aspect of this behaviour is the heavy reliance on printed media amongst some students, other characteristics include avoidance of wider e-resource/database engagement or poor engagement within group work or associated electronic/VLE communication tools. Students may also have anxieties regarding management or storage of digital media and may rely on printed textbooks. Students may also either avoid the VLE where there are options to work around this platform or minimise usage. Students who exhibit these kind of tendencies could be considered transitional in terms of cultural acceptance of digital technologies more generally, their reliance on printed and class-based participation (vs. online or social learning interactions) could be described as physicalisation of remote learning.

Motivational adaption and improvisation via Online Learning	Self-Regulated Engagement; Network Building/ Engaging; Socialisation of Learning; Multi-tasking Commitments; Adaptive Virtualisation of Learning; On-Demand Exploitation/ Improvisation	Motivational learning represents the need for highly driven and efficient study practices as an imperative to online/blended study, this property featured heavily in almost all High Level codes contributing to the Core Category. Motivational learning represents self-led or self-regulated study management and responsibility-taking for studies, group work, interactions with peers and tutors, development of study skills and familiarisation with diverse platforms, equipment and services and the self-led negotiation of personal commitments such as work and family life. Adaptive learning represents the imperative to create or construct strategies and solutions to overcome a range of technical, study-related and networking-related needs within the study context of low contact learning. Students often exhibited adaptive strategies and behaviours to maximise the use of electronic platforms and communications tools for working remotely, this is often in context to low class contact and low attendance at the University for informal networking and discussion with peers or tutors. Improvisation concerns strategies to access on-demand support, resource location or learning needs such as use of support networks within the social or family sphere, exploitation of University or other local services such as local libraries or improvisation such as use of WWW search engines to locate e-resources or supplement formal databases for literature searching. Exploitation and innovation emerged as a

		highly important strategy and process for literature searching due to perceived problems using databases and platforms provided within the Library.
Navigating diverse platforms, equipment, locations	Navigating diverse platforms, equipment, locations	Students also reported the need to become familiar with and overcome challenges in the use of a wide range of WWW portals, government and standards Web sites, public sector Web pages, library platforms, catalogue and databases and other online tools and platforms such as the VLE and informal systems such as Live Spaces. Students also reported using diverse locations for computing and other formal systems such as the Library classification system or work related information sources. Students also reported challenges using equipment, computing facilities and personal or work computer equipment. The navigation of diverse platforms, equipment and locations for remote study was therefore a significant challenge and process observed within this student population.

Table 8: Worksheet 7 - Key Theoretical Sensitivity from the Literature

Derived from Excel Workbook Sheet 7 – "Key Theoretical Sensitivity from the Literature".

Example data in this table:

Theory Bits derived from Literature	Explanation	Citation	Full Reference
Blended learning (for detailed overview see Theoretical Sensitivity worksheet)	"Online learning has its drawbacks. One of the main disadvantages is the lack of social interaction which is taken as given in conventional settings. This creates a special need to motivate the less independent student ...The need for a compromise between the conventional face-to-face sessions and online learning leads us towards a new approach to teaching and learning, the so called hybrid or blended learning." (Heinze and Proctor, 2004)	Heinze and Procter	Heinze, A., & Procter, C. T. (2004). Reflections on the use of blended learning.
Low contact motivations for delivering or engaging in e-learning (for detailed overview see Theoretical Sensitivity worksheet)	Students studying in a part time context will be subject to a range of motivations and pressures for engaging in e-learning style education, this may be due to monetary, personal commitments or other limitations on conventional full time study, these motivations or pressures can prompt the adoption of e-learning approaches and technologies for all	Catherall, P.	Catherall, P. (2005). Delivering e-learning for information services in higher education. Elsevier.

	stakeholders engaged in the education sector, including programme developers and potential students. (Catherall, 2005)		
Use of synchronous communication tools to acheive more dynamic group communication e.g. Skype, Microsoft Messager/ Live tools (for detailed overview see Theoretical Sensitivity worksheet)	"By removing the barriers of time and place, instructors can create and sustain student learning communities supported by interactive communication tools grounded in asynchronous learning models. The instructor's role moves to that of a facilitator who seeks to stimulate interactions between students and between students and the instructor, in the pursuit of improved learning and knowledge base construction." (Wilson, 2000)	Wilson, A. G.	Wilson, G. A. (2004). The impacts of synchronous learning activities upon online learners. (Order No. MQ94008, Royal Roads University (Canada)). ProQuest Dissertations and Theses, , 94-94 p. Retrieved from http://search.proquest.com/docview/305053547.
Use of asynchonous communication tools such as discussion boards or file sharing for group and peer interactions to overcome low contact context (for detailed overview see Theoretical Sensitivity worksheet)	"By removing the barriers of time and place, instructors can create and sustain student learning communities supported by interactive communication tools grounded in asynchronous learning models. The instructor's role moves to that of a facilitator who seeks to stimulate interactions between students and between students and the instructor, in the pursuit of improved learning and knowledge base	Kochtanek, T. R. and Hein, K. K.	Thomas R., K., & Karen K., H. (2000). Creating and nurturing distributed asynchronous learning environments. Online Information Review, 24(4), 280.

	construction." (Kochtanek and Hein 2000)		
Ubiqutous learning style - using a variety of devices and design options to facilitate 24/7 on-demand learning, accomodating the students' own time schedule and commitments (for detailed overview see Theoretical Sensitivity worksheet)	"Ubiquitous learning. This term is often used to describe the relationship between students, tutors and electronic systems in a variety of contexts such as the university, home, workplace, local library or via mobile devices such as an Internet-enabled mobile phone... The growth in low-contact teaching has resulted in an increasing dependence on e-learning systems, raising a number of challenges to support a ubiquitous approach to study and communication." (Catherall, 2005)	Catherall, P.	Catherall, P. (2005). Delivering e-learning for information services in higher education. Elsevier.
E-Moderating (for detailed overview see Theoretical Sensitivity worksheet)	"Gilly Salmon's e-moderating model (Salmon, 2000), (see Figure 2) describes a five-stage process, engaging the student with online communication technology. It is based on a principle that there are certain things that have to exist in order to achieve the effective operation of learning via technology. One underlying issue here is the use of activities, to make students interact with each other and the E-moderator, rather than only accessing information such as handouts and presentation material." (Heinze and Proctor	Heinze, A and Procter, C.	Heinze, A., & Procter, C. (2004). Reflections on the use of blended learning. Education in a Changing Environment 13th-14th September 2004, University of Salford.

	2004)		
Collaborative learning (for detailed overview see Theoretical Sensitivity worksheet)	"In addition to pushing traditional lectures out of college classrooms, information technology is pushing the limits of online human communication and collaboration, opening new frontiers for collaborative learning. It is currently possible to conduct a virtual class meeting on the Web, wherein students not only see the slides and other materials as the instructor moves through them but can actually take control of the presentation, directing attention to a specific slide or making a change to a specific document as everyone watches from their remote locations." (Graetz and Goliber 2002)	Graetz, A. K., Goliber, M. J.	Graetz, K. A., & Goliber, M. J. (2002). Designing Collaborative Learning Places: Psychological Foundations and New Frontiers. New Directions For Teaching & Learning, (92), 13.
Distributed Learning (for detailed overview see Theoretical Sensitivity worksheet)	"The research rationale was based on a perspective that is relatively new in education; this involves the idea of 'distributed learning', or that knowledge is 'distributed' and shared across contexts, tools, persons and resources. It is very different from more traditional views that see knowledge as existing in isolation and out of context (e.g. in someone's 'head', or formally written down in	Logan, C. et al.	Logan, C., Allan, S., Kurien, A., & Flint, D. (2004). Distributed e-learning in art, design, media: An investigation into current practice. (Commissioned Report).Higher Education Academy Art, Design and Media Subject Area.

	a book). In other words, it involves ideas about learning that have been called ‘social’ and ‘situated’, so thinking about knowledge as constructed ‘in situ’ is the best way of considering this idea." (Logan 2004)		
Self regulated learning (for detailed overview see Theoretical Sensitivity worksheet)	"This approach is grounded in constructivist theory. It presumes that students who are active and take control of their own learning at any age level or in any learning situation perform better and achieve better results. The students who already use these tactics must nurture them. Those students who do not have the skills must develop them to be more successful. Distance education students who have developed this style will be more successful than those who have not. In addition, technology allows students to take control of their learning. They are more involved in the decision-making that occurs." (Wilson 1997)	Wilson, J.	Wilson, J. (1997). Self regulated learners and distance education theory. Retrieved 11/10, 2009, from http://www.usask.ca/education/coursework/802papers/wilson/wilson.html
Self-Managed Learning (for detailed overview see Theoretical Sensitivity worksheet)	"One of the defining characteristics of higher education is the expectation that undergraduates will exercise some responsibility for the management of their learning. In the UK and	Ottewill, R.	Ottewill, R. (2002). Student self-managed learning–cause for concern?. On the Horizon, 10(1), 12-16.

	elsewhere student self-managed learning has become more salient due to resource constraints and the increasing emphasis on equipping students with what they need to become lifelong learners. At the same time, as a result of widening access policies, developments in compulsory education systems and changing lifestyles, undergraduates appear less well prepared to cope with the demands of self managed learning than might have been the case in the past. The problem is further compounded by the diversity of view amongst academic staff concerning the extent and nature of the support, which they should provide in this respect. Although the need for support will vary between institutions, all are faced, to a greater or lesser extent, with the challenge of ensuring that their learning and teaching strategies take account of the contingencies of self-managed learning" (Ottewill 2002)		
Demand-led learning (Learning On Demand)	"According to the authors, LOD reduces knowledge acquisition time, cuts travel costs for both students and teachers, lowers off-the-job related expenses,	Trondsen, E. And Vickery K.	Trondsen, E., & Vickery, K. (1997). Learning on demand. Journal of Knowledge Management, 1(3),

	reduces classroom overheads and lowers materials expenses. Through LOD higher-quality learning improves organizational performance and increases employees' breadth of knowledge and ability to deploy skills in the service of strategic objectives." (Trondsen and Vickery, 1997).		169-180.
Mobile Learning (for detailed overview see Theoretical Sensitivity worksheet)	"Looking at mobile learning in a wider context, we have to recognise that mobile, personal, and wireless devices are now radically transforming societal notions of discourse and knowledge, and are responsible for new forms of art, employment, language, commerce, deprivation, and crime, as well as learning. With increased popular access to information and knowledge anywhere, anytime, the role of education, perhaps especially formal education, is challenged and the relationships between education, society, and technology are now more dynamic than ever." (Traxler 2007)	Traxler, J.	Traxler, J. (2007). Defining, Discussing and Evaluating Mobile Learning: The moving finger writes and having writ.... The International Review of Research in Open and Distance Learning, 8(2).
Social Learning (for detailed overview see Theoretical Sensitivity worksheet)	"A blended learning strategy can lead to increased social interaction and social learning, more so than with an e-learning only approach. As social	Langley, A	Langley, A. (2007). Experiential learning, e-learning and social learning: The EES approach to developing blended

	learning theory shows those who share similar interests interact in a way that leads to the sharing of both tacit skills and tacit knowledge. As a result it creates an extension of the learning that occurs in the classroom and thus has the potential to develop the ability of students to develop their understanding of areas of interest." (Langley 2007)		learning, the University of Northampton
Uses and Gratification Expectancy (for detailed overview see Theoretical Sensitivity worksheet)	"The 'Uses and Gratification Expectancy' concept is used to define students' 'beliefs and evaluations' of elearning resources. This concept proposes that e-learning resources possess attributes that are likely to satisfy students' learning needs, learning styles, values, motivations, interests, intentions and epistemological curiosity. The UGE Conceptual Framework (Figure 5) attempts to explain 'how and why' students' UGE influences their 'Perceived e-Learning Experience.' It is argued that for the integration of e-learning resources into a school-curriculum to succeed, in a blended learning strategy, the dimensions of students' UGE for e-learning resources need to be identified and satisfied. In this current study, it is	Mondi, M., Woods, P. and Rafi, A.	Mondi, M., Woods, P., & Rafi, A. (2007). Students' uses and gratification expectancy conceptual framework in relation to E-learning resources. Asia Pacific Education Review, 8(3), 435-449.

	hypothesised that students may be motivated to use e-learning resources to gratify their Cognitive, Affective, Personal Integrative, Social Integrative and Entertainment needs" (Mondi, Woods and Rafi, 2007)		
Calm Computing (for detailed overview see Theoretical Sensitivity worksheet)	"Calm computing aims to reduce the "excitement" of information overload by letting the learner select what information is at the center of their attention and what information need to be at the peripheral. The objective of calm computing as a new delivery of education is to move e-learning and ubiquitous learning a step further from learning at anytime anywhere to be at the right time and right place with right learning resources and right learning functionalities and collaborative peers." (Fiaidhi 2011)	Fiaidhi, J.	Fiaidhi, J. (2011). Towards developing installable e-learning objects utilizing the emerging technologies in calm computing and ubiquitous learning. International Journal of u-and e-Service, Science and Technology, 4(1), 1-12.

Table 9: Worksheet 9 - Core Category

Derived from Excel Workbook Sheet 9 – "Core Category".

Data in this table:

Core Category assimilated/ grouped based on Developed (High Level) Theoretical Categories	**Principal Developed (High Level) Categories related to this Category**	**Explanation of this Category**
Improvised Learning	Transitional Physicalisation of Online Learning; Motivational adaption and improvisation via Online Learning; Navigating diverse platforms, equipment, locations	Improvisation concerns strategies to access on-demand support, resource location or learning needs such as use of support networks within the social or family sphere, exploitation of University or other local services such as local libraries or improvisation such as use of WWW search engines to locate e-resources or supplement formal databases for literature searching. Exploitation and innovation emerged as a highly important strategy and process for literature searching due to perceived problems using databases and platforms provided within the Library. Innovation can be seen to complement and include all existing theoretical categories and particularly the following Developed and High Level Theoretical Categories: Motivational adaption and improvisation via Online Learning, Adaptive Virtualisation of Learning; Self-regulated engagement; On-Demand Exploitation/

		Improvisation; Navigating diverse platforms, equipment and locations.
<u>Tentative Core Category</u> assimilated/ grouped from very early Theory Bits during the pilot interviews	**Original anecdotal Theoretical Codes related to this Category**	**Explanation of this Category**
Information Systems Traversing or Self-led multi-systems traversing	Lone studying via ICT; Self navigating Technologies; Inter-location studying; Remote peer-communicating; Multi-tasking commitments; Study-Work Integrating; ICT self-supporting; ICT knowledge sharing; ICT facility discovery; ICT facility exploiting ; Commitment (life, work, study) accommodating; Vocational study avoidance; Vocational study exploitation/ appropriation; VLE workload avoidance; VLE information exploitation; Career studying (voluntary / involuntary); ICT familiarising; Goal-based ICT appropriation; ICT problem navigating; Support network developing; ICT software/ systems/ equipment ownership (literal owner and stakeholder); Cross-system/ platform coping; ICT systems, software, Web resource, VLE navigation; ICT self-reliance; Web credentialising/ evaluating; Institutional Web navigating/ awareness building; Google-based Web experiencing; Web sorting; Web resource storing/ retrieving; Cross-system Web navigating; VLE-based Web browsing/searching; Web space integrating; Web-resource trusting; Overseas VLE studying; Mobile ICT exploiting; VLE document managing; Digital resource selecting/ incorporating; Digital transforming (digital copy	In brief, the core category or process which the participant continually tries to resolve, could be 'Self-led multi-systems traversing' this basically indicates the primary and core concern of the student is related to managing a disparate array of systems, digital and hardcopy resources, logins, PC-based applications and Web-based systems. Some serious considerations for this tentative core category could include ICT literacy of intake students (i.e. having sufficiently high ICT skills to cope with the breadth of ICT requirements for a Higher Education course delivered via blended learning and associated technologies, and support issues for the training, induction, and ongoing support for users in a low-contact/ part-time context. The self-led issue is perhaps the most important sub-category, indicating the sense the student has of isolation and demands placed on them to perform a range of basic ICT functions within the VLE and in the use of wider systems.

	to hard copy); Work facilitated document transformation; ICT facility dependency; Managing ICT resource availability; Sharing ICT resources (peers, family, friends); Email navigating; System referencing; Traditional email dependency; VLE-email interrelating; Tutor network developing/ maintaining; Remote group participating; Social (Peer) network developing/ maintaining; Shared e-document creation/ development; Group time managing/ prioritising/ coordinating; VLE document seeking/ navigation; Habitual VLE visiting; Habitual VLE avoidance; VLE course / course-requirement dependence; VLE-literature (books) navigation; VLE styles navigation/ reconciliation; VLE content deficit reconciliation; VLE-external systems navigation; VLE-Web reconciliation; VLE-course/programme structure reconciliation; Course content specificity reconciliation/ navigation; ICT-hardcopy multitasking/ reconciliation (e-studying); Multiple location e-studying; Desktop computer problem reconciliation; Quiet-e-studying reconciliation; Digital document multitasking; Digital / hardcopy resource reconciliation.; Web resource/ excerpt integration; Digital resource sorting, labelling and situating; Digital document internalising; Digital document processing; Digital document volume reduction/ management; Digital document filtering; Digital document credentialising; Digital resource discovery; Assimilation of online sources (of information); Credentialising, labelling, storing and retrieving information sources; Plagiarism avoiding;	

	Integrating professional and study sources (of information); Accommodating/ reconciling digital documents; Transforming digital to hardcopy resources; Integrating information sources; Awareness acquiring of information sources; VLE course resource dependence (as information portal); Search engine digital resource dependence; Search engine results interpreting;	

APPENDIX 11: MEMO INDICATOR CONTROL TERMS USED TO DEVELOP SUBSTANTIVE CODES

The table displays the frequency of Memo Indicator Control Terms and provides the Frequency Distribution or share of these terms across all interviews, i.e. in the example below “Commitment Issues” was allocated as a Control Term to 35 interview comments and this occurred on average in 34.65% of all interview sessions.

Data in this table:

Memo Descriptive Code (Indicator) Translated into Control Term	Memo Descriptive Code (Indicator) Properties (comma separated list)	Frequency of Control Terms used for Memo Descriptive Codes (Indicators)	Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators)	Paraphrase for sorting
Commitment issues	Childcare, elderly care, work commitments, travel commitments, personal responsibilities	35	34.65%	Commitment issues
Communication tools e.g. email or social networks important to study	Email, Social Network usage via Facebook or similar, use of course provided communication tools	13	12.87%	Comms tools importance
Commuting to study	Considerable distance between study location (usually over 10 miles), use of public or personal transport with associated costs, lack of local access to the institution	12	11.88%	Commutes
Computer	Poor functionality between	3	2.97%	Compatibility

compatibility problems	course platforms or software and personal computer, possibly no availability of platforms or software on personal computing equipment			issues
Considerable use of Google for E-Resources	Starting point is often Google or Google Scholar for library type e-resources, may search Google rather than bibliographic or Library platforms, attempt to locate full text e-resources via Google rather than seek help via Library systems or support	15	14.85%	High Google use
Internet access or cost issues	Cost of internet may be perceived as added or hidden cost of study, may have no home internet access making study difficult via VLE or electronic resources	2	1.98%	Internet access/cost
Difficulties obtaining exam papers online	Seeking exam papers to view comparable prior assessments, seeking online/ electronic version of exam papers for convenience to avoid liaising with programme or Library staff to source hardcopies	1	0.99%	Digital exam paper issues
Difficulties obtaining software	Software cost may be an issue, lack of access to general wordprocessing or office applications such as Project or PowerPoint, may have a minimal personal license lacking certain components or functionality required, lack of awareness of discounts or free software available via IT Services	6	5.94%	Obtaining software difficult
E-resource databases difficult to use	Interface or navigation difficulties using library or recommended databases and bibliographic platforms, security issues such as additional passwords required, searching parser	9	8.91%	E-resource databases usability

	difficult to use or produces unwanted or irrelevant results			
E-resource databases don't provide relevant results	Library databases showing mismatched results, may be unsure of process to refine searching or find the interface for filtering or refining searches too complex, database may require on operators or training	2	1.98%	Database results issues
E-resource databases lack full text access	Lack of easy access to full document in PDF or similar accessible format, may supply a bibliographic citation only with no obvious way to access document, may be required to use physical library services to access documents, may prompt for payment for texts	5	4.95%	Database full text access issues
Electronic communications underused for distance learning	Seeking to use tools or features such as Blackboard messaging without peer uptake, poor response to emails or messages, low uptake of programme led tools such as Blackboard discussions, low tutor interaction e.g. In non-office hours	7	6.93%	Digital Comms under-used
Feelings of isolation/ isolated nature of study	Working mainly alone during programme, high occurrence of personal study at home or using IT facilities in the Library or IT Labs, Few class hours per week, lack of contact with other students, lack of social contact with class peers or wider student population	5	4.95%	Feelings of Isolation as a student
Group / peer working or communication problems	Participation of group members may be a problem, May be issues related to travel or infrequent access to institution, Poor or low uptake of technologies such as email or VLE group tools,	14	13.86%	Group or peer comms issues

	Lack of responsiveness of individuals to electronic communication			
IT or study skills development challenges	Student may find development of skills in IT or study difficult, Student may consult the WWW or friends to gain information or workarounds, Finds it easier to develop skills independently rather than wait for support via email or in person, Finds self led approach to skills development essential due to inadequate support, specific support gap in certain areas such as use of VLE tools or software applications such as Statistics packages	5	4.95%	IT/study development issues
IT skills support development not accessible	Student struggles with IT skills such as use of software or Web based platforms, Student finds training or incidental support is difficult to obtain either in person or via email, Course performance negatively impacted by lower IT skills	14	13.86%	IT skills training access issues
IT support difficulties	Student finds obtaining ad hoc support for incidental matters difficult, password issues often cited as a problem, support on weekends and evenings cited as poor due to closure or low staffing, waiting times cited as a problem by email and in person, lack of tutor or IT staff knowledge of some issues	10	9.90%	IT support difficulties
Insufficient E-Resources/ databases	Subject or sector coverage not sufficient to provide full text or bibliographic information, existing databases may not be providing full text access easily, may be no specialist coverage for this subject	11	10.89%	Insufficient database

	area			
Insufficient Library/IT Lab PC availability	PCs in Library or IT Labs used to capacity preventing access to a computer when required, insufficient PC booking facilities, PCs may be used in appropriately due to lack of policing or systems policy	10	9.90%	Insufficient PC availability
Insufficient print resources in the library	Lack of hardcopy books or journals, boor or journal usage may exceed quota of copies available, lack of e-resource equivalent may be a problem	1	0.99%	Insufficient printed texts in Library
Lack of confidence in IT skills	Lack of familiarity with digital learning platforms, inexperience with technology causing lack of confidence in study	6	5.94%	IT skills confidence issues
Library database skills development not adequate	Finds library databases and bibliographic platforms difficult to use, has not been provided with specific training in searching such as use of operators or search refinement techniques	2	1.98%	Database skills development issues
Library opening/access issues	Library not open enough hours or on enough days, issues of opening during late evenings or Sundays, desire for working using IT facilities 24/7	4	3.96%	Library availability issues
Library or IT Lab PCs slow or have other problems	PCs slow starting, may crash or exhibit unresponsive behaviour, screen problems may be present such as dim monitor back light, PCs may not start at all, peripherals such as keyboard or mouse may be missing	8	7.92%	PCs slow or technical issues
Library/IT Lab noise and disruption issues	Other students may be talking loudly in the Library or other areas such as IT Labs, Students may be talking in quiet study areas, there may be behavioural issues such or students may be playing games using PCs	5	4.95%	Library or IT Lab noise

Low Contact Study	Generally under ten hours contact with class per week, Sense of isolation from the institution including tutors and peer students, feeling of self-reliance and less scope for obtaining support, lack of social interaction and socialisation with peers or staff	99	98.02%	Low contact study
Mixed physical-online resource use	Uses a variety of online tools and class or oncampus support, may use the VLE and associated tools, may also use print texts, may use hardcopy journals alongside e-resources and databases	10	9.90%	Physical/Online experience
Multi-platform/ Internet resource discovery	May use Library databases such as Swetswise or other recommended platforms/portals such as BIDS or BiZED, may use open Internet sources such as PubMED or the Internet Information Archive, may use open source journals such as the Social Sciences Research Network, may use a variety of Library systems such as catalogue or inter library request Web site, may use a variety of VLE tools and features such as discussions or group tools, may also use WWW search engines and portals to locate information	31	30.69%	Requires multi platform use
Multiple platform sign-in problems	Problems logging into Library platforms such as the catalogue, problems logging into databases subscribed by the Library, problems logging into PCs, problems logging into multiple databases which require unique logins such as Emerald via Athens	5	4.95%	Multi platform login issues
Printers or scanners have technical related	Printers have run out of paper or display errors, printers may not offer the	2	1.98%	Printer/scanner technical issues

issues	correct dimensions or colour printing options, scanners may have technical problems or may be too complex for use without staff assistance, configuration options such as resizing may be difficult without staff help			
Printers or scanners not widely available	Printers may be inaccessible due to long queues, maintenance issues or not enough coverage across the Library or IT Labs, colour printers may be scarce	3	2.97%	Insufficient printing facilities
Printing expense or access problems	Printing may be expensive, printing may be inaccessible due to travel distances or opening times, may rely on printing due to study methods	4	3.96%	Printing cost or access issues
Problems searching the WWW, e.g. irrelevant results	May have issues assessing WWW content, using interfaces to search engines or WWW portals/ directories, may not be familiar with search filters or advanced options, may not be able to use Boolean operators to limit results shown, may be struggling with synonyms and industry or academic jargon or terminology to limit searching to relevant terms or expressions used in the appropriate sector	4	3.96%	WWW search results issues
Referencing support problems	May have problems using intext citation, may have problems using appropriate referencing format for resource type, may have problems identifying referencing style need to use for programme, may have difficulties exporting references from the WWW or databases to course notes, may have difficulties	5	4.95%	Referencing support issues

	with referencing plugins or software such as Refworks			
Reliance on use of hardcopies	May rely on hardcopies due to lack of confidence or skills in managing digital documentation, may lack skills in sorting or storing documents online, may have difficulties or access problems viewing digital documents in applications such as Word, Acrobat, may be unfamiliar with features to view digital documents such as zoom or page view, may not be confident using document management applications or computer features such as My Documents in Windows	10	9.90%	Reliance on hardcopies
Relies on VLE mostly for course materials	May use the VLE for obtaining course notes or syllabus information, may access video or other interactive resources in the VLE, may use the VLE learning object tools and assessments/quizzes, may use communication tools such as group sharing and discussion or core module discussion boards for class participation, may use the VLE to view grades, may access ebooks and other kinds of links to library database content or WWW links, may use the VLE informally to communicate with peers and tutors (internal email or messaging features), may use the VLE to access technical and study support	39	38.61%	Relies on VLE for materials
Studies whilst travelling using mobile computing	May use a laptop or mobile devices to access the VLE or email, may use internet cafes or other wifi hot spots, may use smaller mobile	3	2.97%	Mobile device user when travels

	technology such as Blackberry phones to access course materials or email			
Study support development not adequate	May be interacting with tutors on infrequent or low contact basis, may have limited time when attending the institution to raise issues with staff, may have little time to attend supplementary sessions provided on the programme or via other support departments within the institution, may feel awkward approaching support teams outside formal routine in case this suggests they lack academic skills, feeling that study support should be provided more centrally within the programme, desire to interact more with tutors, desire to develop personal skills in areas such as note taking and document management, feeling of self reliance in terms of skills development	8	7.92%	Study training /development issues
Technical problems	May have problems regarding personal PC or other peripherals, may have maintenance problems with work PCs, may have maintenance problems when using institutional PCs, technical problems may include Windows or other operations system errors causing reduced functionality or non functionality, technical issues can include system compatibility problems or firewall issues connecting to the institutional network, technical problems can also include specific features not	3	2.97%	Technical problems

	working properly in the VLE due to computer or VLE errors this could include assessment manager not working or even the entire VLE being down due to errors or maintenance, other technical issues can include network downtime at work or on campus or similar disruption at work			
Too many documents provided in VLE	VLE may present a lot of course materials such as class notes or presentations, materials may be presented in an unstructured form which makes navigation difficult leading to feelings of having too many documents to digest or manage, VLE may have a large number of optional supporting materials or external links which may distract the student from course class activities	2	1.98%	Too many documents in VLE
University or Library Web pages difficult to navigate	Student may find the Library pages are difficult to navigate to locate specific resources such as databases or Library platforms - such as the library catalogue, the main University pages may also be difficult to navigate to locate course information or other administrative or support materials, student support services may be similarly difficult to use or difficult to locate due to use of institutional terminology, other platforms or systems may present difficulties such as inter-library or booking web pages	4	3.96%	Institutional/Library Web difficulties
Use of Library computers due to need for	Student may use Library PCs due to lack of adequate or personal computing at	4	3.96%	Relies on Library PCs

computing	home or work, student may prefer computer equipment at the Library or IT labs due to system resources and internet availability, may need to share computer facilities at home with family members, may be unable to use work computing facilities or time for this purpose			
Use of Library computers due to need for quiet space	Student may experience disruptive or noisy environment at home, work environment may be unsuitable due to vocational or manual nature of work or due to busy office environment and working demands during office hours	7	6.93%	Uses Library PCs for quiet study
Use of VLE communication tools	Student may use VLE discussion board, messaging tool, email forms to send conventional email from the VLE, interactive quiz or survey tools, group features such as a shared file area or discussion board	12	11.88%	Uses VLE comms tools
Use of a range of computers/operating systems	Student may use Macintosh, Linux, Windows or other types of computer platform	2	1.98%	Uses a range of computer systems
Use of computers across multiple sites	Student may use computers at work or home, student may use Library/ IT Lab PCs, student may use computing services when travelling such as internet cafes, computing facilities may be very different in each location including differences in terms of computer specifications and internet access and bandwidth speed or system reliability	9	8.91%	Uses a range of locations for ICT
Use of too many databases and platforms	Student may feel they have to learn to use a diverse range of VLE and WWW sites and platforms to	6	5.94%	Too many platforms

	achieve their studies, students may feel materials should be provided in a more central location such as the VLE, students may be aware of the need to explore sources for research and may be uncomfortable exploring diverse Web sites and Library platforms, students may lack confidence in using library or WWW platforms due to lack of familiarity with search interfaces or other usability issues			
Used techniques to manage information such as folders, favourites	Students may use Windows My Documents area to store documents locally on a PC, students may back up work to a CD or external storage device such as a flash disk, students may copy files to their network storage folder, students may categorise content into named folders or use pre-configured folders available in My Documents, students may create an original folder hierarchy on the computer hard drive, students may store materials on a variety of external disks such as Zip/ Iomega disks or re-writable CDS, students may use favourites in Windows or within the Web browser, students may use external storage options such as Google spaces or store files in the VLE shared areas, students may use social bookmarking sites such as Yahoo bookmarking	4	3.96%	Uses content management skills
VLE difficult to navigate or usability problems	Students may find the VLE structure or tabs difficult to navigate, students may find the course content menu (usually configured by the	4	3.96%	VLE usability/ navigation issues

	tutors) hard to understand or interpret, students may have difficulty browsing content organised into areas corresponding to tutor names rather than topics or subject areas, students may have problems navigating particular features or tools in the VLE such as the grades or assessment areas, students may have difficulties using the drop box or other interactive features			
VLE under-used by other students	Students may be attempting to use communication or interactive tools such as email forms or messaging but finding other students are not engaged with these features, students may consider tutors are not engaging widely enough with communication tools, students may find they are unable to complete shared projects due to lack of engagement by other students may be attempting to use communication or interactive tools such as email forms or messaging but finding other students are not engaged with these features, students may consider tutors are not engaging widely enough with communication tools, students may find they are unable to complete shared projects due to lack of engagement by other students	5	4.95%	VLE under-used by students
VLE under-used by programme	Student may consider the VLE does not contain enough course materials, student may prefer to access entire course materials via the VLE but	10	9.90%	VLE underused by programme

	find they have to use hardcopy materials in the Library or WWW sources, student may consider the tutor is not active enough on the VLE, in some cases the student may consider the VLE is not being used at all, the student may consider themselves at a disadvantage to students on programmes where the VLE is being more heavily used to assist with offcampus and part time study			
Work has links to programme e.g. custom programme, work based case studies	Student may be undertaking programme with strong employer interest, course may be integrated into working pattern/working day, student may be preparing for use of work related cases or products as part of dissertation or substantive assignment	2	1.98%	Work linked programme
Work related worries such as fee contribution	Student may feel under pressure due to mandatory nature of programme within work context, student may experience anxieties regarding fee contributions by employer, student may be relying on programme for career progression, student may have anxieties regarding progression in order to succeed in the workplace student may be disinclined to undertake work sponsored studies due to lack of personal motivation	3	2.97%	Work related anxieties
Working to develop IT and study skills due to use of VLE etc.	Student may recognise need to develop personal skills in IT or study skills, student may be seeking to develop library or e-resource skills to utilise more current information beyond printed textbooks,	8	7.92%	Trying to build IT/ study skills

	student may be seeking to develop skills in use of the VLE to participate more actively in group work or use of course materials, student may wish to develop better information skills to search and assess useful materials on the WWW such as legislation or academic publications.			

Appendix 12: Index of All Theory Bits and Control Terms

All theory bits (including theoretical insights derived from the memo data and theoretical sensitivity review), encompassing around 180 items were sorted directly using the Excel Worksheet 4 (see Appendix 10, Table 5) into 121 control terms, these were then categorised into ‘Early theoretical codes’ using a sorting table (see Appendix 14).

Index 1: All Theory Bits

The following list displays all Theory Bits:

- Prioritising tasks and objectives to achieve wider aims
- Using a variety of online and oncampus services and tools to obtain a more holistic range of sources and services
- Overcoming lack of computing facilities at home by exploring and developing skills in use of institutional PCs
- Overcoming IT issues such as downtime
- Overcoming perception that specialist databases are not sufficiently available, Google provides an alternative to locate resources
- Overcoming group working challenges such as logistics and communications to achieve group project outcome
- Overcoming proliferation of course materials and documentation in VLE, presenting challenges for management of documentation
- Using hardcopies to store, view and manage information sources for development of coursework

- Overcoming expectations for provision of e-resource databases from previous experience
- Overcoming database navigation problems
- Overcoming referencing and plagiarism issues by seeking to develop referencing skills
- Overcoming searchability issues when using Library platforms to refine and locate more relevant e-resources for course work
- Utilises WWW search techniques to access materials for citation in course work, supplementing course materials for better academic coverage
- Using core VLE and online tools provided by NEWI but also uses communication tools more familiar with such as email, uses WWW to similarly supplement NEWI sources
- Attempting to obtain better range of software to facilitate studies more effectively
- Seeking to develop skills to use more digital resources rather than print to save on cost and improve study efficiency
- Need to find workarounds and technical support for use of non-Windows PC to ensure effective study
- Optimising storage and management of WWW sources and online articles using Web favourites for effective management of sources
- Using the Internet from home as a method of distance learning
- Using VLE as mobile computing solution
- Using the VLE as a distance learning tool for undertaking studies
- Developing further IT skills to improve effectiveness using diverse library, WWW and VLE tools and platforms

- Negotiation with family members to maximise time available
- Supplementing personal issues with formal databases and library tools via general WWW searching
- Seeking to develop wider IT skills using PCs and peripherals for effective study
- Overcoming online communication issues via email and other strategies for tutor and peer interaction
- Overcoming general Library platforms issues and seeking to develop these skills for effective study
- Overcoming usability or interface issues with Library databases to access scholarly materials to facilitate study
- Time management of routine in order to study
- Using a range of VLE discussion and communications tools for effective group work
- Overcoming general IT and electronic library support limitations
- Using the VLE as a communication medium for effective group work
- Utilising VLE communication tools for distance group working
- Utilising IT and social networking skills to further study aims
- Overcoming IT training shortfall to use VLE
- Taking a lead when managing group work to ensure coordination of group activities to achieve group work aims
- Utilising VLE communication tools for distance group working and discussions
- Studying in a variety of contexts to overcome lack of PCs or Library/ IT Lab opening times

- utilising more formal Scholar option to ensure quality resources in lieu of library platforms
- Uses VLE discussion board for liaison with tutor for feedback etc.
- Diversifying skills to use wider range of online sources to improve study effectiveness
- Overcoming confidence issues when using the VLE to undertake studies
- Using the VLE as an intermediary to access wider/ Library e-resources
- Perception that will need to develop additional IT skills to facilitate study at a distance in addition to regular study skills
- Using study as a lifelong learning experience
- Using folder hierarchies to manage course materials
- Overcoming unresponsive IT services to use IT platforms and logins
- Maintaining skills using a diverse range of computing equipment at work, NEWI etc for studies
- Using techniques to balance workload with study
- Overcoming problems using communication features in the VLE for effective group work
- Using the VLE as a core interface for all study materials for more effective time management, balancing commitments etc.
- Developing skills in use of Library databases for effective study
- Expanding skills for use of a range of electronic information sources
- Supplementing personal difficulties using formal Library platforms by using WWW search options to locate materials
- Overcoming irrelevant search results for locating materials for course work

- Overcoming login issues with Library databases to access scholarly materials for effective study
- Developing study and IT skills to develop career related skills and lifelong learning
- Using the VLE to catch up on missed sessions due to other commitments
- Overcoming need for more electronic communications for remote study
- Overcoming email personalisation issues to read NEWI email for communication purposes
- Overcoming sign in problems with library databases, seeking to develop these skills for more effective study
- Overcoming PC limitations in the Library by using personal IT equipment
- Attempting to improve computing experience to improve study outputs
- Overcoming Web site navigation difficulties to locate information
- Overcoming Library Web pages and platforms navigation issues
- Utilising personal mobile PC due to problems with institutional computing facilities
- Overcoming online sources evaluation
- Overcoming plagiarism issues for citation and referencing
- Using electronic library resources to expand core VLE coverage
- Overcoming full text issues when using Library platforms by consulting WWW sources
- Integrating work and study for more relevant study experience
- Attempting to overcome searchability problems when using the WWW/ Google

- Difficulties accommodating range of platforms and logins to achieve study aims
- Overcoming unresponsive communications in relation to tutors to ensure effective feedback
- Overcoming apprehension in using online communication tools for group work with peers, tutor interaction etc.
- Using the VLE due to asynchronous properties for convenient time frame for study
- Overcoming confidence issues when accessing Library databases for wider use of e-resources
- Overcoming perceived lack of intense study or skills support by developing skills to support studies
- Overcoming general lack of confidence when studying
- Attempting to overcome software issues by locating and installing software without external IT support to ensure success of study
- Using VLE as communication and study medium for overseas work-study context
- Developing information literacy skills to improve study performance
- Using VLE as a mobile computing platform for dealing with work related travel
- Developing career skills via work related study
- Overcoming and developing study skills competencies to facilitate study (following break in studies)
- Overcoming reluctance of some students to use electronic communications to achieve group work

- Overcoming lack of communication via VLE to engage with staff or students for effective feedback or group work
- Using the WWW / Google to locate specialist online materials
- Bookmarking online sources to ensure fast access to useful supporting materials to improve study method
- Using Library links to access authoritative information sources and avoid less credible sources
- Overcoming problems for specific or core database to obtain key readings or papers
- Searching via 3d party Web sites or via individual databases due to poorly integrated learning environment
- Developing confidence in use of ICT to facilitate study
- Using range of computing sources such as institutional PCs for stats packages to develop better quality assignment
- Balancing and overcoming study workload with group project expectations
- Overcoming software issues to progress with studies
- Using technology to enhance feedback process
- Overcoming psychologically negative feelings regarding studying at a distance
- Perception that development of IT and study skills was required without formal training to achieve study aims
- Generally under ten hours contact with class per week, Sense of isolation from the institution including tutors and peer students, feeling of self-reliance and less scope for obtaining support, lack of social interaction and socialisation with peers or staff

- Use of technology and the internet to overcome commuting issues and improve study effectiveness at a distance
- Using a variety of IT support routes such as Helpdesk number, email, VLE
- Integrating social and study context to improve group working effectiveness
- Overcoming personal family commitments, disruption etc. By using institutional facilities
- Overcoming some student disengagement with the VLE for group work
- Seeking to study entirely online in digital format but currently using a range of physical and online sources to facilitate studies
- Attempting to utilise library databases to develop information literacy skills
- Using online and VLE e-resources due to travel problems visiting the physical library
- Uses structured links/ catalogue to obtain physical or e-resources via Library for authoritative information
- Overcoming training shortfall in accessing online databases
- Use of VLE to keep updated on assessment feedback for self reflection etc.
- Uses a number of technologies including institutional and informal to constantly liaise with peers for enhanced groupwork
- Relies on VLE as a means of e-learning as the means of achieving the qualification
- Overcoming confidence issues when using the WWW and search results
- Overcoming searchability issues for specific databases to obtain clinical evidence sources
- Overcoming perceived lack of specialist databases within the Library
- Overcoming limited coverage of databases

- Overcoming diversity of logins and platforms at work, study, home etc.
- Difficulties using a range of databases and platforms for study
- Attempting to learn approaches for exam process
- Overcoming personal study issues to manage course work and write dissertation
- Uses techniques to manage links to information sources to diverse range of platforms for more efficient study
- Overcoming uncertainty over appropriate reference format to use
- Utilising personal knowledge of specialist sources to locate e-resources for effective study
- Attempting to use the VLE as a single point of contact for all study materials to save time, travel costs etc.
- Visits a wide range of external WWW sites and portals to obtain relevant information
- Overcoming poorly structured content in the VLE to access course materials by visiting external sources directly
- Overcoming some tutor reluctance to return comments or interact frequently on the VLE
- Use of shared areas on the WWW to improve group working
- Overcoming synonyms and other kinds of irrelevant results when searching specialist databases
- Overcoming lack of standard Office applications via use of alternatives to author assignments
- Uses core handbooks to avoid use of electronic sources, VLE etc.

- Uses VLE as core tool but uses Library and WWW sources to provide supplementary sources.
- Exploring a diverse range of Library and University Web pages outside the VLE to obtain support etc.
- Using VLE as a platform for use across diverse computing locations including use of storage space in Blackboard to access materials from these locations
- Overcoming shortfall in specialist applications, using institutional PCs to access applications to facilitate study
- Managing and multitasking course materials via hardcopies
- Overcoming lack of directly linked materials in the VLE by searching for and locating these materials via WWW
- Using remove device to store course materials for use across diverse locations
- Overcoming Library database interface difficulties by searching via Google
- Overcoming difficulties obtaining both electronic and printed books
- Using a range of library providers to access wider range of online and print resources for study
- Overcoming diverse and large body of documentation, VLE materials etc. To undertake studies
- Use of discussion features in VLE to share experiences, develop understanding and achieve self reflection on subject areas
- Using Web based materials to supplement oncampus interactions to improve study effectiveness
- Uses government/ WWW portals for authoritative searching to supplement core readings

- Use of personal computing facilities to supplement lack of wider access to Library or IT Labs
- Uses a diverse mix of physical library services and online services for study effectiveness
- Sharing group work in the VLE to achieve group objectives
- Have engaged with platforms and systems to develop personal ICT skills due to lack of time attending supplementary training
- Overcoming support problems for specialist software or equipment
- Attempting to source the most recent materials via more dynamic WWW content to achieve better study outcome
- Using VLE as interface to e-resources and study materials due to difficulties using other sources/ platforms
- Adaptive use of e-learning communications tools, mobile devices and VLE features to engage with peers, tutors and course content. Some students are apprehensive regarding the use of e-learning and their remote study context, some of these behaviours can be considered strategies to overcome this perceived separation from the physical institution and its facilities, perhaps reflecting the transitional phase of e-learning at this time or fundamental anxieties some students face when studying in a blended learning context.
- Students may use a range of techniques to compensate for poor confidence in specific platforms by resorting to familiar applications or WWW sources, some students resorted to using work derived information sources or government WWW sources due to familiarity, this behaviour exposes a behavioural pattern in avoiding engagement with certain unfamiliar technologies due to skills issues or lack of familiarity. Students also appeared

to be avoiding some support services or optional courses available again reflecting this avoidance tendency.

- Students appeared to be utilising a wide range of personal, work related and University derived sources, including e-resources linked or promoted via the VLE, email and course materials or reading lists, in many cases students described a reluctance to deviate from the VLE to obtain materials but accepted the need to consult wider information sources for effective study, to this extent many students indicated they had used formal Library databases and recommended Web portals although many stated their preference was often to attempt initial location of resources via a basic Google search. These characteristics suggest students are navigating a range of diverse platforms and systems to access information and are engaging with less familiar or more formal platforms to achieve effective study outcomes.
- Students' anxieties over printing and digital content reveal a study pattern based around physicalisation of e-learning and digital content, perhaps indicating that these students are transitional in terms of skills and attitudes to e-learning approaches.
- Students exhibited a pattern of attempting to consolidate learning within the VLE, including access to course materials and use of communication tools, this consolidation was motivated by time constraints reflected in the nature of their predominantly part time, low class contact context and working schedule. Some students used a variety of content management tools and services on the WWW to enable working remotely, across multiple sites or via removable media such as flash drives, achieving a mobile study approach to facilitate their circumstances

- Students exhibited a dependence on the VLE and many appeared to value online communication tools to improve and facilitate their studies as part time students, students often appeared to be investing in the VLE in terms of time spent using this platform, developing personal knowledge of the VLE and coordinating group or peer discussions via VLE and other online communication tools (including social networks). Some students felt they had to make up a shortfall in both tutor/peer engagement with the VLE and shortfalls in training or support. In some respects students were attempting to lead the use of the VLE or promote this amongst peer groups to achieve efficient group working and study outcomes.
- In some cases students attempted to overcome personal commitment constraints by using VLE or other electronic communication tools to keep in touch with tutors or peer remotely, this kind of motivation appeared to channel the student toward the use of core communication tools and toward use of VLE communication features which may not have otherwise had such a large contribution. Students appear to have attempted to virtualise their social experience with peers and tutors to overcome these commitment and personal issues related to remote working and to attend a greater sense of engagement with the wider programme activities and engagement with tutors and peers
- Blended learning (for detailed overview see Theoretical Sensitivity worksheet)
- Low contact motivations for delivering or engaging in e-learning (for detailed overview see Theoretical Sensitivity worksheet)

- Use of synchronous communication tools to achieve more dynamic group communication e.g. Skype, Microsoft Messenger/ Live tools (for detailed overview see Theoretical Sensitivity worksheet)
- Ubiquitous learning style - using a variety of devices and design options to facilitate 24/7 on-demand learning, accommodating the students' own time schedule and commitments (for detailed overview see Theoretical Sensitivity worksheet)
- E-Moderating (for detailed overview see Theoretical Sensitivity worksheet)
- Collaborative learning (for detailed overview see Theoretical Sensitivity worksheet)
- Distributed Learning (for detailed overview see Theoretical Sensitivity worksheet)
- Self regulated learning (for detailed overview see Theoretical Sensitivity worksheet)
- Self-Managed Learning (for detailed overview see Theoretical Sensitivity worksheet)
- Demand-led learning (Learning On Demand)
- Mobile Learning (for detailed overview see Theoretical Sensitivity worksheet)
- Social Learning (for detailed overview see Theoretical Sensitivity worksheet)
- Uses and Gratification Expectancy (for detailed overview see Theoretical Sensitivity worksheet)
- Calm Computing (for detailed overview see Theoretical Sensitivity worksheet)
- Additional Theory Bit aggregated from a range of related early Memo codes later in the sorting process:

- Additional Theory Bit aggregated from a range of related early Memo codes later in the sorting process:
- Additional Theory Bit aggregated from a range of related early Memo codes later in the sorting process:
- Additional Theory Bit aggregated from a range of related early Memo codes later in the sorting process:

Index 2: Theory Bit Control Terms

The following list displays all 121 Theory Bit Control Terms - these were later sorted using a sorting table (see Appendix 14) to generate Early Theoretical Codes:

- Prioritising tasks, aims and objectives
- Exploiting oncampus and online services
- Skilling and exploiting IT facilities
- Overcoming & negotiating IT problems
- Augmenting database limitations via Google
- Managing/ coordinating group work
- Managing high volumes of course material
- Physicalisation of digital or online documents
- Assimilating prior online resource behaviours with current facilities
- VLE, Library Platform or WWW page navigating
- Referencing skilling to avoid plagiarism and grade detriment
- Skilling with information sources to enhance research

- Negotiating diverse communication tools on the VLE, messaging, personal email, via social networks etc.
- Seeking autonomy to access software installed in diverse locations
- Digital document/ excerpt and notes management for effective file handling
- Overcoming diverse systems and compatibility problems
- WWW/ E-resource sorting, labelling and storing for efficient media retrieval
- Remote internet-based studying
- Mobile/ overseas study via VLE, email, synchronous tools etc.
- Using the VLE to facilitate core programmes information, course requirements, course administration etc.
- Skilling in general IT skills to improve online study effectiveness
- Management of family life to facilitate study
- Augmenting library/database usability via Google
- Networking via available communication tools to enhance peer/tutor interaction
- Skilling with challenging databases to enhance research
- Time management for effective study
- Engaging/skilling with VLE communications tools for group projects
- Resolving IT support limitations
- Remote engagement with group projects via VLE tools
- Facilitating networking/groups via informal social networks
- Resolving VLE support limitations
- Flexible locating to overcome opening/facility limitations
- Exploiting/skilling via Google Scholar to overcome database issues
- Engaging/skilling with VLE communications tools for tutor liaison

- Overcoming confidence issues using the VLE
- Reliance on VLE as intermediary for e-resources
- Facilitating lifelong learning via studies
- Sorting and labelling digital assets using folders
- Integrating work and study context to develop lifelong learning
- Resolving VLE communications tools problems for group work
- Reliance on VLE for prioritised/optimised study routine
- Skilling with wider online sources to enhance research
- Skilling/ negotiating WWW search challenges
- Skilling in use of database sign in to facilitate literature searching
- Exploitation of VLE as supplement to class attendance issues
- Reconciling diverse email platforms to ensure effective communication
- Overcoming Library/Lab equipment issues via personal/mobile devices
- Overcoming WWW site navigation/interface issues
- Overcoming institutional Web site navigation/interface issues
- WWW evaluation strategies for authoritative use of sources
- Skilling in referencing to avoid plagiarism and avoid grade detriment
- Supplementing core VLE provision via wider library/WWW portals
- Resolving full text e-resource problems via Google/Scholar
- Integrating learning into social space via networks, email etc.
- Overcoming confidence issues for group work via online tools
- Asynchronous tool use for time/schedule study effectiveness
- Self-development of study skills
- Overcoming study confidence issues
- Facilitation of overseas engagement via VLE

- Skilling in information literacy, e-resource/WWW credentialising etc. for study
- Facilitating career development via academic skills progression
- Rebuilding academic skills
- Overcoming low engagement of peers in use of communication tools
- Resolving VLE communications engagement with tutors or peers
- Sourcing specialist e-resources or databases
- WWW bookmarking to resolve e-resources
- Overcoming WWW authority issues via Library links/platforms
- Overcoming database issues to obtain core reading texts
- Self-navigating/resolving diverse sources/databases unavailable directly in VLE
- Overcoming general confidence issues using ICT
- Exploiting oncampus computing/software facilities
- Balancing/prioritising workload with group networking demands
- Assessment/feedback and reflection via VLE, email etc.
- Overcoming confidence issues for low contact context
- Developing peer, family, work networks to support ICT issues/use
- Lone & self led studying at a distance from peers/tutors
- Exploiting institutional support networks
- Reliance on facilities for study space, quiet etc,
- Maximising/ optimising online tools/VLE in mixed physical/online-dependent context
- VLE reliance as distance learning study tool
- Extending VLE via informal resource sharing and communication via social media, cloud computing for group work

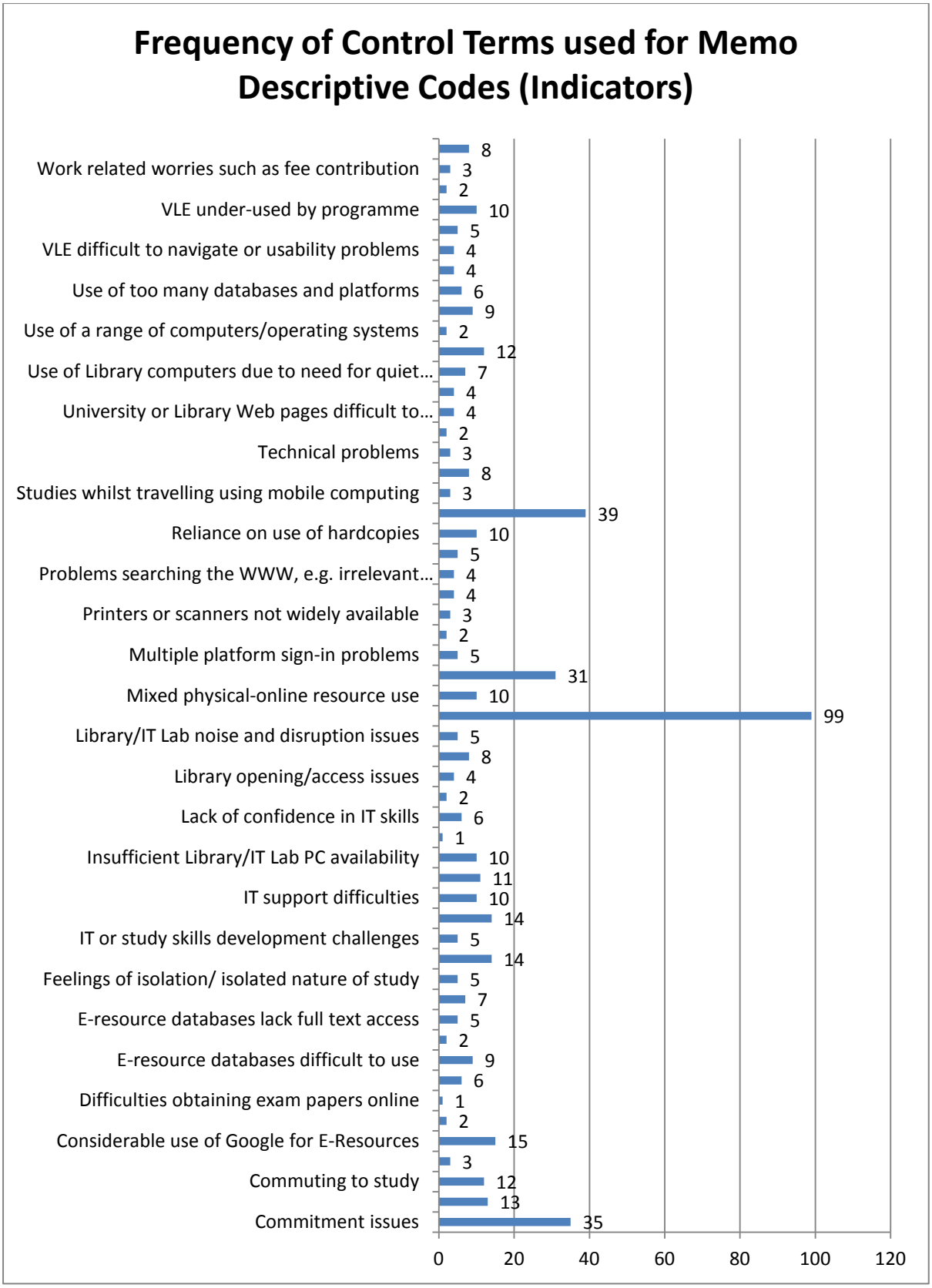
- Overcoming confidence issues using/evaluating/trusting WWW content
- Overcoming/supplementing limited database coverage
- Overcoming challenges accessing range of database/platforms/WWW sources
- Overcoming difficulties accessing online exam materials
- Negotiation of diverse WWW sources via favourites or link sharing platforms
- Resolving/negotiating low tutor VLE interaction
- Facilitating group document development via formal/informal online tools, wikis etc.
- Overcoming search results filtering in specialist databases
- VLE/online tools avoidance via reliance on core handbook or selected print materials
- Use of VLE as a mobile/cloud solution for accessing content across diverse locations
- Overcoming deficit of specialist software applications
- Using removable media to facilitate mobile computing across locations
- Resolving WWW e-texts in the absence of print/digital copies
- Use of a range of library/online providers for sourcing materials
- Informal use of VLE discussions to network with peers
- Sharing knowledge and group information via VLE tools
- On-demand self-led learning due to time constraints attending training
- Overcoming/skilling in study competencies to overcome training gaps
- Maintaining up to date readings via diverse search strategy
- Dealing with anxieties in online learning

- Avoidance of unfamiliar technologies and related training, utilising familiar technologies
- Integrating and assimilating University platforms and sources into existing practices
- Investing resources, time and effort to facilitate study via VLE
- Virtualisation of study experience via intense online tools use
- Choosing to study in part time context to accommodate personal/work commitments
- Using informal synchronous communication such as Skype for group work and socialisation
- Ubiquitous learning via range of devices & locations to accommodate lifestyle
- Active 'e-moderating' participation with tutor via discussion boards, feedback and other tools
- Synchronous debate and collaboration between tutor/students e.g. via virtual classroom tool
- Distributed Learning via multiple e-learning formats, tools, media.
- Self-regulated development of learning skills via diverse research/assimilation, evaluation etc.
- Taking increased responsibility/ motivation for self-led study due to low class contact
- Accessing support, training materials, video etc. just in time to need/activity
- Applying informal networks and socialisation with peers/tutors to embed learning in these contexts
- Dealing with varying levels of expectancy fulfilment and adopting consequent coping behaviours

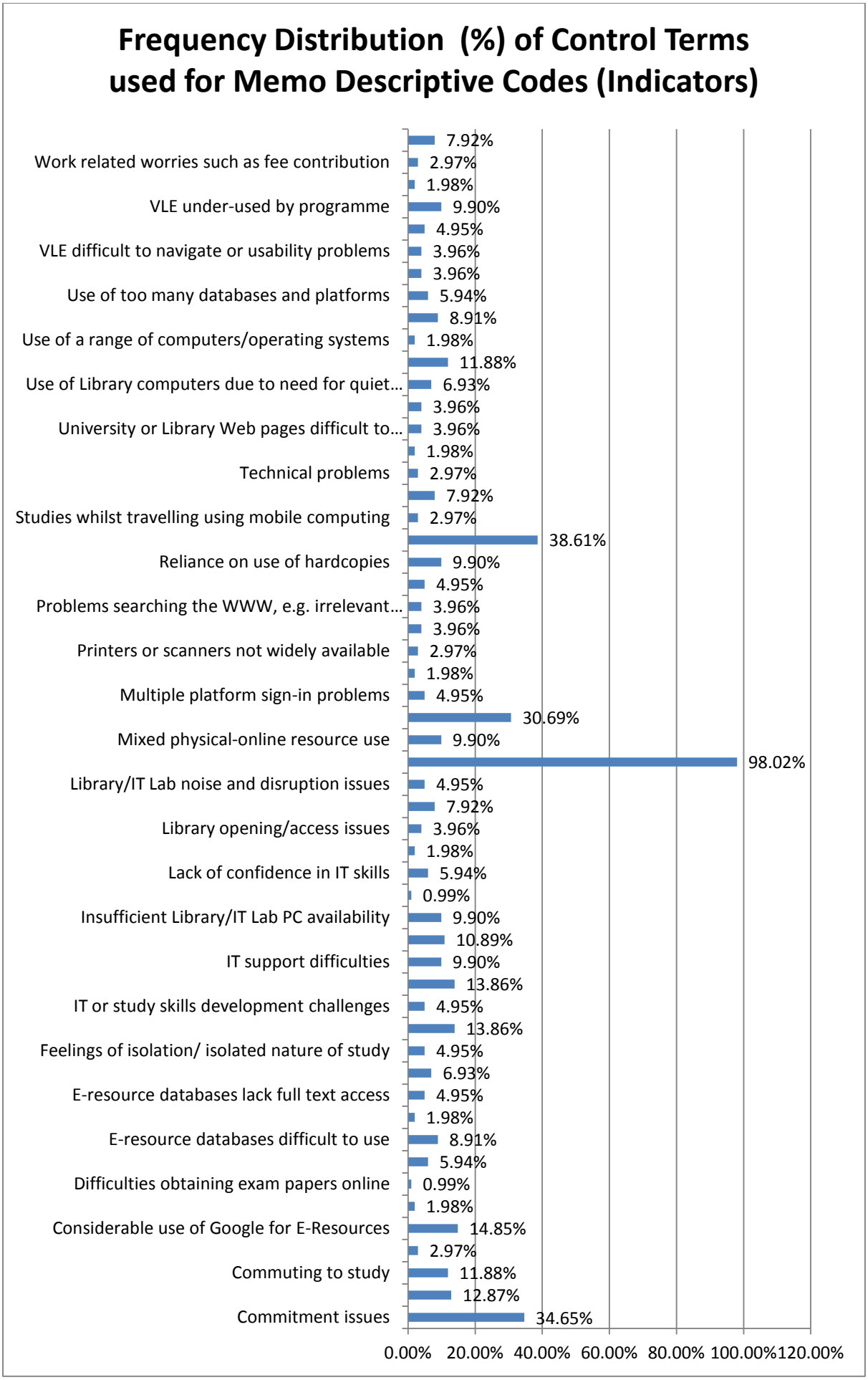
- Selection and refinement of learning resources to avoid information overload via adoption of key resources such as the VLE
- Managing workplace demands for study participation
- Managing workplace sponsored study requirements
- Anxieties related to work related fee resourcing
- Managing access to study balancing work commitments

APPENDIX 13: CHARTS DRAWN FROM CODING ANALYSIS

The following figures illustrate the frequency of Control Terms occurring for Memo Descriptive Codes (Indicators). These were sorted using a basic categorisation approach directly in Worksheet 1 (Appendix 10, Table 1) to reduce the number of commonly occurring indicators via machine-readable Control Terms in Excel; formulae were then used directly within the worksheet to calculate frequency (number of times individual Control Terms occurred) and frequency distribution (the weighting or percentile share of Control Terms across all interview sessions). The following chart ‘Frequency of Control Terms used for Memo Descriptive Codes (Indicators)’ demonstrates the Frequency score for each Indicator:


Frequency of Control Terms used for Memo Descriptive Codes (Indicators)
Work related worries such as fee contribution
VLE under-used by programme
VLE difficult to navigate or usability problems
Use of too many databases and platforms
Use of a range of computers/operating systems
Use of Library computers due to need for quiet...
University or Library Web pages difficult to...
Technical problems
Studies whilst travelling using mobile computing
Reliance on use of hardcopies
Problems searching the WWW, e.g. irrelevant...
Printers or scanners not widely available
Multiple platform sign-in problems
Mixed physical-online resource use
Library/IT Lab noise and disruption issues
Library opening/access issues
Lack of confidence in IT skills
Insufficient Library/IT Lab PC availability
IT support difficulties
IT or study skills development challenges
Feelings of isolation/ isolated nature of study
E-resource databases lack full text access
E-resource databases difficult to use
Difficulties obtaining exam papers online
Considerable use of Google for E-Resources
Commuting to study
Commitment issues
8
3
2
10
5
4
4
6
9
2
12
7
4
4
2
3
8
3
39
10
5
4
4
3
2
5
31
10
99
5
8
4
2
6
1
10
11
10
14
5
14
5
7
5
2
9
6
1
2
15
3
12
13
35
0
20
40
60
80
100
120

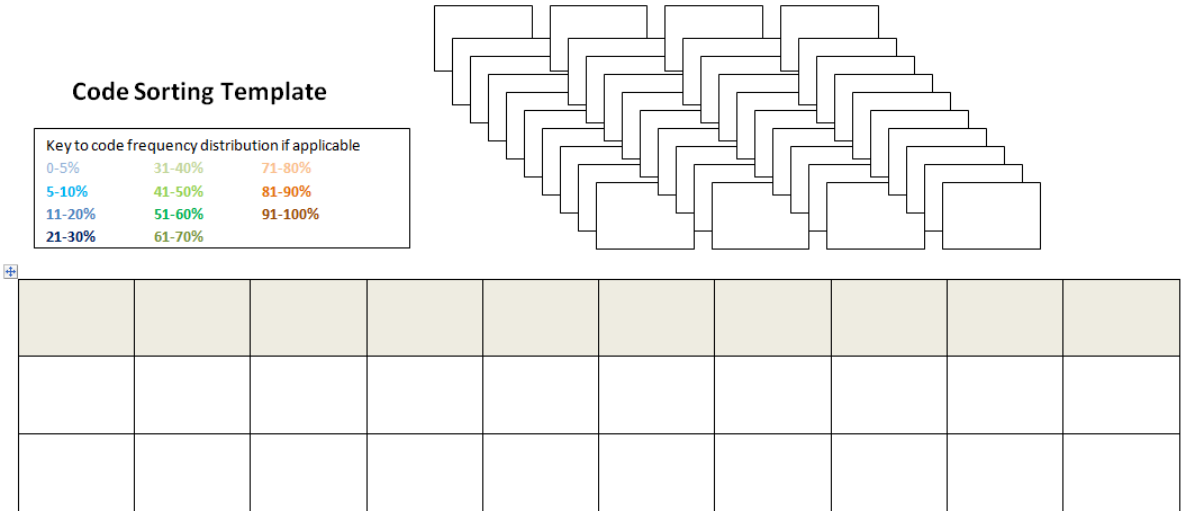
The second chart “Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators)” provides a similar overview of Control Term frequency for the memo indicators but this is expressed as a percentile of occurrences across all interview sessions (the chart spans two pages):


Frequency Distribution (%) of Control Terms used for Memo Descriptive Codes (Indicators)
Work related worries such as fee contribution
VLE under-used by programme
VLE difficult to navigate or usability problems
Use of too many databases and platforms
Use of a range of computers/operating systems
Use of Library computers due to need for quiet...
University or Library Web pages difficult to...
Technical problems
Studies whilst travelling using mobile computing
Reliance on use of hardcopies
Problems searching the WWW, e.g. irrelevant...
Printers or scanners not widely available
Multiple platform sign-in problems
Mixed physical-online resource use
Library/IT Lab noise and disruption issues
Library opening/access issues
Lack of confidence in IT skills
Insufficient Library/IT Lab PC availability
IT support difficulties
IT or study skills development challenges
Feelings of isolation/ isolated nature of study
E-resource databases lack full text access
E-resource databases difficult to use
Difficulties obtaining exam papers online
Considerable use of Google for E-Resources
Commuting to study
Commitment issues
7.92%
2.97%
1.98%
9.90%
4.95%
3.96%
3.96%
5.94%
8.91%
1.98%
11.88%
6.93%
3.96%
3.96%
1.98%
2.97%
7.92%
2.97%
38.61%
9.90%
4.95%
3.96%
3.96%
2.97%
1.98%
4.95%
30.69%
9.90%
98.02%
4.95%
7.92%
3.96%
1.98%
5.94%
0.99%
9.90%
10.89%
9.90%
13.86%
4.95%
13.86%
4.95%
6.93%
4.95%
1.98%
8.91%
5.94%
0.99%
1.98%
14.85%
2.97%
11.88%
12.87%
34.65%
0.00%
20.00%
40.00%
60.00%
80.00%
100.00%
120.00%

APPENDIX 14: SORTING TABLES

Template Sorting Table

Microsoft Office was used to create a template utilising text boxes and tables to manually sort codes into higher level categories, the text boxes can be placed within a table structure using floating positioning, effectively providing for virtual “cards”:



Sorting Table 1: Indicators sorted to create Substantive Codes

Remote Learning Characteristics	Skills challenges (Skills problems and concerns raised)	Resource Discovery challenges	Resourcing for Study (Equipment, costs and related resourcing problems reported)	Technical Challenges (Technical Problems reported)	Study and Research Approaches	Study and Research Challenges	Personal and Non-study related Challenges
Uses a range of locations for ICT 8.91	IT skills confidence issues 5.94%	Insufficient databases 10.89%	Internet access/cost 1.98%	Compatibility issues 2.97%	High Google use 14.85%	VLE usability/ navigation issues 3.96%	Work related anxieties 2.97%
Commutes 11.88%	Database skills development issues 1.98%	Too many platforms 5.94%	Obtaining software difficult 5.94%	Technical problems 2.97%	Trying to build IT/ study skills 7.92%	Study training /development issues 7.92%	Uses Library PCs for quiet study 6.93%
Mobile device user when travels 2.97%	IT/study development issues 4.95%	E-resource databases usability 8.91%	Digital exam paper issues 0.99%	Printer/scanner technical issues 1.98%	Uses content management skills 3.96%	VLE underused by programme 9.90%	Work linked programme 1.98%
Uses a range of computer systems 1.98%	Referencing support issues 4.95%	Multi platform login issues 4.95%	Insufficient PC availability 1.95%	PCs slow or technical issues 7.92%	Relies on Library PCs 3.96%	Group or peer comms issues 13.86%	Commitment issues 34.65%
Comms tools importance 12.87%	IT skills training access issues 13.86%	WWW search results issues 3.96%	Printing cost or access issues 3.96%	IT support difficulties 9.90%	Relies on VLE for materials 38.61%	Low contact study 99.02%	Feelings of Isolation as a student 4.95%
Uses VLE comms tools 11.88%		Database results issues 1.98%	Library availability issues 3.96%		Reliance on hardcopies 9.90%	Too many documents in VLE	
Physical/Online experience 9.90%		Institutional/Library Web difficulties 3.96	Insufficient printing facilities 2.97%			Digital Comms under-used 6.93%	
		Database full text access issues 4.95%	Insufficient printed texts in Library 0.99%			VLE under-used by students 4.95%	
		Requires multi platform use 30.69%				Library or IT Lab noise 4.95%	

Sorting Table 2: Theory Bit Control Terms Sorted into Early Theoretical Codes

The following tables are presented in basic list format, rather than the original sorting format due to difficulties presenting sorting table capacity in this document:

Self-Management of Study Regime and Programme	Exploiting Facilities and Services	Resolving and Supplementing ICT Problems	Engaging with and Negotiating Online Communications	Acquiring and Supplementing Study Skills
• Prioritising tasks, aims and objectives • Managing / coordinating group work • Remote internet-based studying • Management of family life to facilitate study • Time management for effective study • Flexible locating to overcome opening/facility limitations • Facilitating lifelong learning via studies	• Skilling and exploiting IT facilities • Exploiting /skilling via Google Scholar to overcome database issues • Exploitation of VLE as supplement to class attendance issues • Exploiting oncampus computing/software facilities • Maximising/ optimising online tools/VLE in mixed	• Overcoming & negotiating IT problems • Overcoming Library/Lab equipment issues via personal/ mobile devices • Overcoming general confidence issues using ICT • Overcoming diverse systems and compatibility problems • Skilling in general IT skills to improve online	• Negotiating diverse communication tools (VLE, messaging, email, social networks) • Reconciling diverse email platforms to ensure effective communication • Resolving VLE communications engagement with tutors or peers • Overcoming low engagement of peers in use of communication	• Self-development of study skills • Overcoming study confidence issues • Skilling in information literacy, e-resource/ WWW credentialising etc. for study • Rebuilding academic skills • Lone & self led studying at a distance from peers/tutors • On-demand self-led learning due to time

• Facilitating career development via academic skills progression • Investing resources, time and effort to facilitate study via VLE • Taking increased responsibility/ motivation for self-led study due to low class contact • Dealing with varying levels of expectancy fulfilment and adopting consequent coping behaviours • Learning Resources Capital Acquisition • Seeking autonomy to access software installed in diverse	physical/online-dependent context • Exploitation of VLE as supplement to class attendance issues • Organisation of Learning Assets • Digital document / excerpt and notes management for effective file handling • WWW/ E-resource sorting, labelling and storing for efficient media retrieval • Sorting and labelling digital assets using folders • Selection and refinement of learning	study effectiveness	tools • Resolving /negotiating low tutor VLE interaction	constraints attending training • Overcoming/skilling in study competencies to overcome training gaps • Self-regulated development of learning skills via diverse research/ assimilation, evaluation etc.

location • Overcoming deficit of specialist software applications	resources to avoid information overload via adoption of key resources such as the VLE			

Theory Bits Sorted into Early Theoretical Codes (Continued)

Resolving and Supplementing Information Literacy for Effective Research	Engaging with and Negotiating Digital Platforms	Physicalisation of Virtual Learning	Virtualisation of Learning to accommodate Remote Study
• Assimilating prior online resource behaviours with current facilities • Referencing skilling to avoid plagiarism and grade detriment • Skilling with information sources to enhance research • Skilling with challenging databases to enhance research • Skilling with wider online sources to enhance research • Skilling in use of database sign in to	• VLE, Library Platform or WWW page navigating • Overcoming confidence issues using the VLE • Overcoming WWW site navigation/interface issues • Overcoming institutional Web site navigation/interface issues • Supplementing core VLE provision via wider library/WWW portals • Self-navigating/resolving diverse sources/databases unavailable directly in VLE	• Physicalisation of digital or online documents • Reliance on VLE for prioritised/optimised study routine • Reliance on facilities for study space, quiet etc. • VLE/online tools avoidance via reliance on core handbook or selected print materials • Avoidance of unfamiliar technologies and related training, utilising familiar technologies	• Mobile/ overseas study via VLE, email, synchronous tools etc. • Using the VLE to facilitate core programmes information, course requirements... • Asynchronous tool use for time/schedule study effectiveness • Facilitation of overseas engagement via VLE • Mobile/ overseas study via VLE, email, synchronous tools etc. • VLE reliance

facilitate literature searching • Skilling in referencing to avoid plagiarism and avoid grade detriment • Sourcing specialist e-resources or databases • Overcoming database issues to obtain core reading texts • Overcoming confidence issues using/evaluating/trusting WWW content • Overcoming search results filtering in specialist databases • Maintaining up to date readings via diverse search strategy • Engaging with and Negotiating Remote Group Working • Engaging/skilling with VLE communications tools for group projects • Remote engagement with group projects via VLE tools	• Overcoming challenges accessing range of database/platforms/WWW sources • Integrating and assimilating University platforms and sources into existing practices		as distance learning study tool • Using removable media to facilitate mobile computing across locations • Use of VLE as a mobile/cloud solution for accessing content across diverse locations • Virtualisation of study experience via intense online tools use • Choosing to study in part time context to accommodate personal/work commitments • Ubiquitous learning via range of devices & locations to accommodate lifestyle • Distributed Learning via multiple e-learning formats, tools, media. • Accessing support, training materials, video etc. just in time to need/activity • Managing and

• Resolving VLE communications tools problems for group work • Balancing/prioritising workload with group networking demands • Overcoming low engagement of peers in use of communication tools			Negotiating Work-Study Relationship • Integrating work and study context to develop lifelong learning • Managing workplace demands for study participation • Managing workplace sponsored study requirements • Anxieties related to work related fee resourcing • Managing access to study balancing work commitments

Sorting Table 3: Early Theoretical Codes sorted into Developed Theoretical Codes

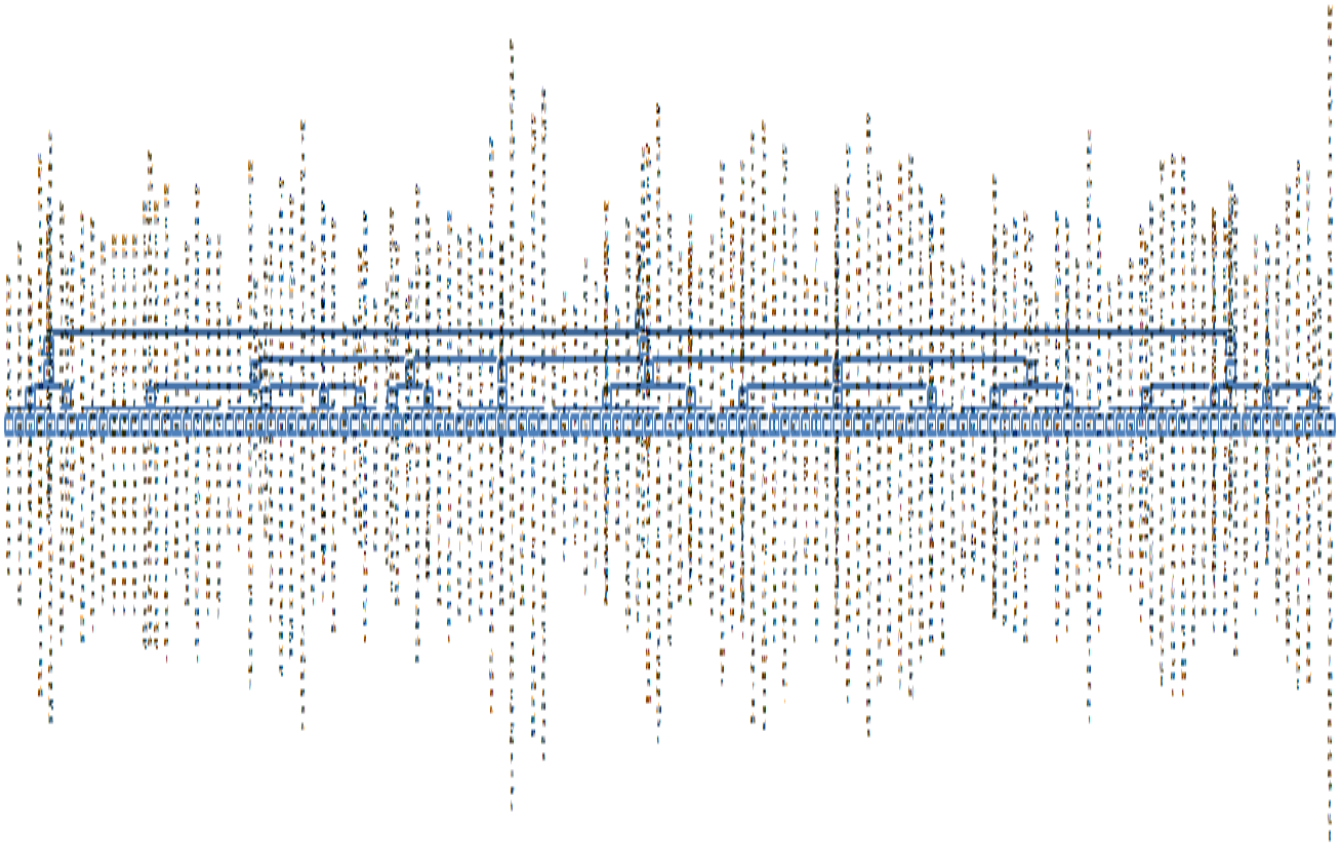
Multi-tasking Commitments	Self-Regulated Engagement	Transitional Physicalisation of Online Learning	Network Building/ Engaging	Adaptive Virtualisation of Learning	Socialisation of Learning	On-Demand Improvisation/ Exploitation	Navigating diverse platforms, equipment, locations
Self-Management of Study Regime and Programme	Resolving and Supplementing Information Literacy for Effective Research	Physicalisation of Virtual Learning	Engaging with and Negotiating Remote Group Working	Virtualisation and Engagement for Online Feedback and Assessment	Socialisation of Learning for Group/Peer Working	Supplementing and Innovating Literature Searching	Engaging with and Negotiating Digital Platforms
Managing and Negotiating Work-Study Relationship	Acquiring and Supplementing Study Skills	Learning Resources Capital Acquisition	Resolving and Networking for Acquisition of ICT Support	Virtualisation of Learning to accommodate Remote Study		Exploiting Facilities and Services	Engaging with and Negotiating VLE and course content
	Developing Confidence in Technologies and Low Contact Study			Engaging with and Negotiating Online Communications			Resolving and Negotiating WWW usage issues
	Resolving and Supplementing ICT Problems						Organisation of Learning Assets

Sorting Table 4: Table 4: Developed/ High Level Codes sorted with Core Category

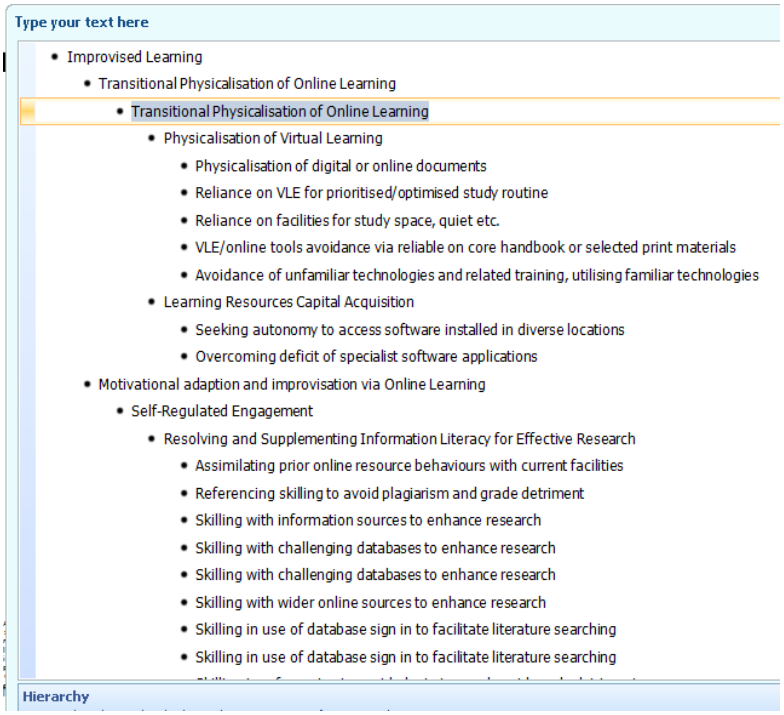
Developed Theoretical Codes Sorted into High Level Codes with Core Category

Core Category: Improvised Learning			*Common Properties drawn from High Level Categories:* Motivational Learning; Adaptive Virtualisation of Learning; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; Navigating platforms, equipment etc.		
High Level Category: Transitional Physicalisation of Online Learning	*Common Properties drawn from High Level Categories:*	High Level Category: Motivational adaption and improvisation via Online Learning	*Common Properties drawn from High Level Categories:*	High Level Category: Navigating diverse platforms, equipment, locations	*Common Properties drawn from High Level Categories:*
Developed Category: Transitional Physicalisation of Online Learning	Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**	**Developed Category:** Self-Regulated Engagement	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**	**Developed Category:** Navigating diverse platforms, equipment, locations	**Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**
		Developed Category: Network Building/ Engaging	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		
		Developed Category: Socialisation of Learning	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		
		Developed Category: Multi-tasking Commitments	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		
		Developed Category: Adaptive Virtualisation of Learning	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		
		Developed Category: On-Demand Exploitation/ Improvisation	Motivational Learning; **Adaptive Virtualisation of Learning**; Self-regulated/managed learning context; On-Demand Exploitation/ Improvisation; **Navigating platforms, equipment etc.**		

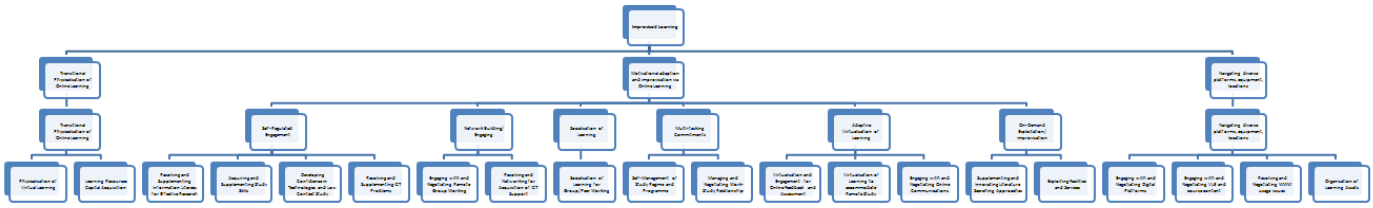
APPENDIX 15: HIERARCHIAL VISUAL REPRESENTATION OF ALL THEORETICAL CODES



Editor Interface for above chart using Microsoft Office 'Hierarchies' tool:



APPENDIX 16: HIERARCHIAL VISUAL REPRESENTATION OF THEORETICAL CODES (MINUS THEORY BITS)



APPENDIX 17: INTRODUCTION TO THE BLACKBOARD VLE AT GLYNDŴR 2007/08

Blackboard at Glyndŵr University

Help: http://www.glyndwr.ac.uk/blackboard
Login: http://blackboard.glyndwr.ac.uk
email: elearning@glyndwr.ac.uk

Bb Blackboard www.blackboard.com

Introduction to Blackboard for Students

Blackboard is Glyndŵr University's Virtual Learning Environment. To register on a Blackboard course site you must have a login on the computer network. You should have a login if you have been issued with a library card.
Note: not all courses have online Blackboard sites **if in doubt ask your tutor.**

Important : Blackboard Username and Password

Please log into Blackboard using your Network Username and Password.

Your Username is printed on your white Library card, your Password will have been issued to you on enrolment.

If you have problems with your network password, please contact the IT Helpdesk in the library or call 01978 293241 or email itservices@glyndwr.ac.uk

Log into Blackboard: http://blackboard.glyndwr.ac.uk
Email Blackboard support: elearning@glyndwr.ac.uk

Contents

Welcome to Blackboard!

What is Blackboard?

Blackboard is Glyndwr University's Web-based online learning and teaching system.

Blackboard allows lecturers to make course study material available for students via the Web. Blackboard also allows students and lecturers to communicate using Discussion Forums, Announcements, Virtual Chat and email. All staff and students are provided with Blackboard accounts.

To use Blackboard, you need :

- **An Internet connected PC**

  Glyndŵr University students may access Blackboard using PCs in the library and other IT labs.
  If you are at home, you will require an internet connection on your computer (using an Internet Service Provider (ISP), eg: Freeserve, AOL, BT Openworld, Tiscali.)

- **A standard Web Browser**
  We recommend Microsoft Internet Explorer: http://www.microsoft.com/ie

- **Note**: All the university PCs should have network access and have the latest Web browsers.

Logging into PCs

All enrolled users can log into campus PCs located in the library building and in department IT labs. It takes around a week following your registration before you can log into university PCs.

During your induction period you may attend a session on using our IT facilities, if you require further assistance logging into university PCs, using Email, or using the Internet, please view our **IT support guidelines:**

http://www.glyndwr.ac.uk/Studentsupportservices/en/Libraryandstudy/Guidelines/#b

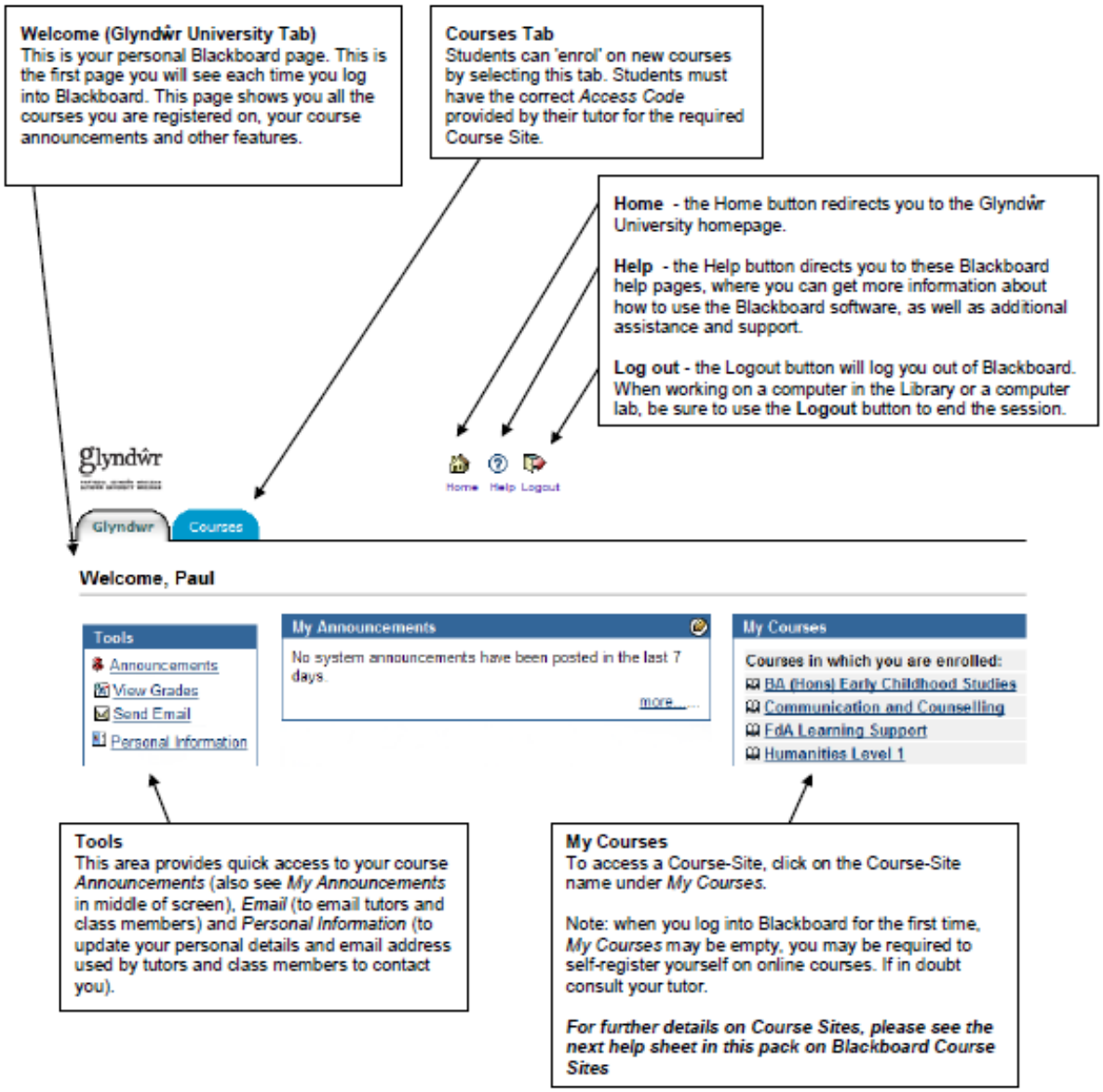
…or contact the **IT Helpdesk** in the Glyndŵr University Library **:**

http://www.glyndwr.ac.uk/Studentsupportservices/en/ITHelpdesk/

Logging into Blackboard

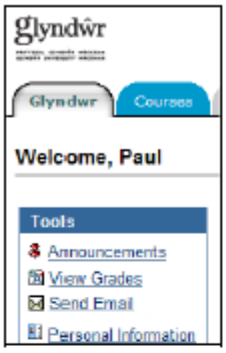
1. Enter the Blackboard URL: http://blackboard.glyndwr.ac.uk into your Web browser (eg: Internet Explorer).
2. Click on 'Login'. You will be prompted for a Username and Password; your Username and Password is the **SAME as your Network Username** (eg: s0551009) **and password** that have been given to you.

The Welcome screen (when you have logged into Blackboard)

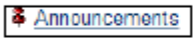


Tools Menu

The **Tools** menu is available on the left side of **Glyndŵr University tab** (the personal page you see when you log into Blackboard) :



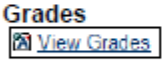
Announcements.



The *Announcements* link in the **Tools** area provides access to all announcements from all the Blackboard Course Sites you are enroled on.

1. Click **Announcements** on the **Tools** menu
2. Click on the **View All** tab to view all of your announcements.

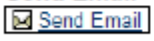
Grades



Use this Tool to see the grades for any online Assessments you have completed in any of your Course-Sites.

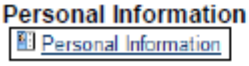
1. Click **My Grades** on the **Tools** menu
2. Click on a Course-Site - you will be shown your grades for the Course-Site you selected.

Send Email



The **Send Email** tool allows you to access the email functions for each of the courses you are enrolled in, and functions exactly the same as in the course. Please refer to the info-sheet on Communication in Blackboard for details.

Personal Information



The Personal Information Editor provides a tool to manage and maintain personal information and settings.

Note: Any information you change or add must be **valid**, including your name and email. If you enter an **invalid** email or personal details, you tutor may not be able to contact you using Blackboard.

1 Select **Personal Information**
2 Click **Edit Personal Information**
3 Edit any areas of information
4 Click **Submit**

About using email in Blackboard

By default, your Glyndŵr University email address is already specified as your contact email in Blackboard and all email sent by lecturers using Blackboard will go to that address.

For further information on using your Glyndŵr University email see our email guideline at:

http://www.glyndwr.ac.uk/Studentsupportservices/en/Libraryandstudy/Guidelines/TheFile,11299,en.pdf

It is most advisable to log in to your Glyndwr student email (Microsoft Live) http://login.live.com/ on a regular basis so that you don't miss important university emails.

If for some reason you want to be contacted via another email address, it is possible to change your email address that is configured in Blackboard.

- After you have logged in to Blackboard, make sure you are in the 'Welcome' Page (Glyndŵr University tab at top of screen).
- Click on **Personal Information** in the Tools box on the left.
- Click on **Edit Personal Information** and enter a new email in the email box.
- Click the **Submit** button.

Note: if you change your email address to one that doesn't exist your lecturers won't be able to send you email from Blackboard.

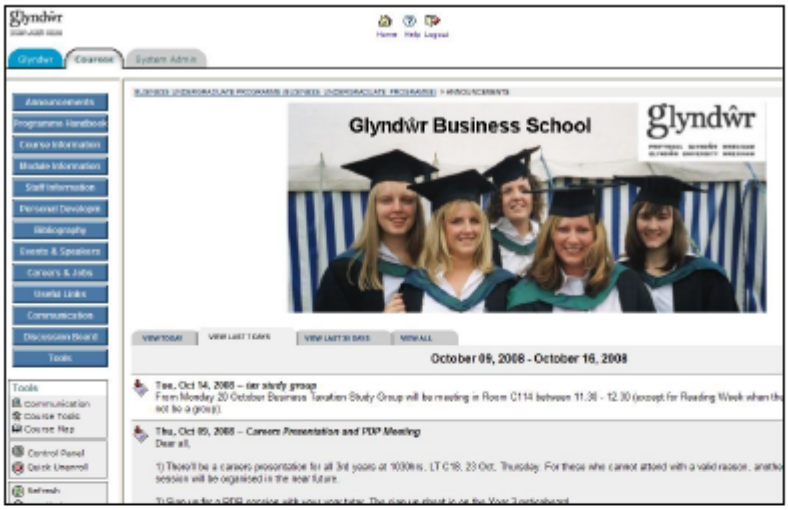
Blackboard Course-Sites

Blackboard contains a large number of 'Course-Sites' that correspond to taught courses.

In a Blackboard Course Site you can:

- **View course notes and presentations**
- **Email your tutor and other students on the course**
- **Discuss topics using Discussion Boards**
- **Use a range of other communication tools and features to keep in touch with your tutor and class members.**

A Course Site :



How do I enrol on Blackboard Course Sites?

To enrol on a Blackboard course-site, make sure you are logged into Blackboard.

1. Click on the **Courses** tab at the top of the screen.

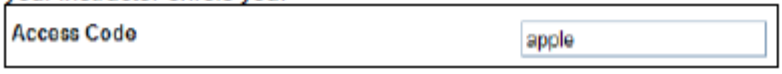
   

2. Select a Subject Area, e.g. ***Business***

3. You will see a list of course-sites *(you may need to expand the number of courses visible using the 'Items Per Page' option at the bottom of the page).*
4. Scroll down to the course you want to enrol on.
5. Click on the **ENROL** button (on the right) next to the course-site you wish to enrol on: 

6. You should be prompted to enter an **access code** (lower case not capitals), which your tutor will provide (if you don't have the access code you may have to wait until your instructor enrols you.

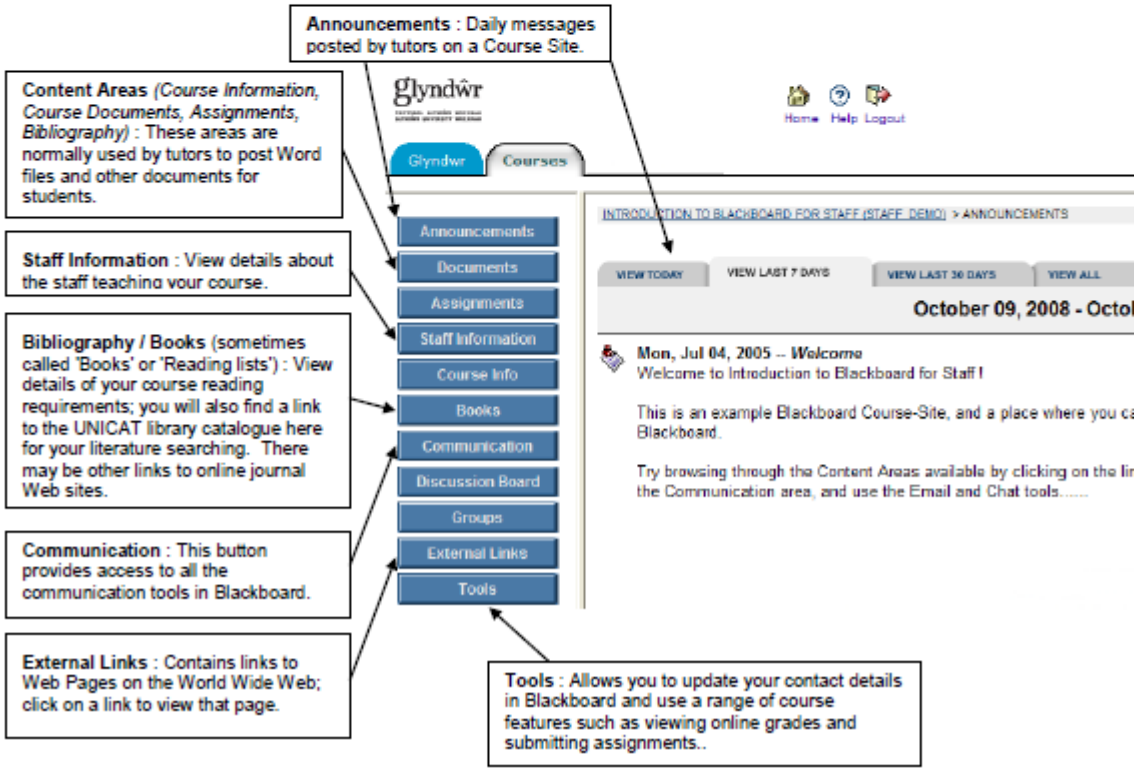
   

7. Scroll down to the bottom of the page and press the **Submit** button - you will now enter the course site. *Next time you log into Blackboard, this course site will be available under 'My Courses'*:

> ***Note:***
>
> *Your tutor will inform you how to enrol on any required Blackboard Course-Sites.*
>
> *You cannot 'enrol' on any Blackboard Course-Site without the unique Access Code*
>
> *Please contact your tutor if you think you should be enroled on a Course-Site.*

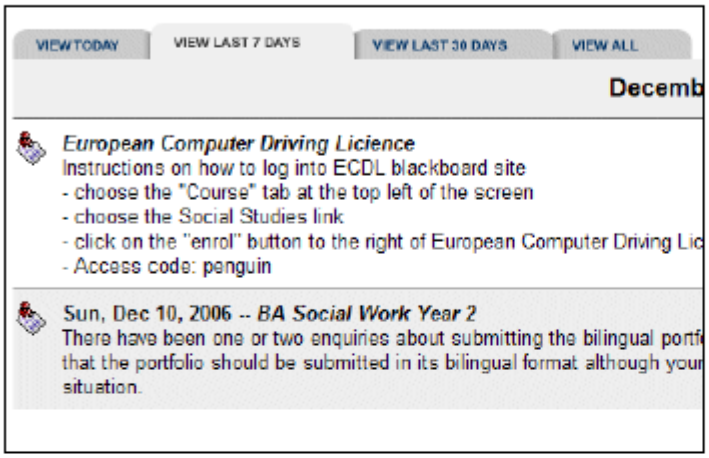
The Course Site Menu

There will be several areas in the course-site where your instructor has placed content for your course, e.g. Word documents, Powerpoint presentations. The Course Site menu also contains a range of communication and information features.



The Announcements Screen

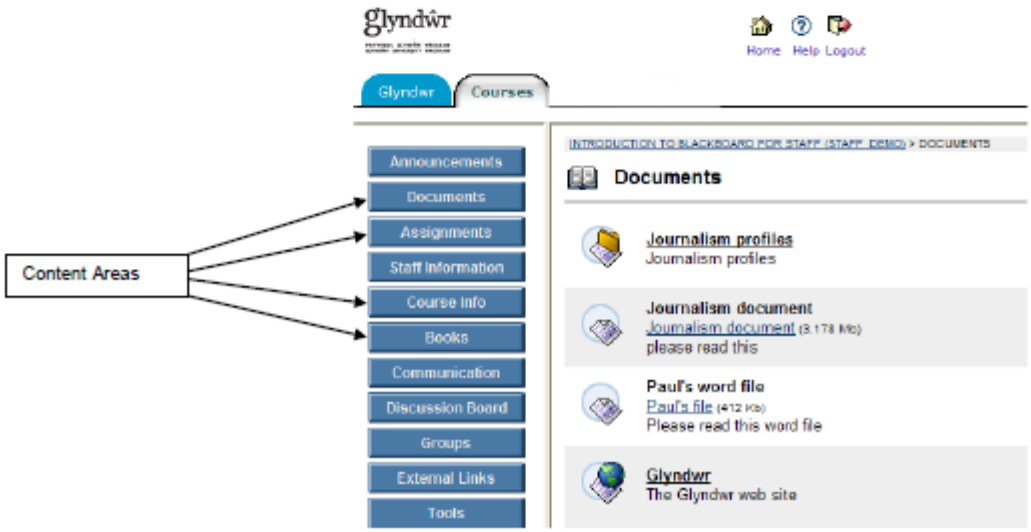
When you enter a course-site, you will see any announcements that have been posted by your course instructor. Announcements are listed under four tabs, **Today**, **Last 7 days, Last 30 days, View All**. The initial view is **Today**, click on the other tabs to see older announcements.



Content Areas

Content Areas provide access to course notes, presentations etc. *(these menu items can be called Course Information, Course Documents, Assignments, Modules or other names).*

When you enter a Content Area you should see all available documents in the right-hand window (you may need to browse through further 'folders' to see all files).



Viewing and Saving files/ documents

Whilst using a Glyndŵr University PC you should have no problems viewing Microsoft Office files (*Word, Powerpoint, Excel* etc.) or *Adobe Acrobat* documents, however if you are using a private computer, you will require the appropriate software installed in order to view these files.
Please contact the IT Helpdesk in the Glyndŵr University library if you are unable to open Microsoft Office or other file types on your private computer.

For further assistance, also see our guideline Printing, Email, Viewing and Saving Files:

http://www.glyndwr.ac.uk/Studentsupportservices/en/Blackboarde-learning/Blackboardforstudents/TheFile,12656,en.pdf

Online Assessments

You may encounter online assessments or surveys on Blackboard; there are a variety of question formats that you may be required to complete; the following example is a multiple choice question, where the user must select the correct choice from a list of options; in the second question, an answer must be typed in a box. If your instructor asks you to complete an online quiz, your results may be recorded on Blackboard; to view any assessment grades, click on **Tools** and select the **Grades** link.

Communication Features

The Communication area 

provides a range of features to keep in touch with your tutors and class members.

Send Email  **Send Email**

Send email to other students or a course tutor; this tool only allows you to send email to someone who is a Blackboard user (including staff and students.)

To send an email message:

1. In the **Communication** area, click **Send Email**
2. Select to whom you would like to send the email, eg: **All instructors** or **Select Users** (to select individuals.)
3. You may need to select specific individuals, tick the circle next to their names.
4. Press **Submit**
5. Type in your **Subject** and **Message**
6. Click on **Send Copy of Message to self** if you want to send a copy of your message to yourself.
7. Click **Add** if you wish to attach a file to your message
8. Click **Submit**.

Discussion Board **Discussion Board**

The Discussion Board allows you to post topical messages, other class members can then read your messages and post replies. Discussions can be used for general class feedback or for formal assessment.

To enter the discussion board for your course:

1. Click **Discussion Board** (You may need to click on *Communication Tools* then *Discussion Board*.)
2. Click on the **name** of the discussion forum you want to enter, the discussion board will be displayed.
3. Click a **message title** to view message content *(the first thread i.e. message in the forum will be displayed)*.
4. To respond to a message you are viewing, click the **Reply** button :

- Type in your reply
- Click **Browse** if you wish to locate and attach a file
- Click **Submit** to post your reply

To start a new topic

1. Click the **Create New Thread** button: 

2. Type a **subject** for your message
3. Type your message
4. Leave **Smart Text** checked, and Post as Anonymous unchecked
5. Click **Browse** if you wish to locate and attach a file
6. Click **Submit** to post your message

Collaboration / Virtual Classroom **Collaboration**

Collaboration is an interactive feature that allows you to communicate with your Instructor and other students in real time, it resembles a Microsoft Messenger chat box.
Note. It is necessary to log in at the same time as tutor(s) or other class members in order to use this real-time feature.

There are two options, the **Virtual Classroom** and **Chat**. Both features allow for real-time chat between students and Tutors. Whilst the *Chat* is for simple chat only, the *Virtual Classroom* allows for online presentations and diagrams.

1. Click on the **Communication** button, then select **Collaboration**.
2. Select **Virtual Classroom** or **Chat**.
3. To chat, enter your text in the chat box at the bottom and click Submit.

Problems using the collaboration tools

At Glyndŵr University : If you are having problems using collaboration tools, please visit the IT Helpdesk in the Edward Llwyd Centre

At Home : If you are having problems using collaboration tools at home, you may need the correct version of the Java plug-in for your Web browser.

1. Follow this link to download the Java plug-in:
   http://blackboardapp.newi.ac.uk/webapps/collab/chat/links/plugin_download.jsp?returnBaseUrl=http%3A%2F%2Fblackboardapp.newi.ac.uk&session_id=_693_1&course_id=_4_1&group_id=&environment=student

   Once you have downloaded the file, navigate to the file and install it on your computer.
2. When installation has finished, try entering the collaboration area again.

If you still have problems using collaboration tools, please visit the IT Helpdesk in the Edward Llwyd Centre.

Group Pages  **Group Pages**

A group has access to a variety of communication features, including a discussion board, file-exchange page, email and Virtual Classroom.

Note: To enter a group, you must be given access by your instructor. If you feel you should have access to a Group, please contact your tutor.

The following Communication tools are available in Groups :

- **Discussion Board**
- **Group Virtual Classroom**
- **File Exchange**
- **Send Email**

The *Discussion Board* and *Virtual Classroom* are identical to the Discussion Board and Virtual Classroom found in the main *Communication* menu area.

The *Send Email* allows you to send an email to one or all the members of your group. *File Exchange* allows you to share work with other members of your group in private.

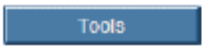
To enter a group you have been asked to use by your tutor :

1. Click on the **Group Pages** button
2. Click on the **name** of your group
3. Select a function

To use the **File Exchange** in your group :

1. Click **File Exchange**
2. You will see the files that have already been uploaded
4. Click on the file **name** to view a file, you may be prompted to save the file to your computer.
4. Click the **Add File** button to upload a new file :

- Give a **title** to your document
- Click **Browse** to locate the file to upload
- Add any further information into the **Comments** box
- Click **Submit** to upload the file

The Tools menu 

The **Tools** menu is available from any Course Site you are enroled on by clicking on the Tools button, the Tools features are slightly different than in **The Glyndŵr University tab.**

Grades  **My Grades**

The **View Grades** feature in the **Tools** area of your Course Site displays the grades for any online Assessments you have completed in any of your Course-Sites.

1 Click **My Grades** on the **Tools** menu.
2 You will be shown your grades for the Course-Site.

Digital Drop Box  **Digital Dropbox**

Note: you should only use the Drop Box if asked by your tutor.

Use this feature in the **Tools** area of your Course Site to send files to your Instructor.

Note. You must be logged into the appropriate Course Site to send the file.

1. Click on the **Tools** button 

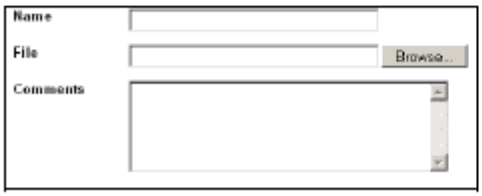
2. Click on the **Digital Dropbox** button 

3. Click **Send File** 

IMPORTANT! If you use the **Add File** button **tutors will not receive the file**.

You should use the **Send File** button to send the file to the tutor.

4. Type a **Name** for the file in the box provided (it is useful to include your own name).
5. Click **Browse** to upload your file:



6. Enter any additional **Comments** and press **Submit** 

The file should now be sent to the instructors ***for the course site you are logged into***.

NB. Once the file is sent to the Instructor it will show your name, the date and time submitted.

APPENDIX 18: CONFERENCE PRESENTATION ABSTRACT ON RESEARCH PROJECT, OCTOBER 2013

Catherall, P. (2013). 'Developing a Grounded Theory of Blended Learning in a Part Time Low Contact Participant Group', 6th MMU Interdisciplinary Conference 2013 (A Celebration of Interdisciplinary), Manchester Metropolitan University, 19 October 2013.

Developing a Grounded Theory of Blended Learning in a Part Time Low Contact Participant Group

The late 1990s saw a trend in the emergence of industry-led and professional-based Higher Education programmes alongside a government agenda for widening participation, lifelong learning for continuous development, adaptability for flexible careers, skills development of the UK workforce and the adoption of new technologies to facilitate this agenda.

This presentation will outline the background to a Grounded Theory study of Part Time, mature student participation within a Post 1992 Higher Education institution characterised by adoption of Blended Learning approaches via use of the VLE (Virtual Learning Environment) and associated Internet tools and platforms. The growth in part time study at the North East Wales Institute of Higher Education (later Glyndŵr University) formed the basis of a study into student experiences, challenges and engagement in response to the emerging context of study facilitated via both class-based teaching and e-learning approaches.

The presentation will outline the development of the study methodology, ultimately

assessing student participant experiences via the Glaser model of Grounded Theory, a sociology-derived interview- and memo-based method providing a narrative of perspectives on issues, processes or activities to develop conceptual understanding of the participant experience.

The presentation will outline Grounded Theory methods used, including theoretical approaches to using data as 'emergence over forcing', sorting of participant data, categorisation of data into 'codes' aggregating feedback into substantive indicators of shared experiences and assimilation of key literature or theoretical developments as contributing data. The presentation will also discuss the sorting process and tools used for developing Theoretical Codes explaining the student experience.

The presentation will discuss an early tentative Core Category ('Information Systems Traversing') unifying diverse student experiences as an explanation for student behaviour in achieving success via Blended Learning in a Low Contact environment; the later developed Core Category ('Improvised Learning') will also be described, emerging from further interviews and the ongoing Literature Review, alongside a discussion of current inter-disciplinary research related to this Grounded Theory.

The presentation will outline the inter-disciplinary nature of the study as one derived from a diverse range of fields, including Education, Information Technology and E-Learning alongside aspects of Pedagogy, Information Science and the more general application of Grounded Theory as an holistic methodology. The adductive or empirical nature of the Grounded Theory methodology will be outlined as a neutral approach which places emphasis on developing a conceptual model based on participant input rather than a hypothesis or pre-existing theory.

The study will illustrate the interdisciplinary implications for the resulting Grounded Theory due to its application outside the chosen sector or area of activity. The

presentation will demonstrate how this Grounded Theory complements classic Grounded Theory rationale for developing a new paradigm beyond the current participant group transcending and applicable to other sectors, industries or general societal activity. The presentation will also outline conclusions and recommendations arising from the research project, including some interdisciplinary related conclusions and suggestions for developing and supporting related skills and processes revealed in the Core Category.