How do technologies support School Direct students' learning on a PGCE with Qualified Teacher Status within a Networked Learning model?

Mike Toyn (BSc, PGCE, MA)

January 2018

Declaration

This thesis was completed as part of the Doctoral Programme in E-Research & Technology Enhanced Learning

Department of Educational Research,

Lancaster University, UK

This thesis is entirely my own work and has not been offered previously for any other degree or diploma.

The word length of this thesis (54306 words) complies with the permitted maximum.

How do technologies support School Direct students' learning on a PGCE with Qualified Teacher Status within a Networked Learning model?

Mike Toyn (BSc, PGCE, MA)

Doctor of Philosophy, January 2018.

Abstract

This work is a study of the way that students select and use technologies to build and maintain a learning network while training to become primary school teachers. It builds on the body of research which has explored Networked Learning by applying it to the context of teacher education and by applying it to a course where the ICTs used are selected by students not provided by tutors.

It is a case study based on intrinsic interest with an exploratory focus to understand how and why students make use of the technologies they select. It uses multiple data sources including group interviews with students, interviews with tutors, questionnaires, virtual learning environment data and transcripts of students' social media interactions. The analysis of these has been performed along three lines of enquiry to establish who is talking to whom, what they are talking about and why they are talking about it.

The findings bring together a novel approach to the application of Networked Learning and research into a new route into teaching and show that students are sophisticated and agile users of a range of technologies. They use a variety of technologies to build and support interactions with artefacts, tutors and other learners. Where there are constraints in place, such as tutors' preference for face-to-face interactions there is evidence that students will make use of technologies to substitute other interactions in their place. It finds that students' most extensive interactions take place with other students and that these are multifaceted combining interactions directly related to learning, around-task interactions and social elements.

It builds on research done in blended learning, networked learning, teacher education and social aspects of learning. It will be of interest to those interested in the role of technologies in education or those involved in teacher education.

Contents

List of Figures

List of Tables

List of Abbreviations

CMC	Computer mediated communication
CSCL	Computer supported collaborative learning
HQLT	High Quality Learning and Teaching module
ITT	Initial Teacher Training
NL	Networked Learning
PGCE	Post Graduate Certificate in Education
PPL	Partnership Programme Lead
QTS	Qualified Teacher Status
RAC	Raising the Achievement of Children module
SD	School Direct
SMS	Short Message Service
SNA	Social Network Analysis
SNS	Social Networking Site
UPL	University Programme Lead
VLE	Virtual Learning Environment

Acknowledgements

There are no endeavours that are truly individual efforts. This work would not have been possible without the advice, guidance and support of many people. I would like to recognise the contributions that everyone has made to this work.

Firstly, the role that all participants played in this study must be acknowledged. Without them the research could not have taken place. Their willingness to take part and contribute made the research process as simple as possible. In some cases, participants went out of their way to help me and for this I am moved and grateful.

Secondly, I would like to thank my colleagues who have been supportive of my study and for putting up with me when my mind has been focussed on this research when it should have been concentrating on work. I would like to extend specific thanks to all the colleagues who covered my workload while I was on sabbatical leave.

Thirdly, I would like to thank my institution for the financial support they have provided towards my fees and for enabling a period of sabbatical leave which made the task of writing up this research enjoyable and engaging.

Fourthly, I would like to thank my supervisor, Julie-Ann Sime, for her support and encouragement throughout this work. Her prompt and constructive feedback was invaluable.

Finally, I would like to thank my family for the support and encouragement they have provided on what has been a long and involved journey.

I dedicate this work to my wife, Rachel.

Chapter 1 Introduction and Background

This research aims to explore the contributions that technologies make to the learning of a group of students on a teacher training course. It seeks to develop an understanding of the complex and varied role that technologies play in supporting learning interactions that the students have. It draws upon Networked Learning (NL) to provide a framework to understand these interactions. NL (which is explored in detail in section 2.1) can be summarised as learning which results when learners make use of technologies to interact with other learners, tutors and artefacts.

This research will contribute to the body of NL research by evaluating its application to a context to which it has not previously been applied. It will also make a contribution to teacher training practice by deepening the understanding of a little researched aspect of student learning.

1.1 The context of this research

As this research is a case study (further discussion of this presented in Chapter 3) this overview of the context in which the research is situated will be rich and detailed. This will allow the results and discussion to be more fully understood.

I work in the Institute of Education at a University in the North West of England which is one of the largest providers of Initial Teacher Training (ITT) in England. This university offers postgraduate courses that offer students the opportunity to gain an academic qualification as well as Qualified Teacher Status (QTS) which is a professional qualification that is required for those wishing to teach in maintained schools in England (National College for Teaching and Leadership 2014). The combination of university based study with placements in schools leads to the award of Post Graduate Certificate in Education (PGCE) with QTS.

Since September 2012, (Department for Education 2012) a new route of ITT has been available: School Direct (SD). This is characterised by a greater involvement of schools in the design and delivery of PGCE with QTS courses; lead schools work with a partner university and agree how student fees will be split between the two parties. The way that my institution offers SD has been influenced by our geographical location and our beliefs about collaborative partnerships. Our location in the North West of England means that we work in an area of relatively low population which is quite dispersed and consequently our approach

needs to reflect the fact that SD students would find it difficult to travel to our campus. This approach is reflected in the partnership statement:

> The partnership benefits from the diversity of school-experience that it can offer its learning teachers – from small rural schools in Cumbria and north Lancashire to large, urban schools in Barrow, Blackburn, Carlisle, Lancaster, London or Preston. It values the expertise and opportunity offered by its diverse partners and celebrates the consistently high-quality experience that all learners experience.
>
> (University of Cxxxxxx 2015)

Consequently, SD at my university is organised in a dispersed way. Schools that are interested in becoming a SD partner work with the university to create a SD alliance and then build their course, this is based on the same modules and assessments as our campus-based PGCE with QTS but the finer details of module content are decided by the lead school. Each alliance has a University Programme Lead (UPL), who is a university tutor assigned to work with that alliance. Alliances recruit their own students and arrange the school based placements for students, in addition to this they plan the timetable for the students and draw upon experienced teachers from within the alliance to teach some of the modules.

The PGCE with QTS comprises eight modules:

- The PGCE component is made up of two contributory level 7 modules of 30 credits each.
- The QTS component is a professional qualification that is based on the Teachers' Standards (Department for Education, 2011). These are eight areas of professional responsibility that students must demonstrate competence in to gain QTS. They demonstrate their competence through three school based, practical placement modules.
- Both the PGCE and QTS components are supported by three modules. These are taught at level 6 and there is no assessment activity associated with them. They are part of the preparation for the placement modules.

. All assessment submission and feedback is done via Turnitin (Turnitin 2018). The first contributory module is assessed in two stages; the first consists of ungraded, formative feedback and the second is consists of grading and summative feedback The teaching of the two contributory modules which result in PGCE is done by the UPL. The teaching of the

qualificatory modules is undertaken by teachers and consultants from within each SD alliance.

The three school-based, practical placement modules are called: Beginning, Developing and Extending and last for four, five and eight weeks respectively. All placements take place at the same time across all SD alliances. This approach means that whilst our SD alliances share some common factors such as the number of placements that students do, the modules that they study and the assignments that they complete, there are many other aspects that are bespoke and unique.

In addition to being one of the largest providers of ITT in England my institution is also one of the largest providers of SD ITT provision. In the academic year 2015-16 we worked with 18 alliances and had approximately 250 students enrolled, in the academic year 2016-17 we worked with 15 alliances and had a similar number of students. The implication of all this information is that this is a relatively new form of course which is delivered in a dispersed way. With the exception of registration day at the start of the course, students do not come to campus, nor do they work with students from other alliances. Thus, the course is composed of several discrete and dispersed cohorts of students.

To this point, this discussion has focussed on the organisation of the SD PGCE with QTS course with little mention of technologies. For the purpose of this thesis, technologies is deemed to refer to physical and virtual tools, for example, laptops, tablets and phones would all be considered as technologies as would virtual learning environments, internet based text or video content or internet based services such as social media networks or email. My institution uses Blackboard as its virtual learning environment (VLE) and has a policy that all courses should provide a *course* Blackboard site which will contain key information such as the course handbook, course timetable, and contact details as a minimum. In addition, each module that students study is supported by a *module* Blackboard site which contains module information, learning materials and assessment details. SD direct students have access to a course specific Blackboard site, whilst their module specific Blackboard sites which are shared with the university based PGCE students. Previous small-scale research activities (Toyn 2015a, Toyn 2015b, Toyn 2014) have explored student views of the value of the online element of a blended learning course, student perceptions of technology to support networked learning and the role of social media tools in generating an online community. Discussions about the definition of blended learning are not new and rarely reach any form of conclusion (Paran 2004; Donnelly 2006; El-Deghaidy

and Nouby 2008; Akkoyunlu and Soylu 2008; Poon 2013; Shen et al. 2013; Bicen et al. 2014; O'Byrne and Pytash 2015; Wasoh 2016). What they do provide is an understanding of the range of approaches that can be considered blended learning. Bayne et al. (2014 p3) offer a reminder that it is not appropriate to think of universities as the exclusive locations where learning takes place for students. This is described by Aspden and Helm (2004 p249) as having contact with the university even when they are not there. Thus, the various combinations of physical and virtual learning that Poon (2013 p274), Shen et al. (2013 p59) and Motteram (2006 p20) outline should not be considered unusual in order to combine the benefits of each (Bicen 2014 p532). There are various roles that the virtual element can take: an online presence for the course instructors (Irwin et al. 2012 p1221) or the approach where face-to-face teaching is considered to be the supervised element and is supported on online interactions that allows students to learn at their place, time and pace (O'Bryne and Pytash 2015 p138). The SD course is most closely aligned with this model where face-to-face teaching and interactions are supported by the provision of online resources, this is because of the intense nature of the course which leaves little free time for students to engage in online activities as well as the practical nature of much of the teaching and learning activities which are not well suited to online activities. This is similar to the model described by Wasoh (2016 p166) where there is an online environment to accompany the teaching with the addition of online modes of assessment which is done through Turnitin. The use of Turnitin is due to a combination of the advantages of an online system for dispersed learners alongside the benefits of this tool for providing effective feedback to learners.

A final technology which is provided by my institution and that is available to learners is the online library resources which comprise books, journal access, a search tool and databases. In addition to the institutionally provided resources, it is known that students make use of internet based text and video content to support their learning as well as internet based services such as social network sites, email and short message service. Whilst it is known that students have access to the technologies mentioned, there is uncertainty about how they make use of them.

It is he combination of SD as a relatively new phenomenon, the geographically dispersed (and remote from university campus) student body and the uncertainty about how students make use of technologies to support learning is of interest to me in my role as course leader for these students. It has potential implications for course design and the way that tutors

interact with students and their expectations of student actions whilst on the course. The following research questions arise from my interest in this area.

1.2 Research question

How do technologies support School Direct students' learning on a PGCE with Qualified Teacher Status within a Networked Learning model? (Networked Learning is discussed in further detail in section 2.1)

This gives rise to the following three sub-questions:

- How do students make use of technologies to support student-to-artefact interactions?
- How do students use technologies to support student-to-tutor interactions?
- How do students use technologies to support student-to-student interactions?

Having outlined the context of my work and this research the next section will review literature relevant to the context, theoretical framework and research question and will highlight where there are limitations in the literature which this study will contribute to.

Chapter 2 Review of Literature

This study is focussed on student use of technologies to support learning within the context of a PGCE course using a Networked Learning (NL) framework. The course makes use of a VLE and it is known that students on the course frequently make use of SNS to facilitated inter-group interactions. The study is interested in both the direct use of technologies to support learning as well as the indirect impact of social interactions on learning. Consequently, the review of literature related to this study covers NL, teacher education, blended learning, social aspects of learning and the use of SNS within HE: these areas will form the structure of the review.

The aim of this literature review is twofold. Firstly, to identify relevant and current issues in each of the areas and, secondly, to provide a rationale for the relevance of this study in relation to gaps in current understanding in these areas.

2.1 Networked Learning

Dirckinck-Holmfeld et al. (2014 p6) recite a definition of NL that has stood the test of time since 1999 when it was first coined.

> *Networked learning is learning in which information and communications technology (ICT) is used to promote connections; between one learner and other learners, between learners and tutors; between a learning community and its learning resources*

What Dirckinck-Holmfeld et al. (2014 p8-9) go on to outline are some pedagogical approaches to which they believe NL is aligned. There are six of these areas:

- Openness in the educational process;
- Self-determined learning;
- A real purpose in the cooperative process;
- A supportive learning environment;
- Collaborative assessment of learning;
- Assessment and evaluation of the ongoing learning process;

Whilst this is a review of literature, it is relevant to take a short time to consider these six areas in relation to the design, structure and delivery of the SD course. Firstly, there are areas to which the SD course has a clear alignment, for example there is a real purpose in

the cooperative process as the students are working towards QTS which is a professional qualification and so their learning has a real purpose. It also has a supportive learning environment even if there are no explicit aspects of the course which set out expectations or actively promote such an approach. There is a degree of self-determined learning as students self-select the topics for the assessment of their two credit-bearing modules and they will each be working on areas of the Teachers' Standards which are relevant to them. However, some of the areas listed above do not apply, or only apply partially to the SD course. Firstly, the collaborative assessment of learning. The course does include a formative assessment activity where peers and tutors give feedback on a verbal presentation of progress on an assignment but the rest of the credit-bearing assessment activities are assessed by the UPL. Students and mentors engage in collaborative judgements of professional practice on placement against the Teachers' Standards but this does not include other students. Finally, there is no formal provision for the evaluation of the ongoing learning process. Despite these limitations, it is proposed that the SD course offers a suitable match for the application of NL theory as a framework for research, if only to establish the extent to which it is applicable.

NL has obvious roots in areas such as online learning environments, an example of this is provided by Clark (2001) who explored ways to stimulate collaboration and discussion in online environments and found that there is a need for tutors to facilitate discussion and to establish ground rules for the nature, tone and purpose of interactions. This has clear links to the ideas underpinning NL. Other historical examples of work that can be seen as part of the evolutionary history of NL include that of Breuleux et al. (1998) who researched the role of technology in networks and its potential to facilitate collective understanding. This work was related to the professional development of teachers and student teachers. Thus, the role of technology in interactions is not new, nor is research into its place in teacher education.

As well as early work on online learning environments, the computer mediated communication (CMC) body of work can be viewed as a precursor to NL theories. Goodyear et al. (2005) looked at the impact of CMC on an undergraduate course in relation to student views on its use, both before learning in this way and then again after having engaged in a CMC facilitated learning activity. It found that there was no difference in opinions before or after. It also noted that the CMC approach appeared to support deep learning approaches. Both findings add weight to the argument that the use of technology to facilitate learning is relevant and valid.

Following on from CMC is the approach of computer supported collaborative learning (CSCL). It is evident in the titles of CMC and CSCL that the latter places a greater emphasis on the interactions that take place through the use of technology. Also implicit in CSCL is that it is a broader approach than CMC which is concerned with the use of technology to support communication, whereas CSCL looks to the use of technology to support learning without restricting it to communications, thus it encompasses the use of technology to support interactions with learning resources. De Laat et al. (2007a) use NL and CSCL interchangeably and argue that NL is a European term that is synonymous with CSCL. In contrast to this, Dirckinck-Holmfeld et al. (2014) argue that the two are not synonymous as CSCL has a strong focus on collaborative learning which they associate with strong ties. They argue that such a focus does not take adequate account of the existence of weak ties between learners. An additional argument to distinguish between NL and CSCL is provided by Jones et al. (2008) who make the point that CSCL is close knit and characterised by a unity of purpose. Thus, NL is more open and caters for diverse learning desires, a point emphasised by De Laat (2006) who notes it is a loose form of collective learning and that learning communities emerge to solve particular problems and are established around a shared interest. Given the nature of the SD course and its absence of collaborative learning activities, it is probably appropriate to assume that the distinction between NL and CSCL is appropriate in this case.

Ryberg and Larsen (2008) discus the role that SNS play in learning communities and argue that SNS do fit within the network metaphor but note that the recognition of the importance of weak ties has a knock-on implication that means it is hard to define a network if weak ties make it difficult to bound. A comparable point is made by Jones et al. (2008) who note that the boundaries in NL can be porous. This is a potential issue for this study which adopts a case-study approach and attempts to provide a boundary to the case. As will be seen in Chapter 4 and Chapter 5, the attempts to describe this boundary are not fully effective as weak ties outside the bounding of the case exist and play a role in student learning.

The way that strong and weak ties make use of different media and technology is an outcome of research by Haythornthwaite (2002) who noted that strong ties are more likely to adopt whatever media they see fit to meet their needs whereas weak ties are more likely to fall back on existing protocols and technologies. Whilst Ryberg and Larsen (2008) highlight the challenges that trying to differentiate between strong and weak ties presents, the selection and use of technologies to support interactions is an area that has been the subject of focus. For example, Gewerc et al. (2014) noted the blurring of boundaries between formal and informal settings and highlighted the tensions that exist when considering the use of

commercial SNS to support interactions between learners (mainly in relation to advertisements and ownership of content). Jones and Healing (2010) looked into the use of technologies by undergraduate students and found a high degree of integration of digital technologies into their lives which served to blur the boundaries of face-to-face interactions and those mediated by technologies. Thus, the selection of technologies by strong ties can be varied and may not be confined to those provided as part of a course.

In addition to the variety of contexts that NL research has been applied to (e.g. the work of Bonzo 2012, with learning technology professionals; De Laat 2006, with police; or, Terzi and Çelik 2005, with computer science students) there have been various applications of different research approaches to gain an understanding of the learning processes that take place within NL communities. These have included the use of phenomenography by Booth (2008) as a way to understand the variation in students' conceptions of NL. In this example, the learners were non-typical, distance learning students. The use of virtual ethnography was adopted by Bosch (2009), in this example the research was not framed by a NL framework but the exploration of social networking that the study was based on is applicable to the NL canon. The exploration of networked groups goes beyond education research as illustrated by the work of Wisdom et al. (2013) whose work in the psychology field explored the variety of learning strategies adopted by learners within a network. There have been numerous studies that used Social Network Analysis (SNA) approaches to help to understand the dynamics of NL communities.

Petropoulou et al.'s (2010) work focussed on how to measure learner activity in NL environments. They note how hard it can be to track all the interactions that take place and advocate the use of SNA approaches in order to provide quantitative measures of interactions between students, other students and learning artefacts. Mazur et al. (2010) wished to explore the interactions between different groups of learners in a teacher education course and made use of SNA to compare the interactions. These descriptive statistics were supported by qualitative feedback via interviews to help reach the findings that groups of students from similar backgrounds were likely to have higher levels of interactions than those from different backgrounds. Jones et al. (2008) and Jones (2004) stress that SNA is descriptive and helps researchers to explore the structure of networks through their interactions. Such approaches can result in broad generalisations such as the power-law relationship that means that networks tend to have large numbers of participants who infrequently interact and a smaller number who participate a great deal. But, they can be limited in their power as they can miss details of quality such as the existence of latent

links (those that exist in theory but have yet to be realised). The descriptive power of SNA is realised by Gewerc et al. (2014) who made use of a tool to extract data from a VLE in order to automatically visualise interactions. However, this was supported with keyword searches in order to gain an insight into the quality of learning that took place.

There is a significant body of work by De Laat (2006), De Laat et al. (2007a), De Laat and Lally (2003), De Laat and Lally (2004), De Laat et al. (2006), De Laat et al. (2007a) and De Laat et al. (2007b) which makes use of SNA in order to understand the structure of networks, in other words to work out who is talking to whom. This body of work extends this approach by the use of content analysis to explore what they are talking about. Their final approach is to use context analysis to gain understanding of why they are talking about these things. This multi-layered approach helps to avoid the limitations of any single approach. For example, it means that findings are not limited to descriptive statistics and summaries of network structure. They note that gaining access to the content of text based discussions is straightforward but the subsequent coding presents challenges as it is time consuming and prone to issues relating to validity and reliability. A further argument for this approach is the need to go beyond grades and outcomes as indicators of learning as these only provide information about the end point and do not take account of the process of learning that has taken place. What is interesting about the approaches in these works is the variety of ways these methods have been put into practice. For example, De Laat et al. (2006) added a time dimension to their study in order to look at the way the interactions changed over time. Alternatively, De Laat and Lally (2004) looked at the interactions within a network from a students' perspective, which is contrasted with De Laat et al. (2007b) which took a similar approach but looked from a tutors' perspective.

An additional aspect of the literature relating to NL is that which provides insight into the relationship between interaction and learning. Particularly as the definition provided at the start of this question refers to learning that takes place in response to connections between the three different elements of NL. Whilst authors such as Hurst et al. (2013) make a strong case for the connection between social interactions and learning, this does not automatically mean that all interactions that are facilitated by technologies will result in learning. When it comes to what is meant by learning, Jones et al. (2008) discuss a process of learners reading or engaging with others via technology and then doing something different as a result. Likewise, Booth (2008) argues that it is important to consider what learning takes places as well as how it takes place and that if interaction leads to seeing things in a new way, then learning can be argued to have occurred. For some, such as De Laat et al. (2007b) it is the

role of the researcher to look for evidence of learning having occurred, whilst for others such as Kio and Negrerios (2013) the approach of learners self-reporting about learning in response to *Facebook* interactions was sufficient. In a related paper, De Laat et al. (2006) argue that online learning represents a complex environment and that a multi-method approach is the most appropriate way to unpick learning.

When it comes to the processes by which interactions can lead to learning, some writers such as Cain and Policastri (2011) explored the role of *Facebook* as an informal learning environment and that the interactions that take place outside the constraints of the formal curriculum lead to informal learning which complements the formal learning of the course. In contrast to this Kožuh et al. (2014) took a more detailed look at interaction and learning, their research found that both the intensity and quality of interaction are connected with academic success. A mechanism for this is suggested by El-Deghaidy and Nouby (2008) who propose that cooperation results in interaction as individuals begin to work together to encourage and support one another to learn. However, a contrasting perspective is outlined by Terenzini et al. (2001) who put forward the notion that it is effective instruction that stimulates interaction and in their work they separate learning activities from interaction.

In summary, this section traces some antecedents of NL and makes a case for the relevance of NL to the context of this study. It also highlights the tentative nature of links between interaction in an NL environment and learning occuring. Significantly, it discusses some of the research approaches that have been used to research NL, particularly those which support mixed methods approaches.

What is missing from this literature are examples of the application of a mixed methods approach to a teacher education setting. Likewise, examples of the application of NL theory to contexts which are not fully online are sparse. Thus, this creates a gap into which this study can fit by providing an opportunity to apply NL theory to such contexts.

2.2 Teacher education

The field of teacher education is vast and too large to be covered in its entirety here and much of it would not be relevant to this study. Consequently, a selective review of typical research in the area will be considered. As a starting point, Bakir (2016) presents a review of research into technology and teacher education that has been influential. What is striking about this is the common theme of teacher education courses seeking to adopt technology

in order to model the use of it to students with the aim that it will develop their competence in order that they can utilise technology in their teaching practice.

This theme is evident in a range of other research findings. For example, Ng (2008), working in Hong Kong, designed a blended learning course in order to model the use of technology to pre-service teachers with the finding that the students appreciated and liked the course but did no better in their assessments than those who had studied face-to-face. Likewise, Rawlins and Kehrwald (2014) integrated technology into a teacher education course in New Zealand with the aim of modelling its use to students. In addition to this, their study attempted to evaluate the ability of technology to facilitate a move away from teacher-centred, didactic approaches towards a more student-centred approach. Their findings were that the inclusion of technology on its own will not change pedagogical approaches but it does offer the opportunity to enhance student-centred learning. This is of significance to this study due to the way that UPLs typically give precedence to face-to-face teaching and do not offer opportunities for online interactions as part of the formal course structure despite the provision of a VLE capable of doing so.

Another theme which is evident in the literature reviewed is research into the effectiveness of course designs which move either towards blended approaches or fully online approaches. An example of this is the work by Young and Lewis (2008) who explored student satisfaction with an online teacher education course in the USA. Their findings were that such an approach was not at odds with student satisfaction but it is worth noting that their reasons for conducting the research were led by a desire to try out the use of technology, rather than being driven by a pedagogical belief that it would lead to better outcomes. This research is not typical though, a contrasting perspective is provided by Harrell and Harris (2006) whose research (also based in the USA) was grounded in a desire to widen participation by making teacher education available to those who were unable to travel to a campus or for whom travel to a campus was inconvenient. Their findings were that such an online course was successful in attracting a different profile of learners to their course. This is of interest as the SD course is structured in response to the geographical constraints of the area however, rather than adopting an online structure, it has chosen to adopt a dispersed face-to-face approach.

The history of research investigating blended and online teacher education courses is extensive as the work of Breuleux et al. (1998) illustrates. They explored the possibilities of establishing networks of teacher education using online tools, perhaps unsurprisingly given

the year of their research took place, they concluded there was still a lot of work to be done in this area. Delfino and Persico (2007) undertook a five-year study exploring the effectiveness of different combinations of face-to-face, blended and online delivery patterns of a teacher education course. Aside from their findings that, through effective design, it was possible to achieve comparable outcomes for students, it is noticeable that the decision to undertake such a long-term piece of research was driven by a desire to establish if it was possible to move teacher education online rather than to achieve a stated pedagogical goal.

One study of particular interest is that of Hramiak (2010) who developed an online community using a tool embedded within a VLE in order to support students while they were on placement by reducing the isolation that is sometimes experienced. The finding was that this was positively received by students. The relevance of this is that this was an institutionally provided tool that was adopted by students, this is in contrast to this study where the online community is a student-created one and it excludes tutors. This might suggest that it is the provision of an online community for students to participate in while on placement (or otherwise) is something that pre-service teachers frequently desire and that there is little significance attached to who provides it. However, the establishment of effective online communities is not easy as Carr and Chambers (2006) discovered when they offered online environments in which student teachers could share experiences and resources. These were not received positively due to a feeling by the participants of a lack of common purpose indicating that simply providing an online space is not adequate, rather students must feel a common purpose with the other users if they are to make use of it.

In summary, there have been a number of attempts to move teacher education online or partially online. In some cases, these have been driven by pedagogical goals or by widening participation goals. However, in other cases they have been as experiments to see if it is possible. Another aim of research into the role of technology in teacher education has been a desire to model the use of educational technologies to students in order that they might subsequently be more confident to adopt it in their own practice.

What is missing from this literature are studies that look at the place of NL within teacher education or the way that students self-select technologies to support interaction and group cohesion. In other words, having built a blended or online course, most studies have evaluated either student satisfaction or outcomes. They have not attempted to explore the way in which the technologies used have played a role in supporting interactions between learners.

2.3 Blended Learning

Whilst the focus of this study is not to explore the design or impact of blended learning on the course, it cannot be ignored that the course mixes face-to-face teaching with resources located on a VLE and so falls into the category of blended learning provision. Thus, a review of research which has explored different aspects of blended learning will be included in order to provide an overview of how it can impact on the process of teaching and learning. In addition, it is one of the ways in which students will interact with artefacts as some of these are provided via Blackboard. Many of the sources reviewed related to blended approaches to teacher education courses but not exclusively so in order to provide an additional, external perspective.

What is clear from the sources reviewed is that there are a number of ways in which provision can be blended. A range of different approaches have been advocated or trialled which helps to emphasise the different ways in which courses can be structured to provide a blended experience for learners. Gorghiu et al. (2014) propose that there are four roles that technology can play which are: as a communication tool, as a source of knowledge, as a mediation tool or as a visualisation tool. Cheng and Chau (2016) also suggest that there are four roles that online provision can offer, their categories are: information access, interactive learning, networked learning and materials development. It is easy to see the correlation between the categories 'source of knowledge' and 'information access', likewise it is not too difficult to see that there is an overlap between 'communication tool' and 'networked learning' but the other categories do not have direct matches which would suggest that different roles are being discussed in each case.

Motteram (2006) used a combination of web based content which was combined with online discussion in his work with practicing teachers engaged in professional development. Donnelly (2006) drew upon a mix of face-to-face teaching which was combined with online problem based learning in her work with student teachers. Both cases emphasising how different blends can be used. A similar approach was adopted by O'Bryne and Pytash (2015) who mixed face-to-face teaching with online instruction, here the difference lies in the nature of the online element which is based on instruction rather than students interacting through discussion. A different perspective on the relationship between face-to-face elements and online elements is provided by Thompson (2015) who discusses the growing use of flipped approaches to teaching and learning where learners access content online in

order to make face-to-face interactions richer and deeper. This is clearly a contrast to the examples discussed above where the discussion and interaction is taking place online. In addition to using blended environments for teaching, some studies have explored how it can be used for assessment. One such example is by Ajjawi et al. (2013) who used it to good effect to support teacher feedback and dialogue via a journal tool.

There are a number of reasons why blended learning approaches are advocated which are rooted in the claims made about it. Shen et al. (2013) argue that it can lead to improved teacher education by providing increased accessibility to learning and better quality. Poon (2013) believes that face-to-face and online provision complement each other whilst Chou and Chou (2011) argue that blending can lead to increased efficiency. Indeed, writing back in 2000, Navarro and Shoemaker (2000) claimed that learning can be just as effective online via the use of content, assessment and discussion. Such varied claims will evidently drive pedagogical choices and lead to the provision of blended provision which seeks to emphasise the perceived benefits. In response to this, some authors such as Wikeley and Muschamp (2004) argue that there are no new ways of learning, just effective pedagogy in a new context, or O'Bryne and Pytash (2015) who put forward the case that pedagogy should drive choices about the use of technology. An example of the way in which pedagogical beliefs have driven course design choices is provided by Wasoh (2016) who found eight different reasons why tutors chose to blend courses. Out of the list of eight, flexible access to materials, supporting face-to-face teaching, communication, and student-centred learning approaches are the most relevant to the course at the centre of this study.

Following on from the claims about the impact of blended approaches and tutors' pedagogical beliefs are those studies which have explored the impact that blended approaches have. These present a mixed picture. For example, Hickey et al. (2015) found that there was no difference in learning when comparing face-to-face approaches with blended ones. A less neutral finding is presented by Price et al. (2007) who noted, in a comparison of online and face-to-face tutoring that the online version was less good. However, Aspden and Helm (2004) found that the provision of technologies within a blended course helped to bridge physical gaps between students and their tutors, their institution, and their peers. Further support for blended approaches is provided by Bicen et al. (2014) who found that students appreciated being able to contact their tutor and to have

the opportunity to revisit materials when needed. Some studies found mixed outcomes, one such example, is that of Shen et al. (2013) who noted that a blended approach allowed for learners to learn at their own pace and place but found that limited interaction led to less effective outcomes and that the workload involved for learners could also be a negative factor. An interesting outcome is presented by Akkoyunlu and Soylu (2008) who found different levels of student satisfaction in relation to web based learning materials, interaction and face-to-face learning depending on the learning style attributed to the students but also found that these differences in student satisfaction did not translate into differences in learning outcomes.

Several studies have looked at the role of the tutor in blended environments. Vaughan and Garrison (2005) argue that when blended learning is used, it is important for the tutor to have a higher presence online than they would otherwise have in a face-to-face situation. A similar finding is presented by Paechter et al. (2010) who found the tutors' role to be of prime importance in learning outcomes due to the role it plays in supporting interaction. The role that tutors play in interaction was also noted by Wu and Tennyson et al. (2010) who found that it impacts the learning climate with a subsequent impact on student satisfaction, a comparable finding is presented by Sun et al. (2008). Further support for the importance of the tutor role in interaction online is provided by Paran et al. (2004) whose participants, when engaged in a course utilising online tutor interactions, expressed a desire for more interaction with their tutor.

Another aspect of blended learning is the relationship between the online and face-to-face elements. El-Deghaidy and Nouby (2008) found that greater familiarity in the real world led to better quality interactions online. Likewise, Donnelly (2006) found that a strong social aspect was needed if online constructivism was to be effective. However, questions over the appropriateness of online provision for deep learning are raised by Paechter and Maier (2010) who found that students valued face-to-face interactions rather than online ones if the desired outcome was meaningful learning.

In summary, in the literature reviewed there are a range of different ways in which courses can blend online and face-to-face provision and there are some mixed opinions about whether these bring benefits or not. What might be concluded is that one should not look to technology to bring about benefits, rather technology should be used to support the pedagogical approach of the course. Where courses have a pedagogy that attempts to use

online approaches to support interaction, it would seem that the tutor role is important in this and that online relationships are strengthened by face-to-face ones. It also demonstrates that, although the course could be described as minimally-blended, in that it is primarily a face-to-face course that is supported by VLE based content and online assessments, this is not an unusual approach. It aligns with findings that suggest that students prefer face-to-face for deep learning and also takes account of the heavy workload of students on such an intensive course by keeping the online content light.

What is not present in this literature is any detailed exploration of the relationship between blended learning environments and NL or the social aspects of student learning. In other words, these studies have explored blended environments as entities in themselves and there do not appear to be any which look at a blended environment through a NL framework. Likewise, there do not appear to be any which look at the way that social aspects of student relationships play out in a blended environment.

2.4 Social aspects of learning

The research question for this study and its related sub-questions relate to students' use of technologies to support learning and thus a clarification of the inclusion of a review of literature on the social aspects of learning is needed. As earlier research (Toyn 2015a, Toyn 2015b) has found, students typically make use of SNS in the form of a closed-group while on the course. The content of the posts to these SNS groups includes discussions of academic content but significant proportions of it are social in nature. The relationship between these social exchanges and learning will form an aspect of this study.

Smith and Peterson (2007) state that there is over 20 years' worth of understanding that student interaction influences achievement. They propose that this lies in the links between conversations based on tasks or emotional matters and outcomes in the form of grades. As this study is concerned with students' use of technologies, then it is appropriate to focus on online sociability as well as the wider benefits of social interaction on student outcomes. Several authors address the bridge between the two. For example, Beldarrain (2006) found that interactivity is a necessary ingredient of successful learning and that technology can facilitate interaction and collaboration. In a similar vein, Balakrishnan (2014) found that the use of SNS by students resulted in them self-reporting benefits for their academic outcomes and learning. Similarly, Kreijns et al. (2013) found that a key element in collaborative learning was social interaction and that social spaces where trust, a sense of community and

interpersonal relationships can be developed are all essential features needed to develop effective interaction. They also make the point that effective groups are close and friendly, adding further weight to the importance of social relationships on learning.

With the exception of work which looks at SNS (which is covered elsewhere in this literature review), much of the work in this area looks at the role of social interactions that take place in online learning environments. On the one hand, this is of limited value as students on this course do not engage in any online discussions as part of their learning, however the area of social presence is relevant to this study due to the way it helps understand what it is, how it is developed and the role it plays in learning. In other words, the social presence that students develop via SNS can be translated to their face-to-face interactions as well as being an affective element of their learning.

Social presence is the extent to which people are able to express and present themselves online. It is often considered as part of the community of inquiry model that argues that the intersection between social presence, cognitive presence and teaching presence is where learning takes place in online environments. For example, Garrison et al. (2000) found that social presence supports cognitive engagement by indirectly facilitating critical thinking and that it has a direct impact on student enjoyment, persistence and fulfilment. They also claim that a sense of community amongst learners is needed for higher order thinking to take place and that the socio-emotional support of other learners is essential for meaningful and worthwhile educational outcomes. Whilst they were discussing online communities, the link between support, community and learning can be applied to settings where the interactions are online but relate to face-to-face learning settings.

The relationship between face-to-face communications and online sociability is explored by Rourke et al. (1999) who were evaluating the role of social presence in a CMC course through the lens of a community of inquiry framework. They recognised that the sorts of cues that take place in face-to-face communication are often not facilitated through technological communication tools and so users need to adopt alternative approaches in order to establish a warm, open and trusting environment. They classified these approaches into three broad areas: affective, interactive and cohesive elements. This framework is the one adopted by this study and is discussed in more detail in section 5.3.3. It is not the only framework that exists to categorise social presence, an example of an alternative would be Sung and Mayer (2012) who noted that respect for one another, sharing, social identify and intimacy were all elements of social presence.

Further work exploring the impact of social presence was carried out by Bentley et al. (2015) who found that social presence was linked to three aspects of the quality of online learning, namely: participation, engagement and satisfaction. If the assumption that online interaction and development of social presence can be translated into face-to-face participation and engagement then this finding is of relevance to this study. Other studies which report of the impact of social presence include Wegerif (1998) who found that collaboration was central to feelings of success or failure; Richardson and Swan (2003) who found links between social presence, outcomes and satisfaction, and Kehrwald (2010) who found it was essential for online learning as it enabled and promoted social activity.

Kehrwald (2010) also found that effective use of technologies creates an illusion of direct experience and that a strong social presence narrows the gap between direct experience and interactions that take place online. Studies by Kear (2010) and Kear et al. (2014) both promote approaches that tutors can take to foster social presence. This is of relevance to this study as it supports the idea that the student use of SNS is a way for them to establish social presence online in a way which is similar to their face-to-face interactions and allows them to transfer the benefits of online social presence to their face-to-face experiences on the course. It is also of relevance due to the absence of tutors in students' SNS groups, particularly in relation to the finding by Stacey (2002) that up to 50% of online communications between students were social and the relevance of tutors in creating such environments. Aragon (2003) also explored this interplay and argued that the goal of social presence is to establish a comfortable environment in which learners are at ease amongst others. By doing so, it will sustain learning and make interactions more engaging. He also found that around 25% of interactions in an online learning environment represented the development and maintenance of social presence. This indicates that even in fully online learning environments, it is not unusual for significant amounts of interaction to be devoted to developing strong interpersonal relationships. Further exploration of the value of such interactions was carried out by Abedin et al. (2012) who looked at the value of non-task interactions. Unlike this study, they were looking at a fully online course but their finding that social interaction played a strong role in effective participation through allowing students to bond with one another and reducing feelings of isolation is relevant to SD students who spend significant amounts of time apart from one another.

In addition to the research discussed above which is primarily concerned with social presence, there is a body of work which spans the fields of social presence and NL. For example, da Silva and Siqueria (2016) explored the relationship between social presence and NL, in particular through the use of social network analysis (SNA) (discussed in detail in section 4.6.1). Their work looked for correlations between the density of social presence indicators and SNA measures of density and betweenness but found that such links were not clear. On the basis of such findings, Satar and Akcan (2018) attempted to provide clarity on such connections but found comparable outcomes. They did note that there are some links between the two, but these were not conclusive. Likewise, Lowenthall and Dennen (2017) found that social presence is not a factor of the volume of contributions in learning networks, rather the key factor is that participants share identity cues. All of these studies highlight the importance of social presence. It is this, combined with the difficulties in capturing the impact of social presence through SNA that provide a justification for the focus on social presence within this study. This is highlighted by the work of Swan (2005) and Hostetter (2013) whose work identified links between social presence and learning outcomes.

The connection between social presence and learning in a network was explored by Yilmaz (2017) in relation to the way that social presence builds knowledge sharing behaviours. It was found that social presence played a significant role in such behaviours in online learning environments. If such a finding can be extended to apply to a blended environment that is further justification for the importance of a focus on social presence within this study. Indeed, a similar approach was taken by Leafman et al. (2013) who looked at the way that students created their own SNS groups, as part of an online course, when the virtual learning environment did not facilitate the development of social presence indicating that the approach of participants in this study is not unique.

In summary, there is a lot of support for the significance of interpersonal relationships on learning. Much of the literature reviewed has explored how these relationships impact outcomes in online courses and found that there are several measures of outcomes that benefit. The literature has also highlighted how there are some connections between social presence indicators and social network analysis measures however, it appears that these are not robust.

What is missing from this literature is an understanding of how online social presence is established and relevant to learners in a blended course that is only minimally blended.

2.5 SNS within higher education

When considering research and literature relating to the role of SNS within higher education, there are three broad areas. Firstly, there is work which has looked at the use of SNS as VLEs, in other words as locations to host formal teaching and learning activities. Whilst these are not directly related to this study, a sample of them will be reviewed as they set the scene for the second area. This concerns the use of SNS by students as a social tool, in other words how learners make use of SNS to establish and maintain social bonds which are not directly related to learning activities. This area is relevant as the participants make use of SNS and an aspect of this will be social. However, not all of their SNS will be social which gives relevance to the final area; that of SNS as a third space or a place which is not for formal learning but is not purely social and provides a medium for interactions related to learning or around learning.

2.5.1 SNS as a VLE

There have been several attempts to explore the value of using SNS as a VLE, in all the cases reviewed, the SNS has been Facebook, probably as a result of its widespread adoption by students. The reasons for such explorations are varied with some, such as Meishar-Tal et al. (2012) suggesting that the reason for adopting the use of Facebook as a VLE is in order to overcome the pedagogical challenges of using it effectively. Others such as Shaltry et al. (2013) who used Facebook with a group of undergraduate teachers did so because they believed it would help them to not only learn via Facebook but that it would model how technology could be used in teaching with the aim of replicating it in classrooms. However, a more commonly cited reason is to be able to draw upon the way that SNS facilitate interactions and discussions between members and to utilise this as part of interactive teaching approaches.

Some research like that adopted by Meishar-Tal et al. (2012) has attempted to fully replace the functions of a VLE within a SNS. In this example, it was found that it did support effective communications with tutors and helped to facilitate a personalised approach to learning but because it was not designed with course management capabilities in mind, it was not always easy for students to locate resources. The issue of online resource management is covered in the review of literature by Tess (2013) who found that Facebook did not support the upload of common document formats such as PDF files or PowerPoint files. A secondary issue cited by Meishar-Tal et al. (2012) relates to concerns among students of privacy with regard to

sharing a social space with tutors. This is not uncommon as it was also cited by Miron and Ravid (2015) and Baran (2010).

There have been a range of findings relating to positive outcomes. These include: knowledge sharing (Baran 2010), greater engagement in discussion activities (Nkhoma et al. 2015), increased levels of interaction between learners (Karimi and Khodabandelou 2013). But, as has already been stated it is not always clear what the incentive was for tutors to attempt to use SNS as a formal learning environment. An example of this would be Nkhoma et al. (2015) who appear to have replicated the discussion board feature of a VLE for the purpose of establishing if it is possible to do via SNS.

When students have been consulted about their views of the use of SNS for formal learning activities or in place of a VLE an interesting pattern appears to emerge. This is illustrated by Cabero-Almenara and Marin-Diaz (2014) who found that students would report that they can see the value of SNS as part of their learning environment in theory, but responded less positively in relation to actually agreeing to adopt it in their own learning. This finding is aligned with the outcomes presented by Irwin et al. (2012), but the students in this survey did agree that it had potential to encourage collaboration. A study of a similar nature was conducted by Wong et al. (2015) who looked specifically at students' willingness to use mobile SNS applications within their learning. The potential to support collaboration and interaction was explored by Pilli (2014) who argue that the existing social networks support such collaboration. A comparable finding is presented by Miron and Ravid (2015) who noted that the collaboration that took place blurred the boundaries between on-task interactions and interactions of a social nature.

In summary, research which has looked into the application of SNS as a VLE has been mixed, this is a finding supported by the literature review carried out by Manca and Ranieri (2013). It cites a number of benefits to such approaches but frequently these are tempered by issues relating to the technical ability of SNS to fulfil all the functions of a VLE or by issues of privacy and a separation of learning from social activities.

What is missing from this literature are studies that present a clear pedagogical rationale for attempting to use SNS in the role of a VLE. In all cases, the SNS was created or managed by the tutor and this highlights another gap in this body of work which is the use of SNS which is managed by students. This area will be discussed subsequently.

2.5.2 SNS as a social tool

An interesting observation when reviewing literature for this element was that alongside the studies which have looked solely into students' social uses of SNS there are those that have looked at the potential for SNS to be used for teaching purposes (as per the preceding section) or the overlap between students' social uses of SNS and academic uses (as per the following section).

Donlan (2014) found that undergraduate students would typically make use of SNS for staying in contact with friends or making social arrangements. This was a finding echoed by Madge et al. (2009) who also found that undergraduate students would use SNS to make contact with others prior to starting at a new university. They also found that the majority of contacts that students had via SNS were with people who the students knew in real life, in other words there were very few instances of students having connections that were only virtual.

In addition to the findings relating to the patterns of SNS use are studies that report on the relationship between SNS use and learning. Distraction or procrastination was found to be regularly cited by students as a negative impact of SNS, for example Fewkes and McCabe (2012) found this to be reported among high school students, Madge et al. (2009) reported that undergraduate students perceived SNS to be a distraction as did Blankenship (2011) and Petrovic et al. (2013). A related finding was presented by Kirschner and Karpinski (2010) who looked into the relationship between SNS use and grade outcomes. They found that higher levels of SNS use were associated with lower grade outcomes.

The frequency of SNS which was an aspect of the work by Tkalac Verčič and Verčič (2013) who found that the majority of the participants in their study used SNS daily. This was seen as an opportunity to facilitate greater interactions with tutors however, in their study very few of the tutor participants were SNS users meaning that the effectiveness of such a communication channel could not be researched. This pattern of low SNS usage by academic staff was also found by Manca and Ranieri (2016) who also found that of tutors who did make use of SNS, very few were willing to use it to interact with students. The disparity of use was also reported by Soomro et al. (2014) whose study of student teachers and their tutors found high levels of use by students whose main motivation for using SNS was social. It also found that those students who made higher use of SNS were more likely to see the potential for it having a role in learning.

The overlap between SNS as a social tool and its role in supporting learning is a feature of a number of studies. Some authors, such as Abbasi (2016) writing in opinion pieces, are particularly enthusiastic about the potential that this offers but those who have carried out research in the field tend to find more mixed outcomes. For example, Belangee et al. (2015) found that the responses from undergraduate participants in their study about a range of questions relating to SNS use gave the highest levels of agreement to the statement that SNS has the potential to contribute to learning if students and tutors are both online. Research by Lin et al. (2013) into SNS spaces shared by tutors and students found that students were happy to be recipients of information sent by tutors but rarely forwarded or shared this with others and were even less likely to share information of their own. This indicates that the students were not viewing the SNS use as a collaborative learning network. This parallels the work of Rap and Blonder (2016) whose use of SNS was a little more formalised. They established groups with the hope that they would be used to support chemistry learning. However, one outcome was that students tended to use the groups for social purposes rather than learning interactions. On a similar theme, Donlan (2014) found that students reported a willingness to accept the idea of SNS being used to interact about academic work but a resistance to doing so in practice and didn't access the academic content posted by tutors.

Where students' social use of SNS has crossed over into academic use, there are some noteworthy patterns. Firstly, the finding by Donlan (2014) that students used SNS to interact with one another to discuss forthcoming assessment activities even if they didn't regard this as learning. Likewise, Vivian et al. (2014) found that students would make greater use of SNS at times of greatest course activity, for example, when assessments were due but this use was still secondary to the social use of SNS which dominated their interactions.

In summary, this research highlights the importance to students of using SNS to establish and maintain social bonds. These online interactions typically reflect the social relationships that students have in real life and focus on keeping up to date with what one another are doing and making social arrangements. Whilst this is important to students, many see SNS as a distraction that impacts on their studying and some research has found that greater SNS use is associated with lower outcomes. Students are not averse to using SNS to discuss learning related issues and this is frequently linked to assessment activities even if students do not always regard the interactions as learning related. Finally, students have been found to show resistance or apathy to attempts by tutors to engage and interact with them in what they regard as their social space.

What is missing from this review of research is an understanding of the value that social interactions play in helping to motivate students, helping them to build social bonds that they can draw upon in face-to-face learning scenarios and the way that social use of SNS crosses over into learning related interactions. This final point will be considered in a little more detail in the next section.

2.5.3 SNS as a third space

This is an area where the body of literature is not very broad. The use of the term 'third space' follows from the work of Aaen and Dalsgaard (2016) who used the phrase to describe how Danish school pupils would use social media to support one another with homework and assignments. It reflects the fact that it is not being used as an educational space (as discussed in 2.5.1) nor is it solely being used for social purposes (as in section 2.5.2) and that it is being used somewhere between the two. In previous work, Dalsgaard (2014) had noted how widespread this use of SNS was amongst Danish pupils, particularly when they were self-organising to support one another to help with homework. It was noted that SNS has the potential to help support peer-to-peer learning with a key feature being the absence of a teacher.

Other work of a similar nature has found comparable outcomes, for example, Lampe et al. (2011) also found that students would use it make arrangements and to organise around class based activities. It is the interplay between face to face teaching activities and the use of SNS in supporting this that is of particular interest to this study. The impact of SNS amongst undergraduate students in Sweden to help them understand academic norms and complete tasks was the focus of work by Cuesta et al. (2016) and it was found to be a valued tool for this by the participants.

The work of Selwyn (2007 and 2009) also looked at the way that undergraduate students used SNS and noted the distinction between social interactions and interactions related to learning. The learning related interactions were classed the sharing of practical information such as times or locations of lectures and the exchange of academic information. Whilst both of these were used to a limited extent, they were both felt to form an important and valuable element of the university. These findings are frequently referred to by other researchers in this field who have come to similar conclusions such as Junco (2011) who noted the wide variety of ways that students use SNS for social purposes but also found that these were supplemented by uses of SNS that had an impact on academic outcomes. It was found that SNS interactions could have a consequent impact on face-to-face learning

through strengthened social interactions. The place of social friendships and the unity of class cohorts in response to SNS use was a finding of Kio and Negreiros (2013) in a study of undergraduate students in Macao. Likewise, Manasijevic et al. (2016) found a positive regard for the value of SNS friendships in relation to real-life friendships and classroom interactions and discussions.

As has been mentioned, all of these positive findings relate to SNS where the teachers are absent. To highlight the importance of this it is worth considering the findings of Sendurur et al. (2015) who found that SNS was widely used to keep in touch with friends and to maintain existing friendships. They also found that a significant majority of participants viewed the idea of interacting with tutors via SNS in a negative way.

In summary, there have been a number of studies that have researched the role that SNS can play for learners as a third space. This can be described as a space which is not part of the formal learning environment, nor is it entirely social; rather it exists somewhere between the two. They are characterised as being student created spaces where tutors are absent. Whilst they do not typically host in-depth or deep learning related interactions, they are considered to be important places that play a positive role in student outcomes and any related face-to-face learning interactions.

What is missing from these studies is an application to the context of student teachers or post-graduate students. Also, these studies have focussed exclusively on the role of SNS as a third space meaning that the bigger picture of interactions within a NL environment have not been considered nor have they explored in great detail the role that the non-learning related interactions play in group cohesion.

Having reviewed literature relevant to the context and research question the next section will provide an overview of the research design which will include an outline of my ontology and epistemology, which will, in turn, provide a justification for my research design choices and will show how they are aligned with my research context.

Chapter 3 Research Design

Clough & Nutbrown (2012) provide a metaphor for methodology and methods based on cooking. They suggest that research methods are like the ingredients whilst methodology is the reason for choosing a particular recipe. They continue by stating that the starting point should be the research question (Clough & Nutbrown, 2012 p34) and from this an appropriate methodology can be selected: "a methodology shows how research questions are articulated with questions asked in the field. Its effect is a claim about significance" (Clough & Nutbrown, 2012 p36). Whilst they note that definitive definitions of methodology are hard to come by, they suggest that a common aspect is that of *justification*; in other words, it provides a justification for the research design and attempts to articulate assumptions that have been made.

The first assumption that needs to be articulated is that of philosophical stance on the nature of reality. Savin-Baden & Howell Major (2013) propose that this begins with a twofold split of ideas between those who take a realist perspective that reality exists and that researchers may be able to find this reality, and those who come from idealism and believe that reality is a subjective entity that is constructed within the mind. Stake (1995 p37) also discusses this and articulates it as a difference between knowledge discovered and knowledge constructed. Likewise, this split is also explored by Cohen et al. (2011) who phrase the distinction in terms of the location of social reality. Either it exists in the world and is objective or it is a result of individual cognition and thus subjective. Having identified and discussed this, Cohen et al. (2011) propose that the next assumption that should be addressed is the means by which knowledge of social reality can be ascertained. In simple terms, if a researcher has the belief that reality is objective, hard and fixed then they will need to adopt a position as an observer in which they are seeking to uncover this reality. Whilst a researcher who believes in a subjective reality will naturally tend towards approaches that involve engagement with research participants.

Both Cohen et al. (2011) and Blatter & Haverland (2012) locate positivism firmly in the realm of objective reality. Broadly speaking, it employs what is known as the scientific method as a tool to uncover laws which underpin or explain objective reality, frequently seeking explanation in the form of cause and effect (Stake, 1995). This is the use of empirical observations which are combined with attempts to falsify beliefs as a way to eliminate unwarranted beliefs (Blatter & Haverland (2012, p10). In contrast to positivism, different opinions are presented regarding the approaches that are aligned with a subjective

perspective of social reality. For example, Cohen et al. (2011 p17) present post-positivism and anti-positivism being aligned with three schools of thought "phenomenology, ethnomethodology and symbolic interactionism". These all share a common theme in that they are concerned with phenomena or experiences of events and the qualitative experience of these. However, Blatter & Haverland (2012) put forward two schools of thought that lie outside of positivist approaches (but not included in Cohen et al.'s classification). The first of these they label as constructivism / conventionalism and critical theory. These are grouped together because of their common belief in the role of interpretation and communication in the generation of knowledge. These are both held to have a stronger influence than sensory impressions because of the way that pre-existing frameworks shape the way that sensory impressions are processed. They point out how such areas of thought originated in phenomenology. Unlike Cohen et al. (2011), Blatter & Haverland (2012) outline a third epistemological standpoint which they term pragmatism / naturalism and critical realism. This might be thought of as a middle ground as its adherents assume that there is an objective social reality outside the mind of the researcher but the way to discover this is not through sense observations. Nor does it seek to establish law-like patterns between variables. Rather it acknowledges that universal laws are not appropriate for its world view and that either explanations of specific cases or contingent generalisations are what can be achieved.

Further distinctions are proposed by Savin-Baden & Howell Major (2013) who offer a scale of positions between objective and subjective reality with corresponding ontological and epistemological positions. They offer: critical social theory, pragmatism, phenomenology, post-structuralism, social constructivism and constructivism as research approaches representing the range from most objective to most subjective. Many of the paradigms which fall outside of positivist approaches can be classified as interpretivist, where the researcher attempts to construct an understanding of reality by interpreting the understanding of those involved in the area of study (Thanh & Thanh, 2015).

Having outlined some relevant distinctions in ontology and epistemology, it is possible to place my beliefs and the approach of this research within this framework. Firstly, I am of the belief that social reality is constructed by the interactions of those within and I seek to understand how students are experiencing their learning within a network and how they use technologies to support this. As Savin-Baden & Howell Major (2013, p64) confirm, such an ontology is matched to research which aims to delve into the creation of social reality. As I believe that the social reality of the participants is socially constructed, it follows that I

expect these social realities to vary between different groups of participants and that I should not expect to find universal truths, rather I must aim to interpret their experience of this.

As mentioned, my interest lies in using a Networked Learning model to explore the use of technologies that support learning by students who are studying for a PGCE with QTS. It follows that I am seeking to understand the experience of the students concerned and this is aligned with an interpretivist perspective. A further point that can be drawn from my interest relates to the generation of understanding of how students are operating within a network and as such it would be fair to propose that the interactions of the students are of interest and it is their co-constructed experience of the phenomena that is important. This aligns the research question with a social constructivist ontology. The research question is "How do technologies support SD student learning on PGCE with QTS within a Networked Learning model?"

It is worth reiterating some of the key aspects that need to be taken into account. Firstly, that the research question is not seeking to establish general laws or rules which govern an objective reality. Rather, it aims to understand and interpret the socially constructed reality that arises from students' experience of the phenomena of networked learning and the role that technologies play in supporting this. This is crucial to the choice of research design and has led to the selection of case study; as Thanh & Thanh (2015) point out, case studies are frequently used in qualitative studies by interpretivists.

3.1 Case study

Case study appears to sit in a middle ground between methodology (Blatter & Haverland, 2012, p15), research strategy (Eisenhardt, 1999) and research method (Yin, 2014, p15, Fidel 1984) whilst Van Wynsberghe & Khan (2007) argue that it is neither of these. However, it is not the aim of this work to provide conclusion to this discussion. It is the aim of this section to justify the choice of case study in relation to the points previously made and to articulate the design choices that have been made. As the research question is concerned with the co-constructed social reality of student experience then an appropriate design is needed to provide insight into this. This point is articulated by Clough & Nutbrown (2012) who make the point that such choices are crucial as the decision to collect information of one particular type will be at the expense of others. The example they cite is of a large scale, quantitative survey which will omit qualitative information about the experience of participants. This means that an approach is required which will employ methods of data collection that

provide rich, qualitative data about the students' experience of the role that technologies play in their learning in an NL context.

Hyett et al. (2014) compare the views of Stake (1995) and Yin (2014) pointing out that the former sees case study in an interpretative paradigm whilst the latter comes from a post-positivist perspective. Stake's (1995 p44) position as an interpretivist is illustrated by his argument that case study does not aim to test hypotheses, it aims to see what is there. Others such as Thomas (2013) also see case study as sitting firmly in the interpretative frame. Whilst this study sits in an interpretative paradigm, the views of Yin (2014) will be influential given his status in the world of case study research. Indeed, David (2007) argues that a strength of case study research is that it is flexible and can be applied to many situations whilst VanWynsbergh & Khan (2007) propose that it is transparadigmatic.

Blatter & Haverland (2012 p18) propose that there is little consensus about what case studies are, this argument is supported by Cohen et al. (2011 p289) who provide an extended discussion of different perspectives. Stake (1995 p2) proposes that a case is a "specific, a complex, functioning thing". However, all concur on the point of view that they are empirical studies. Yin (2014 p16) puts forward the opinion that they are concerned with investigating a phenomenon within its real-world context and that the focus of them is suited to situations where the phenomenon and its context are intertwined. Stake (1995) makes a distinction between intrinsic and instrumental case studies. In the former, the researcher has an intrinsic interest in the case whilst the latter relates to cases where something needs to be accomplished. Blatter & Haverland (2012) make a related point as they propose that they are case-centred and that there is an interaction between causal factors and the context. These ideas could be paraphrased by the comment that Cohen et al. (2011 p289) make that they are "a study of an instance in action". All of these perspectives align with the research question at the heart of this study which intends to use empirical data to explore a phenomenon and to attempt to identify the reasons for the phenomena that stem from the context, or as Blatter & Haverland (2012 p18) put it "the causes of effects [rather than] … the effects of causes".

Having presented an argument for the appropriateness of a case study to the research question this study is based on, a next step is to define and bound the case (Yin, 2014, p31). Stake (1995 p2) also addresses the issue of bounding the case and offers a straightforward approach which is to say that a bounded case is an integrated system. Additional detail is provided when he says "people and programs clearly are prospective cases. Events and

processes fit the definition less well". A further step which arises given the nature of this study is to define the case in as to whether is it single, embedded or multiple in nature.

The bounded case under study is of students who are studying a PGCE with QTS via a SD route during the academic year 2016/2017. In addition to this it is concerned with the way that they make use of technologies to support their learning based on a NL framework. Yin, (2014, p31) makes the case for such a specific description of the case in order to avoid the researcher having to cover everything about the case. Subsequently, it is possible to bound the case, that is to set the boundaries of the case. Whilst Yin (2014) clarifies that this is easy when the case is an individual but more troublesome when looking at organisations or institutions it is something that needs to be addressed. In this study, the boundaries of the case are restricted to those students who are studying for a PGCE with QTS through my institution and are doing so through one of the associated SD alliances. The specific cohort of students relates to those that began their studies in September 2016. Such a bounding is aligned with the criteria that Cohen et al. (2011) propose that they are set in contexts that allow for bounding of "t*emporal, geographical, organisational, institutional and other contexts"* (Cohen et al*.,* 2011, p290). Whilst this appears a tight bounding, the complexities of such a course inevitably mean that there will be places where the boundary is less clear. The course documentation specifies a target award (that is the award that is the target for all students on entry) but it also outlines other exit awards (awards that it is possible for a student to exit with should they not manage to achieve the target award), some of these do not include the PGCE qualification, or include PGCE at level 6 rather than level 7, whilst others do not include QTS. As students who pursue these exit awards remain with the rest of their cohort they would remain part of the study even though they are not technically bounded by the criteria above. A further possible situation might arise in alliances where a student has intercalated (taken a 12 month suspension of studies) from a previous cohort and returns to the cohort on which the study is based. As with the previous situation, it would not be possible to separate such students from the social co-construction of reality and their experience of the phenomenon so such students, should they arise, will form part of the study.

As the case is defined as the students studying within the course this raises another area that warrants discussion due to the fact that there are numerous SD alliances that work in partnership with my institution. Thus, consideration needs to be given to whether it is a

single case design or a multiple case design and whether it is a holistic or embedded version of these (Yin 2014, p50). Thankfully, Yin offers guidance about how to differentiate these. Firstly, the distinction between single case and multiple case is best considered in relation to the context. Yin (2014) proposes that in a situation where there is a single context then they should be considered as single case designs. This is the situation for this study as the context is the same for all the students in that they are students on the same course, offered through the same institution. Secondly the distinction between holistic and embedded which is based on the unit of analysis. Yin (2014, p54) provides a structured overview of an embedded, single case design of a Trade Union which is based on units of analysis which are quite varied and include; shops, locals, social environment amongst others. Such a diverse range of units of analysis might seem at odds with the suggestion that this study is an embedded, single case design where each unit of analysis is a different SD alliance. However, it is the fact that each alliance that forms part of the study will be analysed independently from the others that makes it an embedded design. Yin (2014) highlights the need for each unit of analysis to be drawn together in order that they relate to the case as a whole which acts as a reminder that the analysis of each alliance alone will not be sufficient; it will be necessary to draw these together at the level of the case. However, in contrast to this discussion, Blatter & Haverland (2012) argue that due to comparable characteristics, it is not necessary to distinguish between single cases and the study of a few cases.

An additional perspective on the appropriateness of case study research to this study can be gained by considering the rationale and type of study. Firstly, the rationale, which is that this study regards the students in question as a common example (rather than considering them as critical, unusual, revelatory or longitudinal, Yin, 2014, p51). Using the terminology of Stake (1995 p3) the case in question is of intrinsic interest. Furthermore, Yin proposes that case studies can be exploratory, descriptive or explanatory (2014, p238); in relation to these terms and the research question, it is suggested that this is explanatory case study as its purpose “explain how or why some condition came to be” (Yin, 2014, p238). A parallel rationale is provided by Stake (1995 p18) who suggests that a starting point for case study research should be through the establishment of statements that imply cause and effect in order to guide and structure the research. Such a classification is not unique and Cohen et al. (2011) outline a number of different authors and their perspectives on the types of case study that exist. A distinction is made by Thomas (2013) between case studies that are retrospective, snapshot or diachronic; this study aims to provide a snapshot of the current situation. One thing that is common in these, as is present in the “causal-process tracing”

model that Blatter & Haverland (2012, p27) put forward, is that case studies can play an important role for researchers wishing to gain a fuller picture of what is taking place in a case and that this can allow for the case to be related to theoretical frameworks. As this is the aim of this study, it is further support for the appropriateness of case study.

3.2 Methods

Having presented a case for the appropriateness of case study research to this study, consideration will be given to the methods that are typically used by case study researchers and how these will be used by this study.

Yin (2014, p106) proposes six sources of evidence: documentation, archival records, interviews, direct observation, participant observation and physical artefacts, whilst Stake (1995 p60-68) includes observation, description of content, interview and document review as the key sources of evidence available to case study researchers. Interviews are anticipated to form the richest source of evidence as they will provide insight into the participants' perception of the phenomena. As the research question is underpinned by co-constructed social reality, interviews with groups of participants will offer the potential to provide evidence in relation to all three of the sub-questions. In addition to interviews with groups of students, interviews with tutors will be utilised to inform the research question relating to student-to-tutor interactions.

Interviews with groups of students have the potential to offer rich data in relation to all three of the research sub-questions, however, they are likely to be representative of students' use of technologies at the point at which they are conducted. In order to provide a longitudinal perspective on this, a series of student surveys will be carried out which will contain questions relating to all three of the research sub-questions.

The resources for learning which are available via Blackboard are technically virtual resources (rather than physical) but this distinction is unimportant as it their ability to provide concrete evidence of the construction of knowledge which is important. These are easy to access and available to student and researcher alike. Blackboard usage information will be valuable in providing insight into the way that students interact with such artefacts.

One form of evidence that this study proposes to utilise is data from students' SNS discussions as it is anticipated that this will contain information about the way in which students make use of such a tool and the way that it plays a role in their learning. From the outline that Yin (2014) provides, it is not obvious whether this is best classified as documentation or a form of direct observation. However, this need not be an issue as it is

recognised by Cohen et al. (2011) that more than one tool should be used for data collection and that there should be many sources of evidence. Students SNS discussion are expected to form a valuable source of evidence in relation to the research question concerning student-to-student interactions..

It is anticipated that this will be a manageable amount that will prevent the overwhelming that Eisenhardt (1999) cautions against arising from rich and voluminous data. She also confirms that it is possible to add data collection methods part way through the study should the need arise.

Given that there are 14 different SD alliances which share characteristics but at the same time are distinctive from one another, it would be reasonable for a question to be raised about how many of these should be participants in the study in order to fully answer the research question. Blatter & Haverland (2012) suggest that case studies are small-N in that they do not need to rely on large numbers of participants and that it is the quality of the data which is important. This point is echoed by Stake (1995) who offers the reminder that case study is not sampling research. Thomas (2013) puts forward three criteria for judging which cases should be included: those to which the researcher is connected, those which are good examples of the typical and those which are outliers. Indeed, Cohen et al. (2011, p290) point out that a key characteristic of case study research is that it is descriptive and detailed. Both of these points of view indicate that it is quality of data that is important rather than how much data is collected. However, in order for the research question to be answered, the data needs to be relevant. It is for this reason that purposive sampling will be drawn upon in order to select cases that are representative of the cohort (and subsequently that the research question is representative of other cohorts). It is proposed that five groups will be sufficient to strike the balance between representing the cohort as a whole and keeping the volume of data to a manageable level.

Building on the discussion above and considering the research question:

> *How do technologies support SD student learning on PGCE with QTS within a Networked Learning model?*

In relation to its three sub-questions:

> *How do students make use of technologies to support student-to-artefact interactions?*
>
> *How do students use technologies to support student-to-tutor interactions?*
>
> *How do students use technologies to support student-to-student interactions?*

It is possible to present an overview of the research methods adopted and their relationship to the research question. Table 1 presents an overview of the five data collection methods that have been selected and shows how each of them relates to the three sub-questions. It can be seen that each of the sub-questions will be able to draw on a variety of data to help triangulate and build an informed understanding of the response to the question.

As there are five participating groups, there will be four tutor interviews (as one of the participating groups is my own). The groups range in size from 12 to 20, thus the number of participants in each group interview will depend on groups size and the number of students who have chosen to participate in each group.

	VLE usage data	Tutor interviews	Student group interviews	Student surveys	Student SNS content
Student-to-artefact interactions	✓		✓	✓	
Student-to-tutor interactions		✓	✓	✓	
Student-to-student interactions			✓	✓	✓

Table 1: Research question and data collection methods

Further details of each data source are discussed in relation to ethical concerns (section 3.4) and in Chapter 4 where the data is presented.

3.3 Limitations

Flyvbjerg (2006) presents a robust defence of case study research against five common misunderstandings that are frequently levelled against it. Many of these critiques arise from conceptions of what research is and how it contributes to understanding that are rooted in positivist approaches. In his article, Flyvbjerg, defends case study research against the following misunderstandings:

- *General, theoretical knowledge is more important than concrete practical knowledge,*
- *One cannot generalise on the basis of an individual case,*
- *The case study is not useful for generating hypotheses,*
- *The case study contains a bias toward verification,*

- *It is often difficult to summarise and develop general propositions and theories on the basis of specific case studies.*

(Flyvbjerg, 2006, p40)

Cohen et al. (2011) discuss in detail the issue of generalisation in case studies and highlight that this is a challenge that is often levelled at case studies which frequently use purposive sampling which is not statistically representative. This is discussed by Yin (2014 p40) who argues against attempts to make statistically based generalisations and promotes "analytical generalisations" which either refer to existing theories or seek to raise concepts which arise from the study, this point of view is echoed by Rule & John (2015) who make the suggestion that case study should focus on the specifics of the case but it is relevant to make tentative generalisations, likewise Stake (1995 p85) argues that "case studies are undertaken to make the case understandable". In a similar vein, David (2007) advocates the suitability of case study in situations where the knowledge gained is intended to be used in some way with the proviso that it relates to the case only. However, a slightly different approach is promoted by Thomas (2013) who refers to the work of Stenhouse (1980) and points out that although it may not be possible to generalise from any given case study, the accumulation of data over time will build value from case studies. This echoes the point of view expressed by Stake (1995 p74) that it is from the aggregation of instances that understanding is built. A further perspective is offered by Van Wyhnsberghe & Khan (2007) who suggest that case studies should lead to working hypotheses or a collection of lessons learned, this is similar to the point of view that is presented by Harland (2014) who makes the point that case study is not attempting to replicate the scientific method and that it is up to the reader to learn from the study by reading from a critical perspective. It is these final viewpoints that will guide this study, that the aim will be to learn lessons for the context of the course in question and to offer the findings to a wider audience with the expectation that they will critically consider whether it has implications for other settings, this point of view is echoed by Hyett et al. (2014) who state that case study is inherently comparative and does not seek to generalise to populations.

Other aspects which act as limitations to case studies are threats to validity. Yin (2014, p45) and Cohen et al. (2011, p295) discuss construct validity, internal validity, external validity and reliability and offer a critique of applying tests of these which stem from the scientific method or positivist approaches to research. On the other hand, Stake (1995 p108) does not explicitly refer to threats to validity, reflecting his interpretive standpoint, instead, he

discusses the need for triangulation of data sources and the relationship between the depth of data and the contestability of any claims based on it with more contestable claims requiring a greater depth of data. Yin (2014) and Cohen et al. (2011) suggest how threats to validity might be addressed in ways that are relevant to this form of research.

Tests	Case study tactic
Construct validity	- Use multiple sources of evidence - Establish chain of evidence - Have key informants review draft case study report
Internal validity	- Do pattern matching - Do explanation building - Address rival explanations - Use logic models
External validity	- Use theory (in single case models)
Reliability	- Use case study protocol - Develop case study database

Yin (2014, p45)

Table 2: Yin's (2014) design tests

The use of a variety of sources of evidence which have been selected in order to illuminate key elements of the research question will provide triangulation (Stake, 1995) and to maximise construct validity (Yin, 2014). However, the approaches of Yin and Stake are harder to reconcile in other aspects, for example the use of case study protocol suggested by Yin (2014, p45) runs counter to the approach of Stake (1995, p72) who acknowledges that case study researchers make use of protocols but need to fall back on intuitive approaches when faced with situations that have not been previously encountered.

Cohen et al. (2011) discuss this and highlight the importance of the chain of evidence due to its role in allowing the reader to track through the process and judge its validity for themselves. Comparable points are made by Fidel (1984) who argues for clear discussion of data such as interviews, or Harland (2014) who advocates high quality case study research by bringing the reader as close as possible to the experience in order to offer a believable insight, a similar comment is made by Hyett et al. (2014). Whilst such guidance is helpful, it is not always possible to achieve. For example, Yin's (2014) tactic of having key informants review drafts or Eisenhardt's (1999) suggestion that multiple investigators should work on data. Whilst these are not possible, this study will aim to increase construct validity by requesting that participants review the data that they have provided even if it will not be feasible for them to review the analysis of the data.

It is worth noting the comment that Hyett et al. (2014) make that Yin (2014) views case study in post positivist paradigm and thus his approach is to develop protocols for the researcher to follow. This is in contrast to the social constructivist perspective of Stake.

Likewise, Fidel (1984) argues that case studies should not be rigorously planned as the researcher should be able to react to what they find.

3.4 Ethical considerations

Cohen et al. (2011 p76) highlight that the ethics of educational research are situated and that it is not sufficient to follow rules or procedures; each aspect of one's research must to considered in detail. This discussion will address the topic of informed consent alongside privacy, anonymity and confidentiality. Whilst informed consent was built into the design and implementation of this study, it is worth considering the extent to which this can be freely given. This is because there is potential for a tension to exist between the choice to participate or not and the knowledge of the students concerned that I am the leader of their course (and in one case their tutor). This tension is addressed by Nolan & Vander Putten (2007 p402), although their work is focussed on action research approaches, it does note the challenge of ensuring informed and free consent when working with learners who are dependent on the researcher for their grades and other enriching experiences, which in this case could include the writing of references to be supplied to potential employers. Removing this tension entirely is not feasible given the nature of the case to be studied, and it has been addressed by providing students with an assurance, both verbally and in written information sheets, that their participation is voluntary and that they could choose to participate or not participate without fear or favour. All participants were provided with a verbal description of the purpose of the study and what participation would entail, this was followed by an opportunity to ask questions about the study. Potential participants were left with a printed information sheet and given time to make their decision to participate individually. A further layer of protection was provided by a cooling off period during which participants could withdraw from the study. It was made clear that after the cooling off period had expired, any data provided would remain part of the study. As the methods included multiple data collection points, participants were free to choose to stop participating at any point during the study. There is a potential risk to the anonymity of participants by including details of the dates during which this research took place. However, the use of pseudonyms and the withholding of the name and location of my HEI keeps this risk to a minimum.

It is when considering each of the data collection tools in turn that the situated nature of ethical consideration comes into particular focus. These will be discussed in turn, starting with those that present the least issues.

Firstly, the collection of usage statistics from Blackboard (Virtual Learning Environment). This potentially presents a challenge as the VLE is used by all students on the course, not just those who are participating. However, as the study is only seeking quantitative data on patterns of usage by participants, the potential for tension which can arise from discussion boards and other common VLE tools that might be used by participants and non-participants alike is not relevant. It was possible to select, from the list of all users, those who had chosen to participate and download the data for them alone. As soon as it was downloaded, the data was anonymised before any analysis took place and has been stored on password protected devices.

Next, is the use of regular surveys during the data collection period. Potential participants might have agreed to be part of the study, but taking part in surveys was optional and so anyone who did not want to could simply choose not to respond. It was decided to use an online survey tool for these (Bristol Online Surveys) due to the wide geographical spread and the challenges present in administering paper surveys. It also offers a greater degree of convenience to participants. The survey tool used holds data securely and does not collect any information such as IP addresses that could be used to identify individual participants.

The use of interviews took two forms. Firstly, one to one interviews with tutors who work with the groups of students who are participating. Whilst these are all academics who are familiar with research processes and are more informed than most about the meaning of informed consent it is important to note that they were provided with full details of the study as well as the protection to withdraw their data during a cooling off period following the interview. Recordings of the interviews were stored electronically on password protected devices. I carried out the transcription which negated the need to ensure the protection of the data between myself and transcription services. The second form of interview was the use of group interviews with groups of participating students. These were done with those students who had chosen to participate, it should be noted that within these group interviews, students had the right to not contribute thus providing another option to opt out of the study (in other words, to be present but to remain silent).

The final data collection approach to be considered relates to the students' contribution to SNS. The complex issues this raises are addressed by Aaen & Dalsgaard (2016) who explored the use of Facebook as a learning space. They highlight the need to get informed consent and to treat data confidentially and anonymously. This is an area raised by Ess (2009) who note that online research is frequently good at avoiding deception and excessive

inducements, it is less good at securing informed consent. However, these comments mainly relate to the use of large chat rooms with many participants who may come and go with high frequency. The SNS content formed part of the data for this study comes from closed groups that the students have created and thus there is a stable and known membership. Whilst this makes the matter of informed consent somewhat easier to ensure, Ess (2009) raises a related issue concerning small groups where the members may know one another offline and may be able to work out who has commented based on what they have said. The students in each SNS group all know one another offline and most likely participate online using their real names but these are closed groups created by the students which specifically exclude tutors and mentors. Thus, it is an important ethical safeguard to ensure that content is anonymised and to avoid using content that might identify students within this work.

There are a variety of approaches that have been taken by researchers in this area to the practicalities of researching SNS content and the ethics related to this. One such example is that of Selwyn (2009) who joined a Facebook group using his real name alongside the students and periodically archived the content. Erjavec (2012) adopted a slightly different approach which was to temporarily become a member of the group in order to gain access to content but did not participate in the group. A different approach is suggested by Barnes et al. (2015) who propose that faculty Facebook pages can be used as a shared space for researchers and participants and that participants can be informed of the purpose of the group and consent to it by joining. All of these approaches mean that, at least of some of the time, students will be aware that tutors will be members of their group which means that it is not easy to ensure that students have the right to withhold their data.

For reasons relating to the ethical consideration of the right of participants to withhold their data and also from a research perspective of not wishing to influence student interactions online, it was decided to adopt the following approach to collecting data from SNS. A third party, commercial service was used. They were put into contact with the students who added them as a member of their groups. This service made an archive copy of the content. This was shared with the participants in the form of a searchable database. Students could then search for their own content and flag any posts that they did not wish to be part of the study. The third party then removed these elements and allocated each participant a pseudonym. These pseudonyms are themed for each group; one uses alternative names, another car brands, yet another the names of pop groups and the final group uses colours. The anonymised copy was shared once again with the students for approval before a copy was provided to me. The third party was then removed from the SNS group and deleted

their copies of the content. This process meant that protection for students was offered at many levels; at the highest level, an entire group could choose not to provide this data (this option was taken by one group), a student could choose not to provide any of their data even if the rest of their group agreed (this option was taken by one student, whose data was removed by the third party before the data was provided to me), and finally, specific elements of data could be removed if students were not happy for it to be part of the study (it is suspected that this took place as there are some evident gaps in discussions). From my perspective as a researcher, it is frustrating to have gaps in the data however, this is balanced by knowing that a robust process has been adopted to provide participants with a complete and effective choice about participation and that their data is private, anonymous and confidential.

Chapter 4 Presentation of Data

4.1 Data sources which relate to more than one sub-question

As highlighted in Chapter 3, two of the data sources provide evidence that will be valuable in responding to more than one sub-question. The following section provides an overview of these along with an outline of the analysis process that took place following data collection. This overview will then be used as a reference point when discussing the relevant elements of the data in the chapter on the presentation of the data. (Where a data source relates to a single sub-question, it will be discussed within the relevant section of the presentation of the data)

4.2 An overview of the data arising from group interviews.

Two group interviews took place with each group of participating students. The first round of interviews took place during October 2017 which is the first term of the course. The second round took place in February 2017 which is the second term of the course. The first interview was the most detailed and provided an opportunity to discuss students' use of technology. The second interview was shorter and allowed students to consider if their use of technologies had changed since the first interview. The first, in-depth reading took place at the transcription stage which allowed for significant immersion in the data. Following several other readings of the data whilst bearing in mind the research questions, ideas for a coding system began to evolve. An initial system of coding attempted to combine the different strands of Networked Learning (tutors, artefacts and other students) with the purpose of the network connection. However, this proved too unwieldly to use and a more structured system was developed. This was based on semantic blocks of interview where possible as the nature of group interviews is that there will often be chunks of discussion on a particular topic as a number of students comment and move ideas on. The structure of the system was based on the use of codes relating to three areas: *how, what* and *who.*

This *how, what* and *who* structure relates to the research question's association with Networked Learning and the interpretative approach of this study. It firstly considers *how* students are using technology, in other words what forms of technology they are using. A number of sub codes were developed in response to the most common forms of technology that students reported using. These are:

- VLE resources (including Turnitin and library resources),
- Internet resources to support academic learning (including Google Scholar),
- Email and SMS,
- SNS,
- Internet resources to support professional learning.

These codes help to provide insight into the types of technology that students make use of to support their learning. The structure also provides insight into *who* the students are interacting with via the technology. Whilst NL typically considers learning to take place, or be supported by, interactions between three elements: tutors, other students, and resources or artefacts, the analysis of the interview transcripts revealed that there are several different groups of people, for these students, that fall into the category of 'tutor'. Thus, the following sub-codes were developed:

- UPL,
- Mentor,
- People outside the course,
- Other students.

These codes were then used as filters to split the comments into two categories: those relating to student-to-tutor interactions and those relating to student-to-student interactions.

Finally, to provide alignment with the general approach of analysing who the students are communicating with combined with an analysis of what they are communicating about, a series of sub-codes were developed to categorise *what* the students were talking about. The sub-codes developed were:

- On-task interactions (including assignment or placement discussions),
- Around-task interactions (including details, tasks, workload discussions),
- Social interactions (including pastoral support, emotional support).

4.3 An overview of the data arising from student surveys.

A total of five surveys were conducted during the research period. Table 3 provides a summary of these which includes an overview of the point in the course when the survey

closed to responses and significant course events that coincide with these dates. It also shows the number of respondents and the response rate. It is noticeable that the response rates fell during as the academic year progressed, this might be due to survey fatigue, it might also be because students felt they were providing the same information each time and that their responses were not changing. This is borne out by the similarities in responses over time.

Survey Number	Close Date	Point in year	Number of responses	Response rate (%)
1	31-Oct-16	Formative assessment MAPP7044 RAC / build up to B placement	42	48
2	30-Nov-16	B placement	54	61
3	22-Dec-16	Post B placement / working on MAPP7044 Summative	42	48
4	18-Jan-16	Build up to D placement	38	43
5	28-Feb-16	Post MAPP7044 RAC feedback / D placement	29	33

Table 3: Student survey dates

The surveys contained both open and closed questions which related to technologies they had used as part of their learning, who they had been in contact with and how they had used technologies to support their learning. Data arising from closed questions is presented in graphical form within the relevant section of the presentation of data chapter. The data obtained from open questions underwent minor coding and categorisation and an overview of this is explained prior to the presentation of the relevant data within each section.

4.4 Student-to-artefact interactions

The data presented in this section relates to learning interactions between students and artefacts representing one of the three elements of NL. It relates to the sub-question:

How do students make use of technologies to support student-to-artefact interactions?

The data sources relating to these interactions are usage data from Blackboard, responses from two rounds of group interviews with students and responses from five surveys that took place at intervals during the course / research period.

4.4.1 Data relating to interactions between students and artefacts via Blackboard

The first source of data used to explore the way that students use technology to support interactions with artefacts is Blackboard (VLE). This allows tutors to export usage statistics that can be analysed in a number of ways to help identify patterns of use. The course

provides students with three Blackboard sites: one related to the course as a whole, one for to Raising the Achievement of Children (RAC) and one for High Quality Learning and Teaching (HQLT). As there are three Blackboard sites and five participating groups in this study, it would be possible to present the data for each individually but this would be counterproductive as the volume of data would mask overall patterns and reduce its effectiveness in responding to the research questions.

Figure 1 shows the breakdown of days when students from all participating groups accessed Blackboard (all three sites combined). It clearly shows that students work 'office hours' when accessing Blackboard. In other words, they typically access it more during the working week than at weekends. Additionally, Thursday represents over a quarter of all time spent on Blackboard which is likely to reflect the fact that this is the day when most UPLs do their face-to-face teaching and will include access by students as part of their taught sessions.

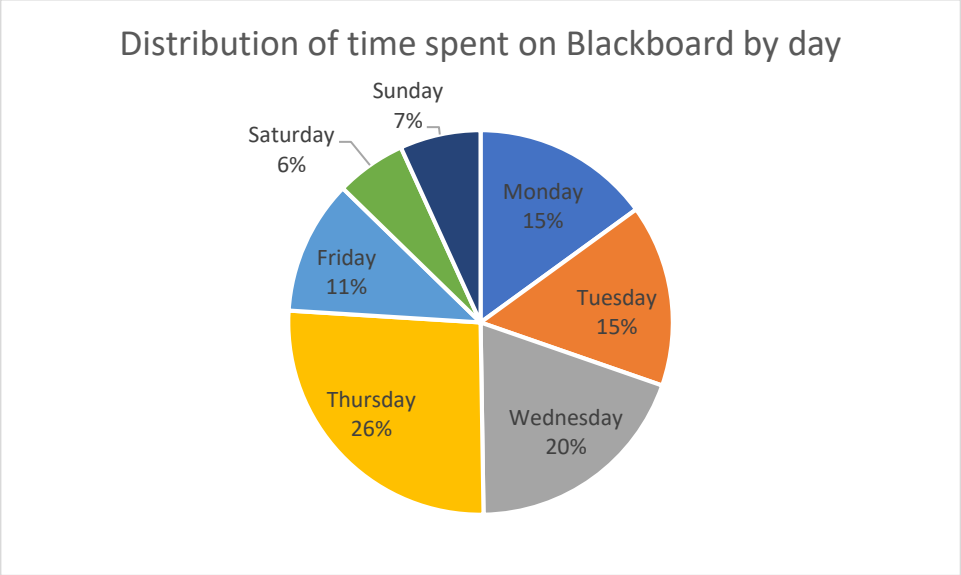

Figure 1: Distribution of time spent on Blackboard by day

Figure 2 presents the weekly activity statistics for all Blackboard areas for all participating students. It is particularly frustrating that the data collection was not able to capture details from the outset of the course until 31st October 2016 as this omits any activity at the start of the course as well as activity prior to the submission of the first formative assessment. However, Figure 2 does show a rise in activity in weeks beginning 28th November 2016 and 5th December 2016 which coincide with the return of formative feedback. The next activity spike is prior to the submission of the summative assessment for the first module (RAC). If this data only were available, it would be easy to conclude that student use of Blackboard

was driven by assessment activities but the rise in activity in the weeks beginning 20th February 2017 to 6th March 2017 shows a different story. This period covers the time of intense teaching sessions for the second module (HQLT) when students are also preparing for an intense week-long placement. This suggests that students are making use of Blackboard for learning purposes as well as for assessment related activities (submitting assignments and receiving feedback). However, as students do not leave evidence on Blackboard other than in the usage logs this data alone only confirms student interaction with artefacts and does not provide evidence of learning.

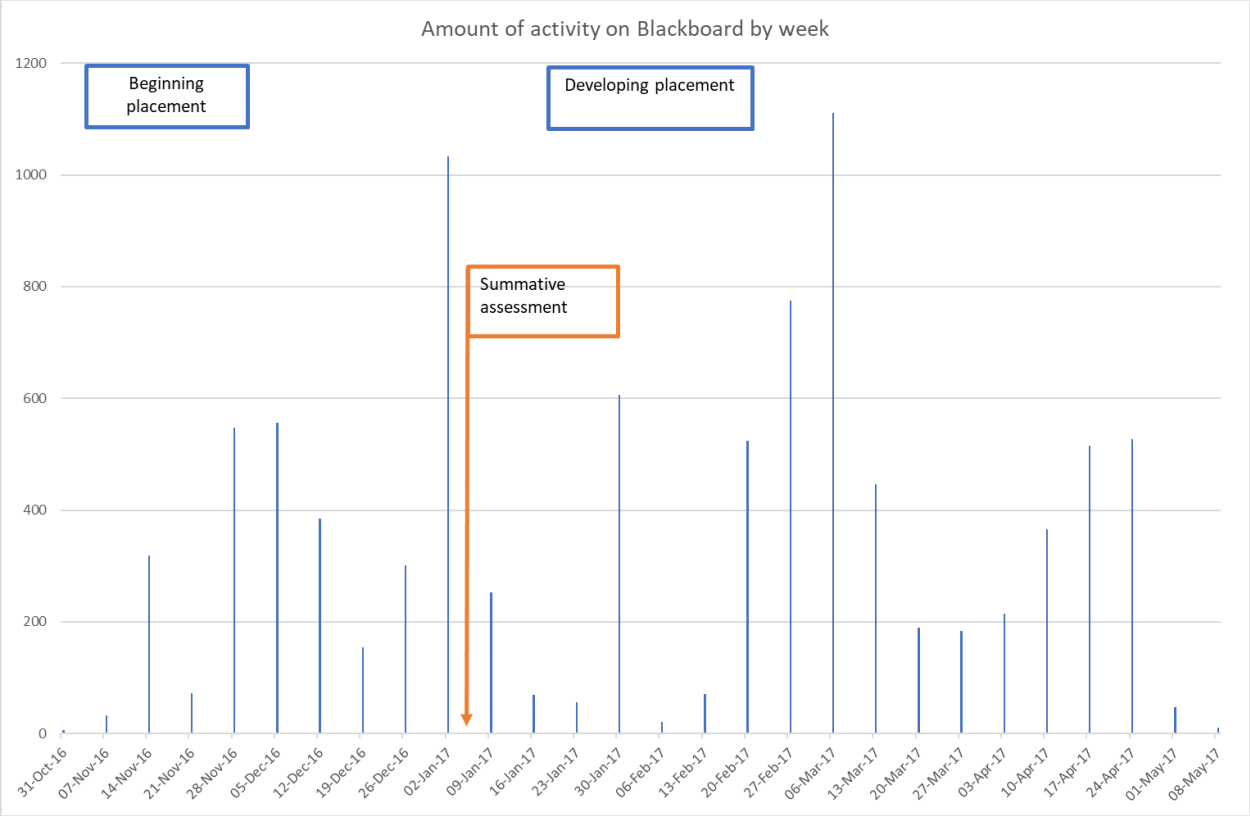

Figure 2: Amount of activity on Blackboard by week

The export of usage data from Blackboard has some limitations. Firstly, it only stores such information for a limited period of time. At the point when the data was exported, it was not possible to access data from the start of the course. Any further study of this area would be wise to make monthly exports of data to ensure that such gaps do not exist.

As second limitation is that some forms of data are only available in terms of 'activity' rather than 'hours'. Activity is measured in the number of clicks a user makes in each specific area of Blackboard rather than the amount of time spent online. The reasons for this are

understandable: that it is easy to measure and a click is a positive action that shows engagement whereas time spent on a page is more passive (a user might load a page and then go to make a cup of tea for example). However, it does mean that activities such as reading on-screen content are not recorded in as much detail as would be ideal.

4.4.2 Data from group interviews relating to students' interactions with artefacts

There were two rounds of group interviews with each of the five participating groups of students. Within each of these interviews were questions designed to prompt responses from students about their interactions with artefacts. In order to maintain anonymity as discussed in section 3.4, the recording and transcription process did not attribute comments to specific students, thus, in the extracts presented there is only details of the group which provided the responses and a distinction between comments from myself (which start with "Q –") and responses from students.

As the interview data had been coded using a system that included a *what* category, it was possible to use this as a filter to identify aspects of group interview transcripts that apply to technology tools that facilitate interactions with artefacts. The relevant *what* categories that were applied to the filter were: Blackboard (VLE), Turnitin, OneSearch (library search tool) and Internet (used a catch all term for any internet based resources that students might access that have not been provided by the university). Having filtered and identified relevant interview content, the process of reading and re-reading the extracts could take place in order to identify themes from the students' responses.

The first theme to be discussed is Blackboard. Many students showed strong opinions on this and there were many comments which indicated that it was not a valued resource and would be something that students might only access on an infrequent basis or when instructed to do by a tutor. The most frequently cited reason for accessing Blackboard was to gain access to PowerPoint presentations that would be used in face-to-face sessions. Students commented on the value of being able to see these prior to face-to-face sessions in order to pre-read them and to start the learning process prior to the session starting. These points are exemplified in the following extracts from the group interviews.

> I use it about once per week when I am in here and doing lots of studying and I'll look it up and see what we are doing (Burton, first group interview)

> I'll start. I rarely go on it. I'll go on it if I get an email to say you DO have to go on it (Preston, first group interview)

Not all student learning takes place via face-to-face sessions; assignments are an important part of student learning. Consequently, there were several comments on accessing artefacts that would support student learning in preparation for assessment activities. The first one to be considered is OneSearch, which is the university provided search tool that searches the university library and journal databases. Whilst some students found this to be a useful tool and commented on how it helped them to access artefacts to support their learning, many cited that is was frustrating and that they would default to using Google or Google Scholar to source relevant materials. Students felt that it was vital to be able to access electronic books and journals as their courses are based within their alliances rather than at university. But this was not a view shared by all as some students commented that they had considered driving to the university campus in order to gain access to hard copies of books. Indeed, there were many frustrations expressed with electronic books and journals including resources 'timing out' and vanishing, to a feeling that paper copies were easier to work with. A collection of comments which represent these points is presented below.

> OneSearch, is that what you use?
> Yeah (much agreement)
> I use it a lot (much agreement)
> Google scholar is good as well. (Carlisle, first group interview)

> And I've used Google Scholar to get articles that aren't in the library or OneSearch but are referenced in a book that I have read that I need so I then go and get that from somewhere else. So I use google quite a lot for that. (Burton, first group interview)

It is logical to follow the discussion of accessing learning materials useful for assessment activities with a discussion of the assessment process itself. Students are required to submit their work via Turnitin (an online assignment submission tool and originality checker) and this was the topic of a number of conversations. The convenience of online submissions was expressed as a benefit of such a tool. Also, many liked the different forms of feedback that it facilitates. As assessment is used as a way to measure learning, the views of students on the contribution that feedback made to subsequent assignments is useful as evidence of interactions contributing to learning. Comments that illustrate these opinions are presented below.

> I think it is quite a good way of getting feedback because you can see where they have commented on certain bits of the essay as well as like an overall view of it as well. So, it is good. (Carlisle, first group interview)

> The feedback was good but I wish you could print it.
> (Burton, first group interview)

Towards the end of each interview students were asked to prioritise all the different types of technology they had talked about in relation to the contribution they made to learning. The responses were quite insightful. Many answered a different question and said that friends would be the first port of call to support them with their learning if they were stuck (either face-to-face or by SNS). If friends were not available or could not help then topping the list of technology tools was the Internet. Only if this did not help would students turn to Blackboard, thus a discussion of comments about Internet based resources will be of value, an example is presented below.

> I guess, with some respect, because I am with (*student*) at (*school*) who is quite clued up, my first protocol is to ask (student). If she is struggling with it, then I might bring it up with another lecturer or somebody else. Then I might go to WhatsApp and if people don't know on there then I would have to look on Blackboard. That's my approach. (Blackburn, first group interview)

Firstly, it should be noted that the types of use that were discussed could be described as independent learning of professional knowledge. Students shared many examples of how they had built their professional understanding of classroom practice through the use of Internet resources. Sometimes this would concern their own subject knowledge, sometimes it was to develop pedagogical knowledge of how to approach the teaching of a particular topic and other times it was to access specific resources to be used as part of teaching activities in classrooms.

In comparison to the question about how often Blackboard was accessed, students commented that the Internet was used on a daily basis and some students commented that the range of materials available made it hard to deal with as there was always 'just one more thing' to look at. Students talked about a range of websites that would be regularly used (YouTube[1], Twinkl[2], Sparklebox[3], TES[4], Pinterest[5]).

[1] https://www.youtube.com/
[2] https://www.twinkl.co.uk/
[3] http://www.sparklebox.co.uk/
[4] https://www.tes.com/teaching-resources
[5] https://www.pinterest.co.uk

> Sometimes I think I tend to over research so I'll see something and I think 'that might be useful' so I'll save it and then it turns out that I have downloaded SO many things that you kind of get lost don't you (Preston, second group interview)

It was interesting to hear how students applied critical filters to their Internet searches in order to have confidence in the value of the artefacts they encountered. Many would consider detailed understanding of their classroom context in relation to the artefacts. Whilst others would consider the context of the artefacts found and take note of factors such as the geographical location of search results. Such interactions provide evidence of the way that students are doing something different as a result of interacting with artefacts which can be considered as evidence of learning.

> It depends what you are looking for, because if it is like a technique to, you know, do long multiplication, you know if it works or not so you don't really need to know the background and the qualification of the person who has posted it, you can see if it works. But if you are looking into, I don't know, RE, you might want to know say 'who is this person who is saying this?' 'are they qualified to say this?' (Carlisle, first group interview)

> I think a lot of YouTube is American …
> Yeah
> … which I find frustrating and I often just turn it off straight away because I want something UK based, especially if I am going to show it in a lesson…
> Yeah.
> … I don't want an American narrative (Carlisle, first group interview)

As all students are paired with a mentor when on school placements, students were asked about their reasons for turning to the Internet for such professional development information rather than asking their mentor. Their responses included not wanting to reveal their ignorance to their mentor but much more frequently, they discussed a desire to be able to make an informed choice from a range of options that was much broader than the responses from a single mentor. This is indicative of students drawing on a broad network of connections to artefacts to develop their learning. Again, these points are exemplified by the following comments.

> But there are certain things that you don't want it to be your first question to your mentor because it makes you sound a tiny bit incompetent. If you think "I can't think of anything myself", so there is an element of 'yeah, I'll get some ideas from my mentor' but you do want to also impress them by 'look what I can come up without your help (Preston, second group interview)

> And it is specific on the internet, because if you just quickly ask your teacher or your mentor, 'what can you tell me about this, because I've got to teach this?' they go, just go de, de, de, de, de, just do this, just do that. But when you are online, you are specifically looking at a certain area and it is specifically aimed at what you need that week or certain search to specifically aim at what you are trying to teach. And there is not just one, there might be three of four different clips and then you can go into the background and you can dig underneath it to really understand it. Rather than just getting a surface … (Blackburn, second group interview)

In summary, participants typically reported that they placed little value in the formal learning artefacts provided by the institution via Blackboard and that they would access these only when directed to do so. In contrast to this, students stated that they make wide use of self-selected artefacts when seeking to develop their learning in relation to formal assessment activities or professional learning for placement. They felt confident to make use of these self-selected resources as they were able to apply their own critical filters to the range of resources available. An area where formally provided artefacts were generally valued was via the assessment process where the use of technology to facilitate the submission and feedback process was felt to supportive and effective.

4.4.3 Data from student surveys relating to student-to-artefact interactions

An additional point of reference regarding the way students interact with artefacts comes from the responses to the surveys that students completed. There were five surveys conducted during the research period that were timed to coincide with specific periods of activity during the course. Details of the dates of these are summarised in Table 3. The survey data helps to provide a descriptive overview of different technological tools and how their value is perceived by students.

Figure 3 shows how students responded to a question asking if they had accessed Blackboard during the week prior to completing the survey. This was intended to give a snapshot of students' Blackboard use at a selection of key points during the course.

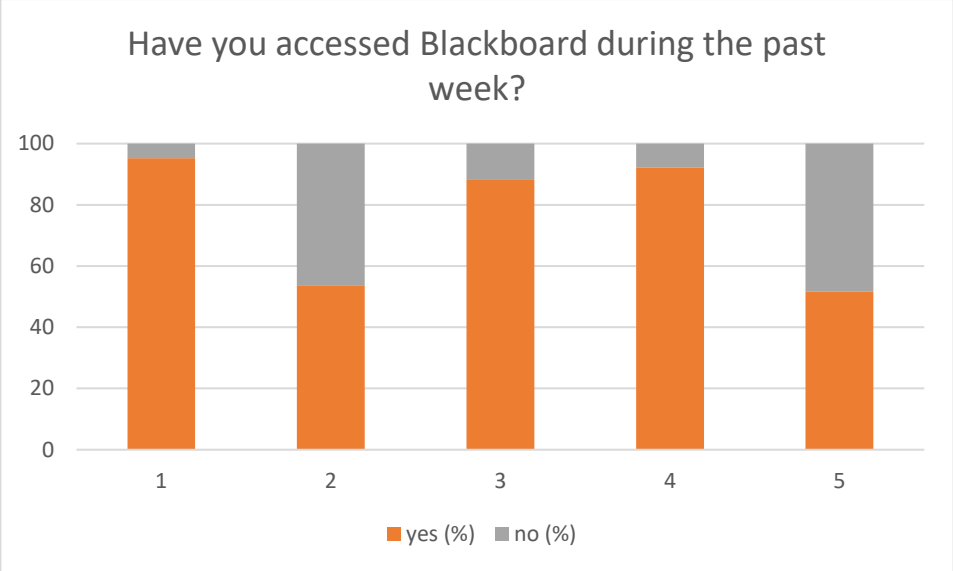

Figure 3: Summary of Blackboard access from survey data

The two surveys that indicated the lowest engagement with VLE were 2 and 5 (refer to Table 3 for dates), these coincide with periods of time when students were on placement. This mirrors the responses that students gave about their use of SNS during placement in that it was reduced. It is also understandable as the content of Blackboard supports student learning in relation to their credit bearing modules which students would not be working on during their placements.

The reasons for accessing Blackboard were explored through a follow up question and a summary of these responses is presented in Figure 4. The categories shown were presented as options for students to select from, they were able to select as many of the options as they wished.

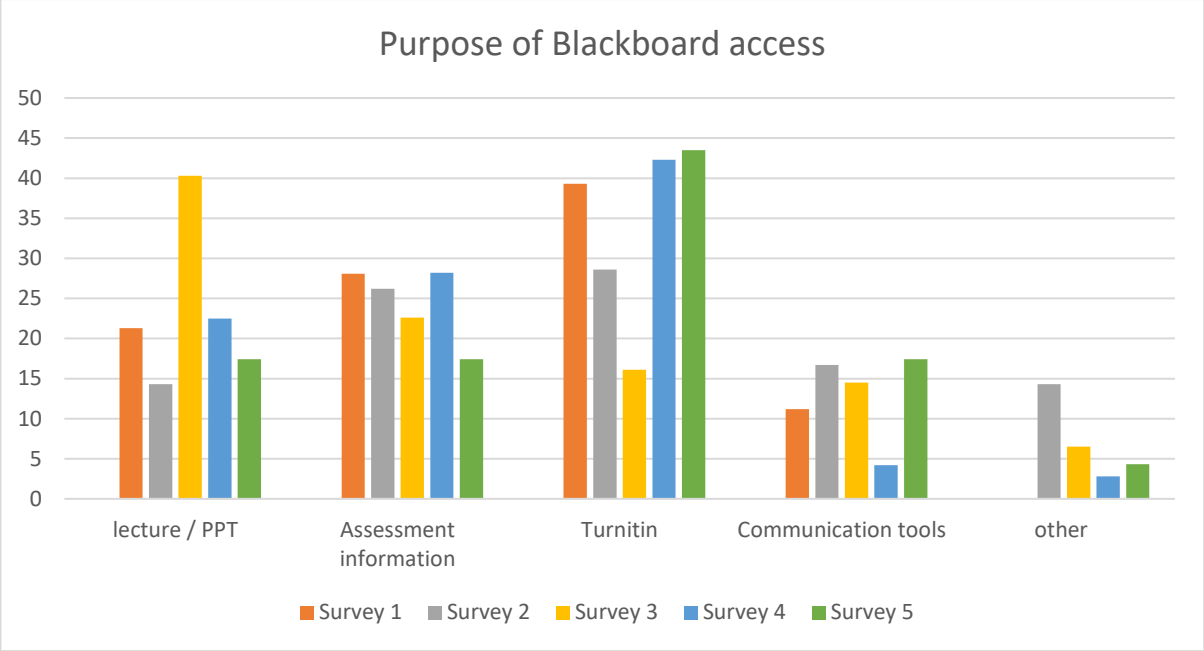

Figure 4: Breakdown of Blackboard access by purpose of visit

The first thing to notice in Figure 4 is that lecture / PPT, assessment information and Turnitin account for the majority of responses. The three of these can be seen as a proxy for evidence of learning, in other words, students access artefacts in the form of lecture notes, confirm the assessment requirements and then provide evidence of their learning through their assignment submission.

It can be seen in Figure 4 that the three surveys where there was the highest reported access of Blackboard coincide with the highest reported reason for access being Turnitin. This is the assignment submission and feedback tool that is integrated into Blackboard. Survey one overlaps with the submission of the first formative assessment activity. Likewise, surveys 4 and 5 coincide with submission and feedback on the summative assessment activity. This provides strong evidence that students' use of Blackboard is driven by assessment.

Figure 4 also shows that at the point of survey 3, students responded that they made greater use of Blackboard for lectures, PowerPoints or to access reading before or after a taught session. The date of this survey coincides with the period of most intense teaching on the second credit bearing module, HQLT which is matched by the peak in Blackboard activity indicated in Figure 2 (based on Blackboard usage data).

In addition to the questions presented in Figure 3 and Figure 4, students were also asked to respond to questions which had free-text responses. The purpose behind these was to provide students with an opportunity to identify technologies which they deemed to be significant in their learning without being prompted by options contained in a question.

The first of these questions asked students to identify which technology they had used most frequently (the implication being that frequency of use has a correlation with significance to their learning). The responses were grouped so that comments such as 'Facebook', 'Facebook group', 'Social Media' were treated as the same. A preliminary analysis showed that there were no significant differences in the responses across the five surveys and thus the data has been amalgamated and presented in Figure 5. What is significant about this data is the technologies which facilitate access to artefacts: Internet, OneSearch and Blackboard, were infrequently identified by students as the one that they had used most frequently that week. From this, it could be implied that students place little value on the role of technology to facilitate interactions with artefacts to support their learning.

Accepting that Figure 5 suggests that only 5% of respondents used Blackboard more frequently than 'other' technologies during the previous week, it might still be the case that it plays a significant role in learning. As a supplement to the responses presented in Figure 4 which asked students about the purpose of their visits to Blackboard, students were asked to articulate how Blackboard supported their learning. The results were categorised and presented in Figure 6 which strengthens the case for the role that assessment plays in learning which was introduced in the discussion around Figure 4. It also supports the proposal that students make use of Blackboard in order to access materials that support their face-to-face teaching sessions as 'lecture notes' are identified as the second most frequent response to the question about how Blackboard has supported learning.

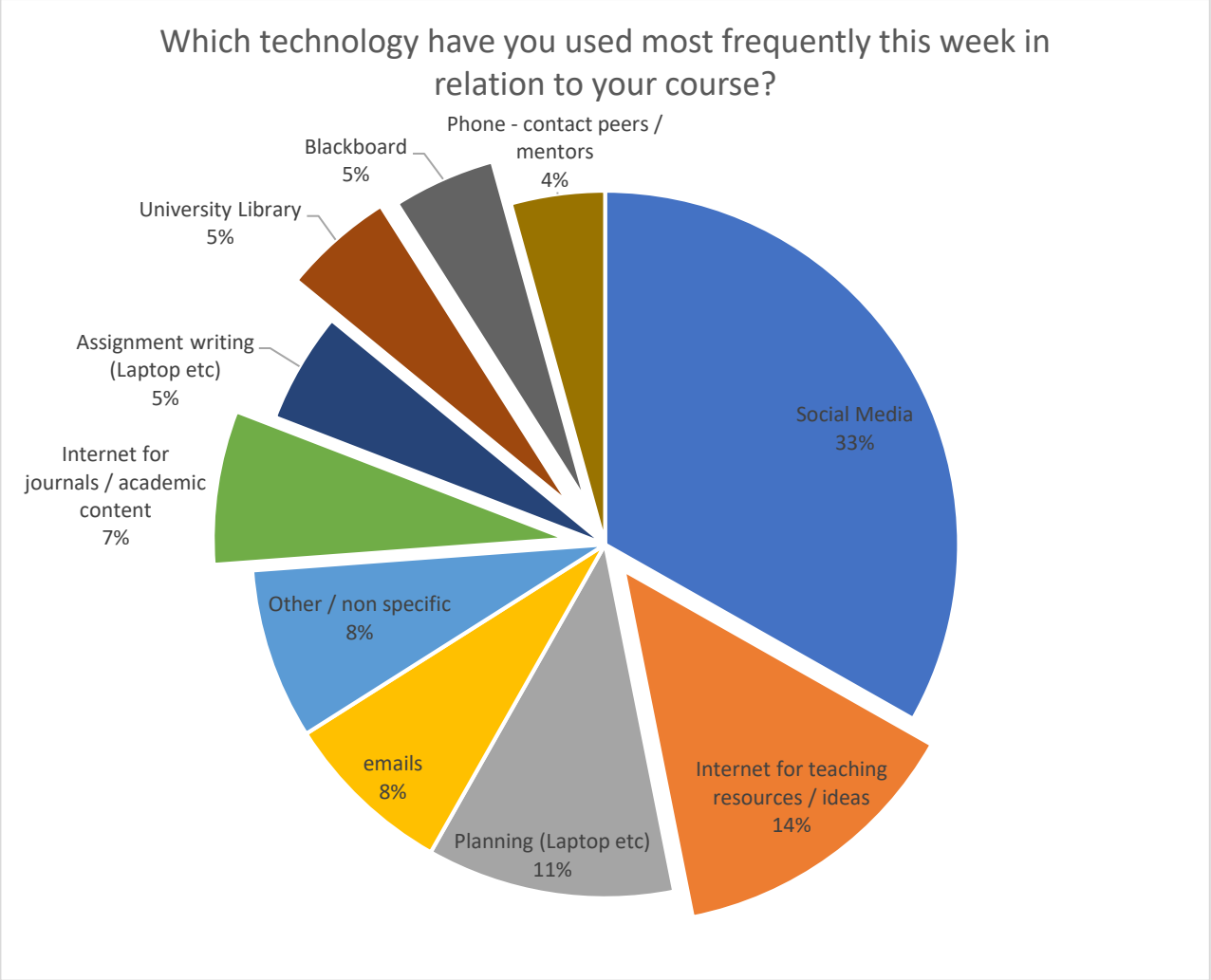

Figure 5: Student views on which technologies play a role in their learning

In the same way that students were asked to say how Blackboard had supported their learning (Figure 6) students were asked to articulate the role that the: university library, text based internet content, and image or video based internet content all support their learning. When reviewing the responses to these questions it was apparent that the responses all fell into very limited ranges of answers to no further analysis to break them down or present them as charts is required. Overwhelmingly, students said that the library had been useful in supporting learning as it (perhaps understandably) provided electronic access to books and journals.

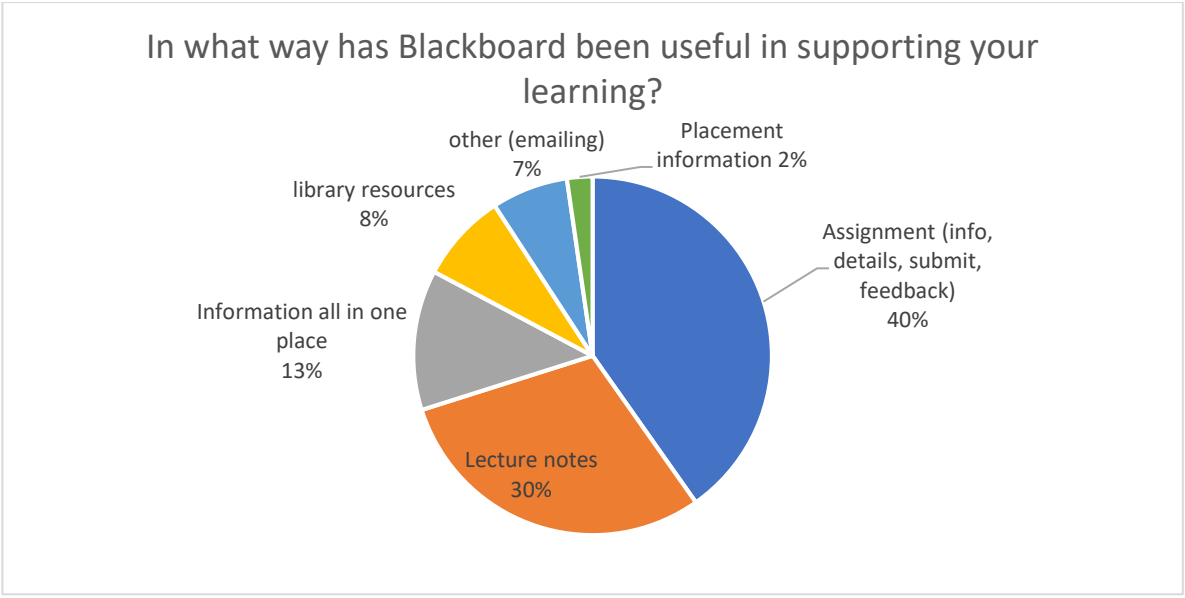

Figure 6: The role of Blackboard in learning

When asked about internet based content (representing interactions with artefacts not provided by the university through either Blackboard or the library), the students commented on the different role that text based content played in comparison to visual content in the form of images or videos. Firstly, they felt that text based content was useful as it supported learning by providing access to resources that played a role in assignments and, secondly it played a role as a source of lesson ideas. The first of these reasons is aligned with comments from students about their frustrations in accessing books and journal articles via OneSearch or the library and that many of them resorted to the use of Google Scholar for this (discussed at the start of this chapter). The second of these reasons acknowledges the importance of professional learning on placements and how access to a range of ideas relating to classroom pedagogy in important. (This also is discussed at the start of this chapter).

In contrast to these two reasons, when asked about the role of image or video content and their learning, students responses were strongly centred on professional learning. However, here they make a distinction between accessing a range of ideas relating to classroom pedagogy and accessing resources which support the development of their curriculum subject knowledge. Consequently, the format of Internet based artefacts is important when considering the role they play in learning.

To summarise this section, participant responses to surveys show high reported levels of access to Blackboard which contrast with the low value placed on Blackboard which was reported via group interview responses. There is evidence that course activities such as

assessment and intense periods of teaching are important incentives prompting students to make use of artefacts provided via Blackboard. This comes from both direct questions about this as well as free-text responses both of which offer some evidence of the relationship between interactions and learning. When asked to comment on which technologies had been used during the week related to their course, there were few responses relating to those technologies which supported access to artefacts.

4.5 Student-to-tutor interactions

4.5.1 Overview of student-to-tutor interactions and associated data sources.

The data presented in this section relates to the element of NL which concerns interactions between students and tutors. There are three sources which have been utilised to provide the data for this section in relation to the sub-question:

How do students use technologies to support student-to-tutor interactions?

Firstly, there are the two rounds of group interviews with each of the five participating groups of students. Secondly are the responses from the five surveys that took place at intervals during the course. Finally, there are interviews with the UPLs who work with four of the five groups (myself being the fifth UPL).

The second element of NL (alongside interactions with artefacts and other students) concerns interactions with tutors. Due to the nature of this course, the students interact with several different people who fall under the title 'tutor'. Firstly, there is the UPL who teaches and assesses the two credit bearing modules. The non-credit bearing modules are taught by teachers from schools within the alliance. Secondly, there is the mentor who works with students while they are on placement.. Finally, there are experienced teachers in SNS networks external to the course. As a consequence of the varied number of people who could be classed as 'tutor', there are a number of different ways in which technology can play a role in facilitating interactions between them.

To facilitate an understanding of the role of technology in supporting these interactions, three different data sources are available. Firstly, there are elements of the group interviews with students that discuss these, secondly there the questions within the technology use surveys that relate to these interactions, and finally, there are interviews with UPLs to provide an alternate perspective to those of the students. An ideal scenario would include interviews with mentors. However, as there are 82 students participating in the study, each of whom would have a different mentor per placement, all of whom would be widely

geographically dispersed the time involved to conduct even a sample of interviews was prohibitive and so this perspective has not been included within this study.

4.5.2 Data from group interviews relating to student interactions with tutors.

In the group interviews (a summary of these is presented in section 4.2), students talked primarily about interactions with three groups of people who fall under the heading 'tutor': their UPL, their mentor, and others outside the course structure. There were occasional comments regarding interactions with their PPL or with Library and Student Services, but these were infrequent and where they were discussed, they were only mentioned by individual students indicating that such interactions are not regarded as significant by the majority of students. Thus, they have not been included in the body of data for this chapter.

In terms of the volume of comments made during interviews about interactions with the four groups of people mentioned above, by far the largest relate to interactions with mentors, followed by those with UPLs and finally, those with others outside the course. This will be adopted as a structure for presenting the data from the group interviews. To preserve anonymity, names of students were not associated with their comments during group interviews. In all of the extracts presented, the group which provided the comment is indicated along with details of which round of interviews the comment came from. Where a comment was made by me, it is prefaced with "Q –".

Student interactions with mentors as 'tutors'

Firstly, there was a body of discussion about the different technology tools that were used to communicate with mentors. All students confirmed that they had shared email contact details with their mentor

> Q - What about communications with mentors: is that email, do you text do you Facebook with them?
> Email
> Q - And for those who do text their mentor, do you have an email contact for them as well?
> Yes (Burton, first group interview)

There was some variation in the responses concerning interactions via Short Message Service (SMS, commonly referred to as 'text' messages) but there were a lot of examples of this being the case.

> Q - Does anyone NOT have the mobile number for their mentor?
> (Several responses to indicate they don't have)
> I don't for my mentor but I do for my class teacher (Fylde, first group interview)

> Q - Does anyone NOT have mobile number for their mentor?
> Me, am I the only one? (agreement. Laughter) I will get it on Monday! (Carlisle, first group interview)

Where students did communicate with their mentor via SMS there was no widespread agreement over who initiated this network interaction. Where it did exist, it was felt that the existence of such a network connection led to better relationships with the mentor and better classroom practice regardless of what was exchanged via the connection.

> Q - You have text messages with your mentor?
> Yeah
> Q - Who initiated that? Was it you or was it your mentor?
> Both (Fylde, first group interview)

> Q - Who initiated the swapping of number? You or your mentor?
> My mentor Yeah. I have the phone number for my class teacher and for my mentor. But the class teacher was more initiated by them whereas my mentor was more initiated by me. (Fylde, first group interview)

The following comments provide examples of the way that the use of technology to form a network connection with a mentor can have a positive impact on students' placement experiences and outcomes and by implication, learning.

> Yeah, she is more approachable, I have a million and one questions and I sometimes think 'should I ask her?' but because she has given me her number, I know it is alright. (Blackburn, first group interview)

> Yeah, whereas text tends to be praise 'you did well today' that sort of things, just snippets …
> Q - So text (messaging) in that scenario has helped you maintain confidence in your teaching?
> Yeah. (Fylde, first group interview)

In addition to the nature of professional relationships influencing the choice of technology used for interactions with mentors, the content and context of the interaction has an influence of this. Factors that contribute to this choice include whether the interaction is brief, detailed, professional, pastoral or urgent. As has been mentioned, for some students, there is no choice:

> I only ever email my teacher (Preston, first group interview)

However, for those where there is a choice, then the decision between SMS and email is frequently driven by the topic of conversation, the following examples illustrate how short,

quick exchanges would be done by SMS and longer exchanges which might revolve around the shared development of lesson plans would typically take place via email. The interactions regarding of lesson plans are examples of how interactions lead to changes in the way things are done by students which represents evidence of interactions leading to learning.

> My mentor has texted me to say things like 'today is non-uniform', he had forgotten to tell me so he sent me a quick text that morning but obviously, if it is more information based then it is sent in an email. (Flyde, first group interview)

> Plans and long pieces as emails, and last night I was putting a display up and I just texted and said 'I am putting a display up' and she said 'oh, how is it going? We are doing this tomorrow, does that make sense?' But long winded, 'oh, here is the lesson plan I'm doing what do you think of this?' would be an email, but just a quick 'how is this going, we are doing this' would be a text.
> Q - Do you get feedback via email on your plans when you share them?
> She will look at my plans and then do notes on top of it and send it back and if another email comes in she might say 'I like all of this' (Preston, first group interview)

The immediacy of SMS communications was raised by a number of students and reflects the heavy workload of the course which leads to intense time pressure on evenings, particularly during placement and the need for quick answers. The following excerpts illustrate this.

> I only got round to exchanging numbers to text was because of a breakdown of communication of emails. There was one week where I was planning for a lesson and they had emailed across a change in the plan which I didn't read because it was later on in the night. So I went in with my plan, I should have changed it. So it was that whole, let's text, then I can just text you to remind you to look at. It just went from there and it went more to a communication that way. (Carlisle, first group interview)

> It is more immediate. Yeah, you know they have got it.
> I swapped numbers with my mentor before the summer holidays. I had a pre-course meeting. The most useful text I got from him was what the dress code was for the INSET day. That is just something, your first INSET, your first ever INSET day … (Carlisle, first group interview)

In addition to the immediacy of SMS messages, students often referred to the use of SMS for communications of a pastoral, informal nature as the following pair of extracts illustrate.

> It was an offer as well, 'don't just sit there and stress – get in touch' sort of thing. Whereas if it was email it would be more about, I don't know, observations and feedback and that sort of thing (Burton, first group interview)

> Yeah, I had a bit of a wobble and my mentor texted me and to check that I had sorted things out and that things were alright again. (Carlisle, first group interview)

There were mixed opinions regarding the appropriateness and value of SNS for maintaining interactions with mentors. Some valuing it as a means of maintaining ties with their mentor whilst others felt it an inappropriate resource to use.

> I used Facebook to talk to my mentor on my developing placement, so I learnt through that because I would ask her questions (Fylde, second group interview)

> Q - Are any of you on SNS with your mentors?
> No.
> Mine tried to add me but I didn't accept, I don't know why so I've not accepted. I've just pretended that I haven't seen it. (laughs) (Carlisle, first group interview)

In summary, students reported widespread and sustained interactions with their mentors through technologies. These interactions would typically take place via email or SMS and the nature of the communication would influence the selection of the most appropriate technology. For example, short quick exchanges would be sent via SMS whereas longer interactions with attachments would be conducted via email. Another factor relating to decisions to make use of SMS for interactions was its immediacy and conventions around its use for short confirmatory messages to maintain and boost self-esteem. Interactions about lesson planning via email provide direct evidence of learning whilst pastoral interactions via SMS are indirectly related to student learning.

Student interactions with UPLs

In contrast to interactions with mentors, student interactions with UPLs via technology were both less frequent and almost exclusively via email.

> Q - So (UPL)'s primary form of communication (when she is not in the room with you) is via email?
> Yes.
> Q - To your student email?
> Yeah (Burton, first group interview)

Students provided interesting examples of the way that different elements of NL would interact regarding communication with UPLs. Particularly regarding the combination of student-to-tutor interactions alongside student-to-student interaction. Students would use SNS to check that everyone was aware of messages from tutors.

> I think we do use it quite well like when we were saying 'oh, look there is a message, go and have a look at the message' or 'has everyone seen the email about that' (Preston, first group interview)

> If someone puts something on the Facebook group that says, 'have you seen that email from (UPL) then I'll go on it then' (Preston, first group interview)

There were different opinions about which element of NL should be the starting point when information was required. Some felt that it was better to approach other students before the UPL whilst others thought the opposite. In the second example, the student illustrates how a one-to-one communication might lead to the sharing of this information via SNS to the rest of the group. In these examples, the interaction with the tutor is one step removed as evidence of learning; in other words, it is when the interaction with the tutor is subsequently shared with other students that it results in learning.

> Sometimes it is just easier to ask one of us lot than to email (PPL) (Preston, first group interview)

> To be honest, if I had any of those questions, I just emailed (UPL), […]
> Q - Did you then share that information when you had got it from (UPL)?
> If I had it, yes (Burton, first group interview)

Whilst the majority of students who shared examples of interactions with their UPL talked about one-way communications, for example where the UPL gave details of tasks that needed completing, or for clarification of details about tasks, times locations etc, some students discussed how email communications with their mentor fulfilled an important pastoral role. In these examples, it appears as though the communications are ongoing and sustained and that they play an important role for the students concerned.

> Q - Do you email (UPL) at all? Much? Often?
> No (many voices)
> Yes (one voice)
> Q - What do you email him?
> Everything! I am just like, oh my god, oh my god! I can't do it … (Preston, first group interview)

> I have been in email constantly with my tutor […]
> Q - Can I just come back then, you said that was particularly helpful to you, could you, is it possible to say, how it has been helpful? Or what impact it has had?
> Erm, it is just a constant really, the support if there is other things going on and with assignment things, questions about my placement, just, I don't know, it has been ongoing thing that I have used with both tutors (UPL and PPL). It has just been useful (Burton, second group interview)

Finally, some students regarded the feedback they received via Turnitin as a form of interaction with their UPL, the final statement in the following example shows how the comments were received in a conversational manner.

> But (UPL's) feedback was great
> Yes, really helpful […]

> I liked it because, it is not necessarily a whole thing that you have done necessarily wrong but it is just maybe you have the wrong word in the wrong place or the wrong date and you are like 'thanks for picking up on that because I wouldn't have done it' (Burton, first group interview)

Key points arising from this section are that students perceive that interactions with UPLs are predominantly via email and that they are one directional. In other words, they are tutor initiated and contain instructions or details of tasks that need completing. The exception to this is exchanges between students and tutors that take place as part of the assessment and feedback process that takes place via Turnitin; some students recognised this as a useful communication channel with their UPL.

Student interactions with others outside the course

An interesting outcome of the group interviews was the information that students provided about the way that they make use of interactions with people who are outside the course structure but who would fall into the role of 'tutor' regarding the elements of NL. In the cases mentioned, the students were building network connections via SNS or email subscription lists with teachers and educationalists who were able to offer guidance support and advice that would impact on the students' professional practice. The first example illustrates how an open group on Facebook is being used as a source of teaching ideas whilst the second one refers to the use of emails newsletters.

> Because you will see a comment and someone will ask 'I could really do with knowing …' there is something you can do to follow the post, so someone will say 'I am teaching Egyptians who has got some really good creative ideas' so you can read what other people have done and they might put a link on to something or a picture of a display. So they are brilliant! (Preston, second group interview)

> Like subscriptions as well like I subscribe to the [unclear] and she sends out emails all the time. and then I have activity village and TES and loads of them and when they send newsletters out every month, if anything appeals to you, you can just click on it and go read or whatever and hear people's viewpoints and such. (Blackburn, second group interview)

Whilst these interactions fall outside of the bounds of this case study, they have been included as they help provide information on the way that students will self-select people to act in the role of tutor and that they will make use of technologies they deem appropriate in order to do so.

4.5.3 Data from student surveys pertaining to Student-to-tutor interaction.

Each of the five student surveys contained questions which related to students' interactions with their tutor. In the context of the survey, 'tutor' was taken to mean their UPL. (Details of

the dates of surveys is presented in Table 3) Figure 7 shows the percentage of respondents who reported having been in contact with their tutor during the past week. It should be noted that the question does not clarify the direction of communication (whether it was the tutor initiating the contact or the student), the direction of communication will be discussed in the final part of this chapter which presents results from the tutor interviews. Also, it should be noted, that in no survey did more than 40% of students report having been in contact with their tutor. The two surveys that show the highest reported levels of contact with tutors are three and five which took place prior to the submission of the first assessment and following the release of feedback on this assessment.

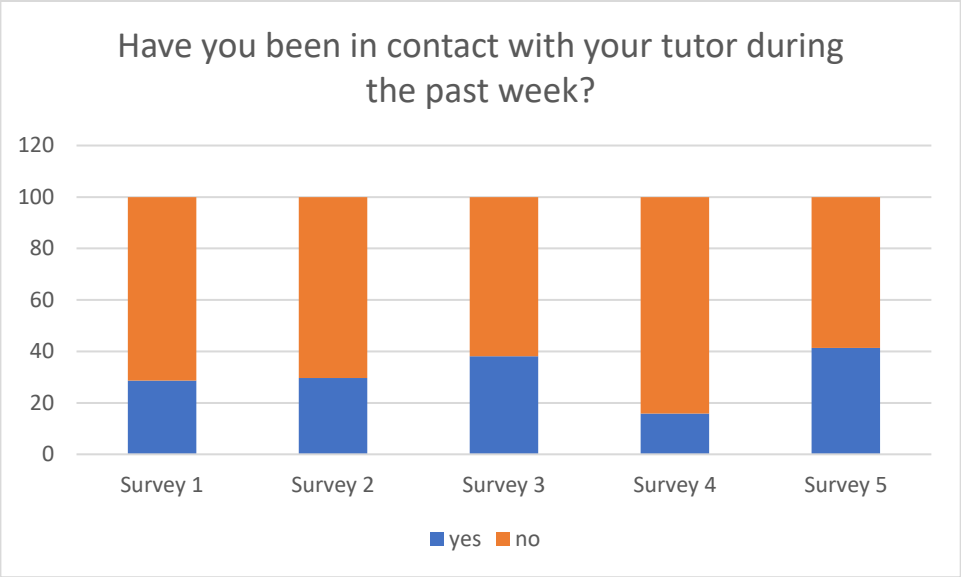

Figure 7: Chart showing percentage of students who have been in contact with their tutor

If students had responded to say that they had been in contact with their tutor, they were asked to provided details of the method they had used to do so. Figure 8 shows that the most significant technological tool used to do so was email. Small numbers made use of phone or SMS contact. (The figures for 'other' can be ignored. The question asked students to only consider contact other than face-to-face. If students selected 'other' they were invited to state how the contact had taken place. In all the examples, students who had selected 'other' stated that it had been face-to-face showing it was a misinterpretation of the question)

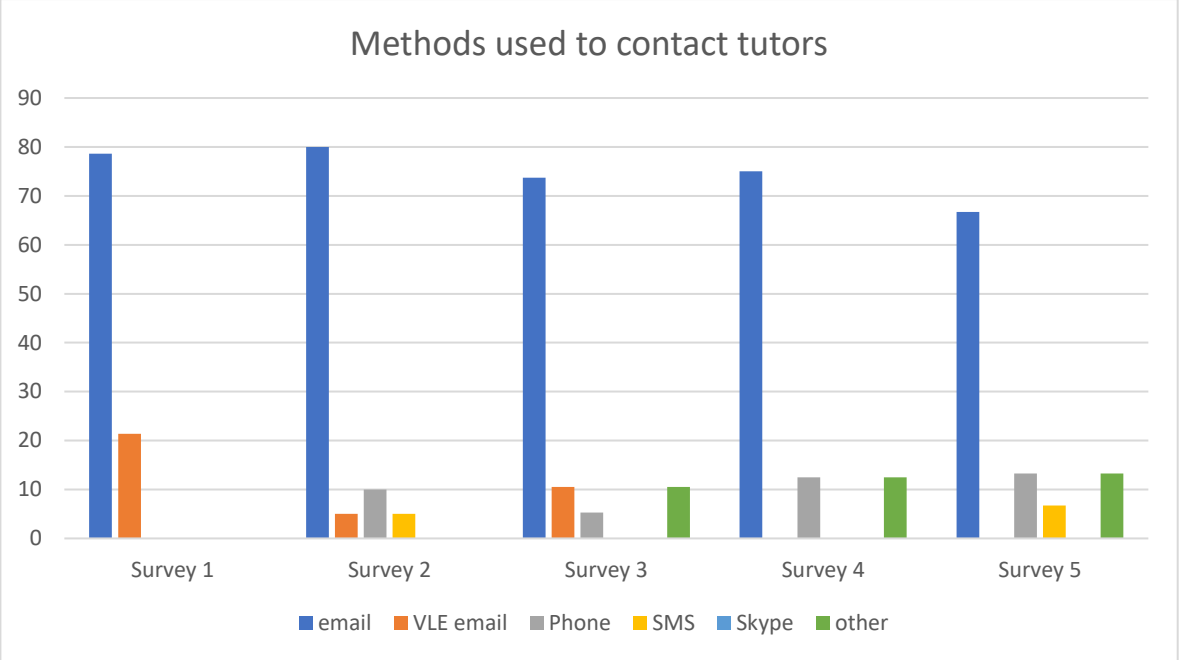

Figure 8: Methods used to contact tutors

In addition to asking about the methods used to contact tutors, students were invited to offer a reason for the contact. The free-text responses to this question were grouped according to topic and are presented in Table 4. It should be noted that the response rates here are very low and so have questionable reliability. However, the two largest reasons for contacting tutors ('Assignment' in survey 1 and 'Placement' in survey 2) are aligned with other data presented that indicate that these course elements dominate student focus at these times. In summary, students engage in low levels of interaction with tutors, but where these interactions do take place they are related to topics concerning student learning.

Category	Survey 1	Survey 2	Survey 3	Survey 4	Survey 5
Assignment	7	1	1	3	
Placement	2	11	1	1	4
Misc	2	3	2	2	2
Tutorial (arranging, details etc)			2		
Health, pastoral, absence			4		2
Session notes / reading / tasks			3		
Job related			1	1	1
Total	**11**	**15**	**14**	**7**	**9**

Table 4: Reasons for tutor contact

Finally, there were two other free-text questions that relate to the NL element of student-to-tutor interactions: “How have you used email to support your learning?” (Figure 9) and “How have you used SMS / text to support your learning?” (Figure 9).

Figure 9 shows that email is used to contact tutors and mentors much more than it is for interactions among students such as sharing planning or exchanging information. This supports other data about the way that students select technological tools depending on who they are interacting with. It is also noticeable that email is consistently used to a greater extent to contact mentors than it is to contact tutors. This reflects other data about the volume of interaction that takes place via technology with mentors.

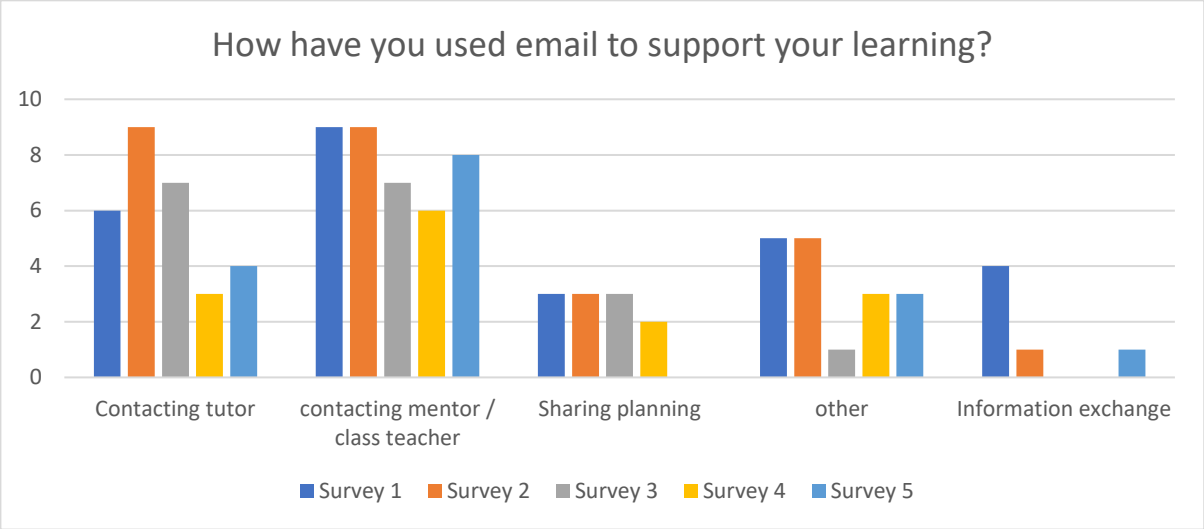

Figure 9: How have you used email to support your learning?

The responses to the question about the use of SMS were grouped and are presented in Figure 10 which shows that there were no reports of students using SMS to contact their UPL and only a handful of examples of it being used to contact their mentor.

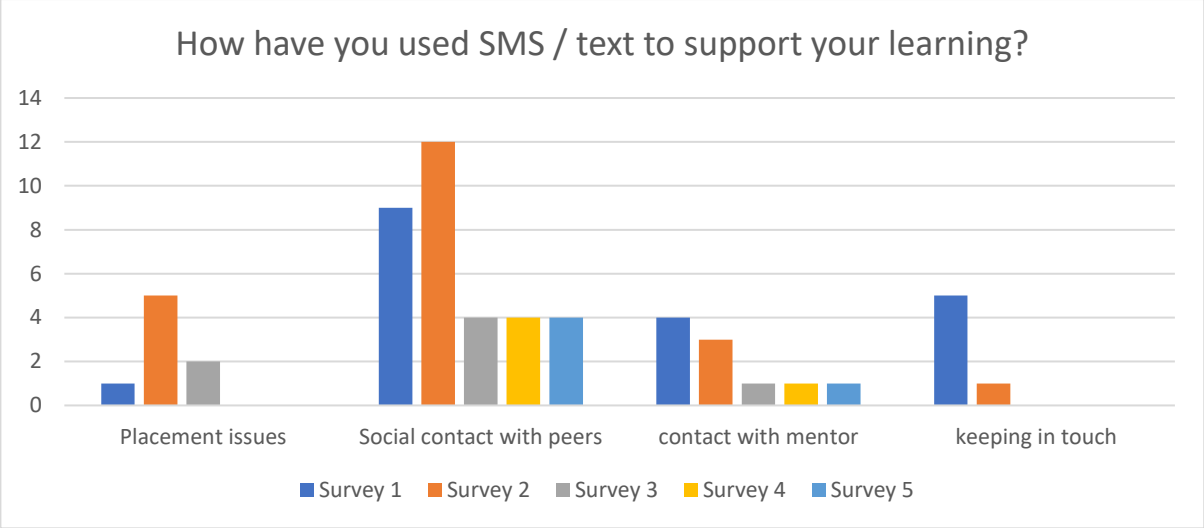

Figure 10: How have you used SMS to support your learning?

These responses from the student surveys show that in each of the five survey periods students typically do not have contact with their UPL via technology. When they do, it is most likely to be via email and that the context for these interactions is likely to be related to assessment activities or placement activities. When asked about the role that email has had in their learning, the majority of student responses indicated that it was used to interact with UPLs or mentors. However, when asked the same question about SMS only a minority of responses related to interactions with tutors and these related to interactions with mentors.

4.5.4 Data arising from interviews with UPLs relating to Student-to-tutor interactions

The first theme that arose from the interviews in relation to NL and the element of interactions with tutors was that tutors' communications with students were often one directional and that there was not an expectation of interaction. Communications were frequently described as emails in which students were informed of tasks or reading that needed to be completed. The following extract illustrates this point, it also implies that tutors are willing to assume that such interactions will result in learning without the need for students to respond.

> I will send them messages, I will reiterate expectations. So, for marking and feedback, I said, "You are going to be getting your feedback back on this date, this is what you can expect". So, it was just reiterating those messages. (Interview with UPL for Preston)

These comments did not exclusively define tutor interactions with students as there were examples where tutors had engaged in sustained conversation with students via email. Where these were reported, they were focussed on pastoral issues rather than directly with

student learning. The following extract summarises this. It aligns with the data from student group interviews where there were reports of students commenting on the value of regular email contact with their tutor.

> But the follow up has been emails. So, after I have set it up, I have kept contact saying 'how are things?' 'hope they are going well' 'let me know' and they have said, they have responded. So, there has been a bit of a dialogue. (Interview with UPL for Burton)

It is possible that the majority of tutor communications were reported as being one directional because tutors appeared to recognise the primacy of face-to-face teaching and the importance which students attach to this.

> Our time with the students is so much about delivering content. However much we say it about facilitation, which it is, but it is still 'this is the session title, these are the learning outcomes, this is what you will get from it' (Interview with UPL for Preston)

This example shows how, even in the face-to-face teaching, the locus of control rests with the tutor and would be aligned with the one-directional flow of communication between tutors and students.

In addition to interactions around teaching, interactions around the assessment process form an important part of the learning process. Here the use of Turnitin for the assessment and feedback process raised some key points. Some tutors felt that it wasn't a useful tool for supporting a dialogue about student learning.

> But I don't think it encourages the student to actually respond to any of it. I don't think there is an opportunity for a learning conversation. (Interview with UPL for Preston)

Whilst others were anxious about the ability of written comments to truly convey an accurate portrayal of the intended meaning of feedback.

> Yeah, and you think you have been really clear in what you have said but it is their interpretation of it at the end of the day, and, you know, they can interpret it differently. Even if you think you have been really clear! (Interview with UPL for Carlisle)

> The students have provided the work, you have given dialogue on it but for them it requires that face-to-face discussion to help the students really understand what is needed. (Interview with UPL for Burton)

This would lead to attempts to engage the students in dialogue about their assignments in order to arrive at a shared understanding of the feedback. Again, this highlights the primacy that tutors give to face-to-face communications. Whilst tutors have offered opportunities for dialogue about feedback, responses from students have been mixed.

> I have had to say 'contact me, let me know what you would like' you know, we can talk on the phone if need be, we can Skype, whatever so it's, you know you can offer, but there is definitely some in there who I am thinking 'you didn't do well, I hope you understand' so I have written an email that says 'you really need to be sure that you have understood fully what the feedback means' and you don't get, […] any comment back (Interview with UPL for Fylde)

> There is only one who has got in touch and she has arranged a tutorial (Interview with UPL for Carlisle)

In addition to tutors typically engaging in one directional communications and having a greater regard for face-to-face contact, they also place limitations on the format of communications with students. The resistance to interact with students on Facebook is grounded in the need to maintain proper professional relationships with students as acknowledged by the following example.

> I'm not part of their Facebook group. In terms of professional distance, I wouldn't want to be either. (Interview with UPL for Preston)

Tutors also attempt to model professional approaches to appropriate times during which communications should take place, for example, through the clarification of office hours. This is evidently a different approach to that taken by mentors who students talked about contacting during evenings to discuss planning.

> I'll be perfectly honest, I'll say to them, 'right, my working week is 9-6 Monday to Thursday, 9-5 on a Friday (except when I am here with you of course)' But I don't work weekends. I do, but they don't need to know that. I don't do my emails at weekends (Interview with UPL for Carlisle)

The most common technology tool used to communicate with students is their university provided email account. Again, this is grounded in reasons of professionalism and security.

> Q - Email, is that your primary form of communication?
> Yeah, that is all I use and all we encourage them to use, partly because you have got that security of it coming through the university system. (Interview with UPL for Carlisle)

> But again at induction we say, "Right, from now on, the only emails you will get, will come to your student account. You can forward that to your personal email, that is fine. But, you know, that is all we are going to use" (Interview with UPL for Carlisle)

In addition to university email accounts, there were mixed views about the use of mobile phone to maintain contact with students. Some indicating that they would never consider it, some that it would be OK if it were a phone provided by the university and others who have given out personal phone details in specific cases. Again, these examples are to be

contrasted to feedback given by students about the frequency with which they contact mentors via mobile phone.

> Q - Do the students use anything different? Do they have your mobile?
> No.
> But if you are getting a new university phone … ?
> I might then give them my number (Interview with UPL for Burton)

> In certain cases, where there have been real issues, I have given my mobile number. Because I am not in the office very much. I am very rarely in my office so I either give them my mobile or it is going to be home so it is one or the other (Interview with UPL for Fylde)

Key points that can be drawn from this data are that UPLs readily acknowledge that most of their communications with students are one directional. That is, they are the ones to initiate the interaction and that the nature of the communication does not typically lend itself to a response from students. Despite the availability of a range of technologies to facilitate interactions with students, UPLs will typically select email, citing concerns over professionalism and privacy in relation to other technologies such as SNS or SMS. One area where UPLs interact strongly with students via technology is through Turnitin, however, even here, tutors will revert to face-to-face interactions if detailed discussions about feedback are required. All of which is suggests that tutors do not see the potential of interactions facilitated by technologies to have great value in learning.

4.6 Student-to-student interactions

This section relates to interaction between students and other students and is aligned with the sub-question:

How do students use technologies to support student-to-student interactions?

It is the richest in data and consequently this section is extensive as it attempts to provide a comprehensive overview of these interactions. The data source which provides the most detail in relation to this element of NL are the interactions that took place between students via SNS, the intensity of these interactions is suggestive of an impact on learning as proposed by Kožuh et al. (2014). These are the first to be presented. Following this is the data arising from the two rounds of group interviews with each of the five participating groups of students. Finally, the data obtained from the five surveys that took place at intervals during the data collection period are presented.

Of the groups participating in this study, one (Blackburn) had selected WhatsApp whilst the other four had chosen to create a Facebook group. Of these four, one group had opted not to provide the content of their Facebook group as data for the study.

4.6.1 The use of Social Network Analysis within NL

When exploring student-to-student interactions within a NL framework, a commonly used approach is that of Social Network Analysis (SNA). Authors such as De Laat et al. (2007a), De Laat et al. (2007b), De Laat et al. (2006) and De Laat, Lally (2004) have adopted such in order to explore 'who is talking to who', this can then be combined with other approaches such as content analysis and contextual analysis to explore 'what they are talking about' and 'why they are talking about these things' (De Laat et al. 2006, 338).

SNA is a method of analysing the structure of networks that is based on graph theory. In addition to making use of network graphs that show how actors in a network are connected to one another it can provide statistical descriptions of the relationships between actors. Due to the way that WhatsApp presents posts in a single continuous thread, it is not possible to extract meaningful data that shows who has interacted with whom, thus the Blackburn group's data is not included in this section. The information contained within the Facebook data meant that it was possible to transform the information about who commented on each thread into a matrix based on who started posts and who replied to them. Having done this transformation, the data could be imported into UCINET (Borgatti et al. 2002) (a software tool for SNA). This allows for the generation of SNA graphs as well as providing statistical analysis of the relationships between actors.

4.6.2 Graphical representations of Social Network Analysis

SNA graphs provide a visual representation of which actors (students) in a network are connected to one another. On their own, they are somewhat descriptive, it is when they are combined with statistical analysis that they become valuable tools for understanding the nature of relationships in a network. The network graphs presented also provide a representation of betweenness; this is a measure of centrality and shows those students who are more central in the network and through whom, most connections flow. Larger nodes represent a higher degree of betweenness centrality. They also provide a representation of tie strength; this is a measure of how many connections between two students exist. Where two students have had multiple connections, the line connecting them will be wider than for students who have had less.

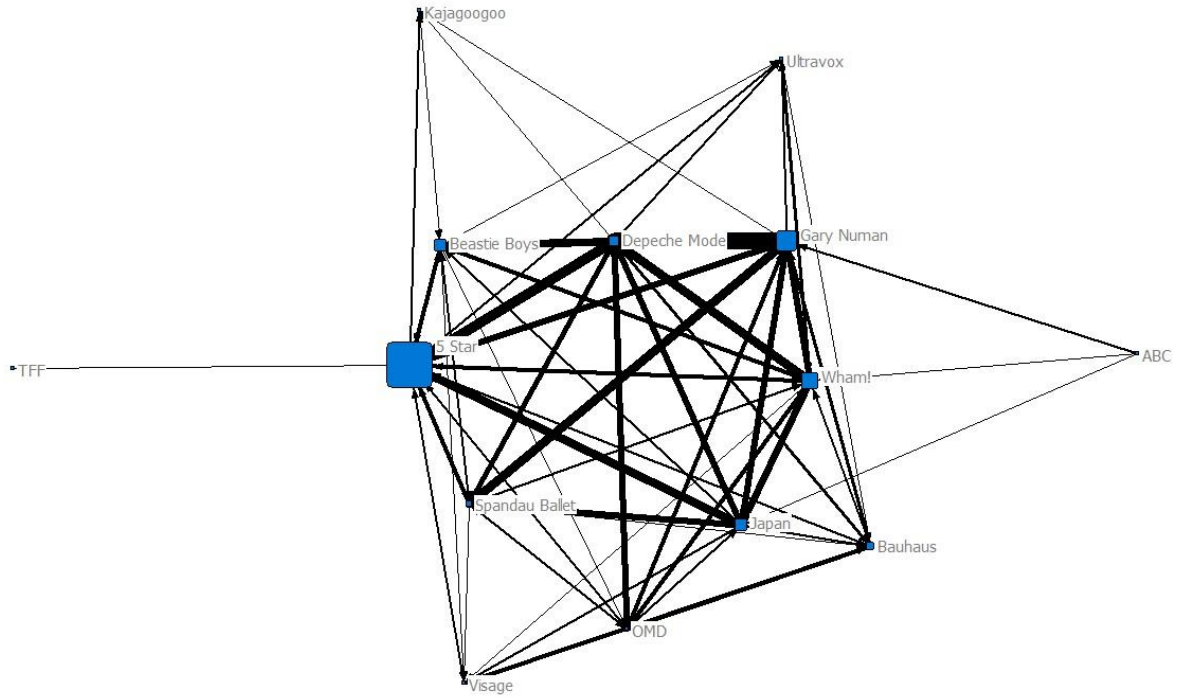

Figure 11: SNA graph for Preston

In Figure 11 it can be seen that there is single student (5 Star) who is most central to the network, having communicated with the largest number of other students. In contrast, there is also a single student (TFF) who exclusively has a connection to the most central student.

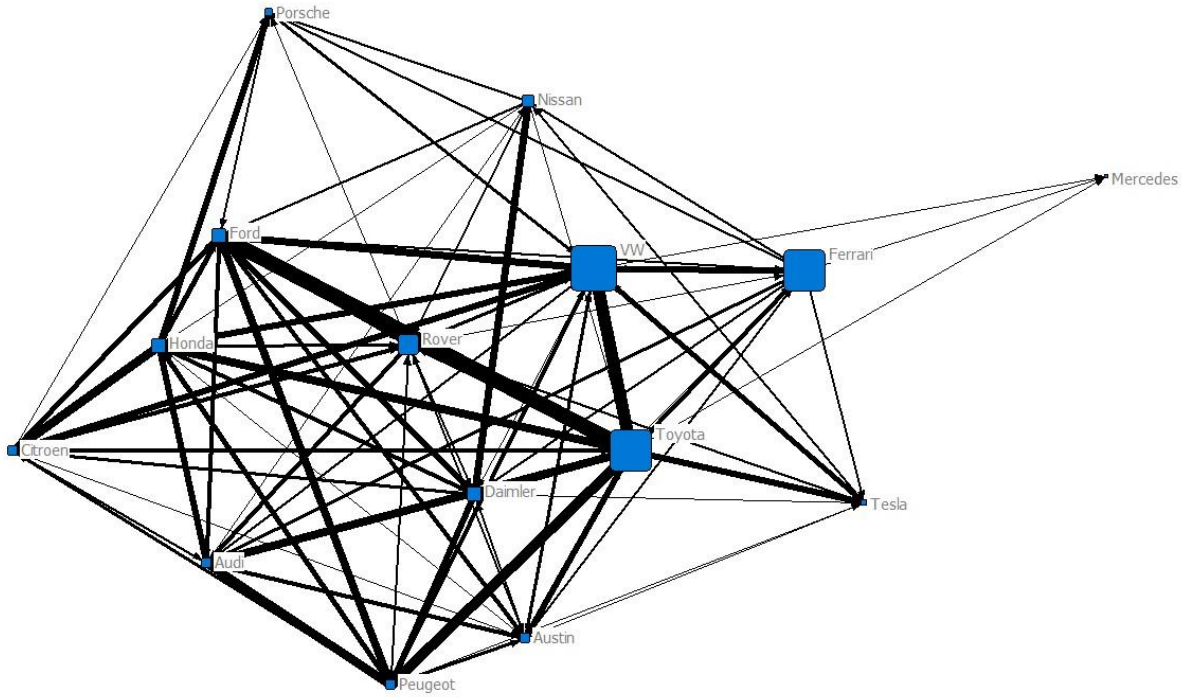

Figure 12: SNA graph for Fylde

Figure 12 shows a different pattern as there are three students (VW, Ferrari and Toyota) who have a high degree of betweenness centrality and the most unconnected student (Mercedes) still has connections to three other students, who happen to be the most connected.

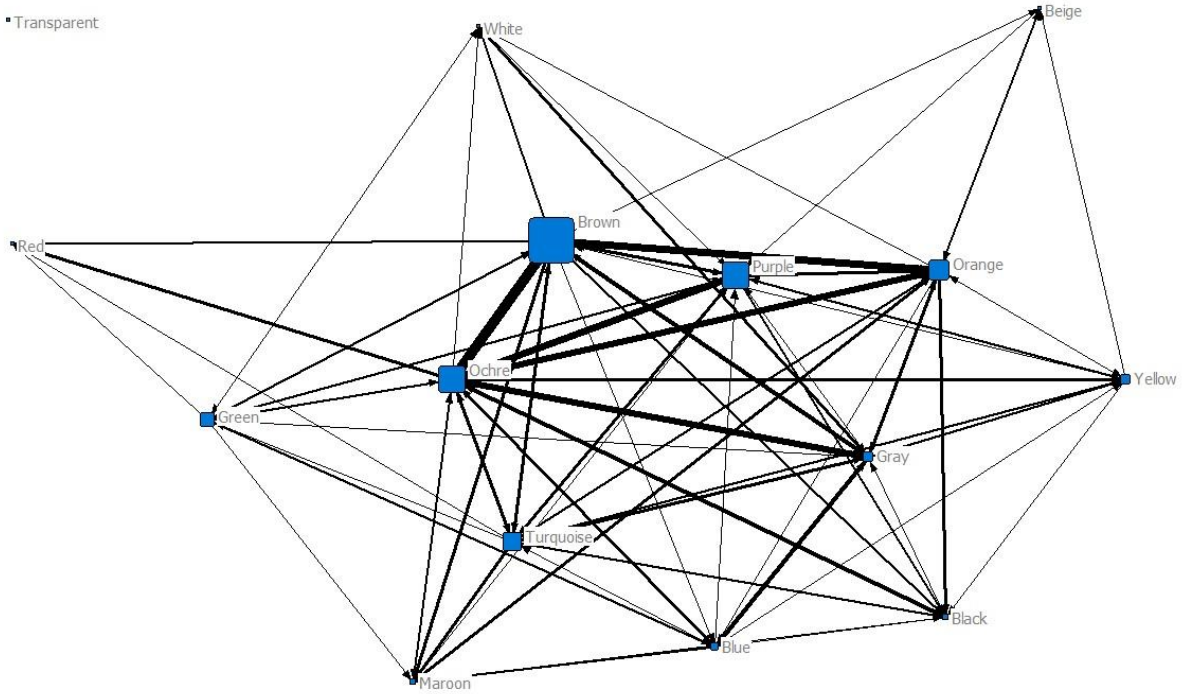

Figure 13: SNA graph for Carlisle

What Figure 13 shows is that for the Carlisle group, like for Preston, there is a single student (Brown) who is has a significant role in the network as represented by their high degree of betweenness centrality. Unlike the other two groups, there is a second tier of students who have a moderate degree of betweenness centrality (Ochre, Purple and Orange) which explains the more visually apparent interconnectedness as represented by the number of lines in the graph. It should also be noted that there is a single student in this group (Transparent) who is a member of the Facebook group but who has not participated in it by either starting a post or responding to a post made by another student.

These graphical representations show that each group typically has a small number of students who have a high betweenness centrality. There are also small numbers of students who have low betweenness centrality and they lie on the periphery of the group having interactions with only a small number of other students. Each of the three graphs shows an extensive range of connections between the students indicating strong and robust networks.

4.6.3 Statistical data arising from Social Network Analysis

In addition to the visual depictions of the networks, UCINET has inbuilt tools to automatically generate statistical descriptions of the relationships in the network. As has previously been discussed, the way that WhatsApp group messages are handled means that it has not been possible to summarise the network interactions and so this statistical data is only available for the three participating groups that have chosen to provide their Facebook conversations as data.

Freeman centrality measures

Freeman centrality is a directional measure that creates two measures for each actor: in-degree and out-degree. In-degree centrality is a measure which represent how many in bound connections a given actor has, this is representative of their value within a network. Those with a high in-degree centrality are valued as many others within the network have, or seek to establish, connections with them. Conversely, out-degree centrality is a measure of how many connections an actor has with other actors in the network; those with a high out-degree centrality are not restricted to single or limited sources of information and can go to many places for information.

The highlighting applied to Table 5 helps to identify the most significant actors for each alliance (the shading has no significance, it has been applied to help identify higher values more easily). Because Freeman centrality is a directional measure, it provides insight into the direction of links in the relevant networks, because of the way the relationships in the network were generated from the Facebook data, this equates to measures that show the differences between students who made initial posts (out-degree) and those who responded to posts (in-degree). What is of interest in Table 5 is that it shows that there are some differences between the students with a high betweenness measure as indicated in the SNA graphs and those who have high centrality measures. A further distinction to be drawn is the subtle differences between those students who start posts (out-degree) and those students who respond to posts (in-degree); some students are central in both measures while others are only central in one measure or the other.

Preston				Carlisle				Fylde			
student	in-degree	student	out-degree	student	in-degree	student	out-degree	student	in-degree	student	out-degree
Depeche Mode	75	Depeche Mode	63	Ochre	66	Ochre	89	VW	77	Toyota	90
Gary Numan	54	Gary Numan	63	Orange	53	Brown	79	Toyota	67	Ford	75
Wham!	47	Japan	51	Purple	46	Turquoise	41	Audi	62	Honda	70
5 Star	45	5 Star	50	Gray	46	Orange	35	Ford	60	Peugeot	60
Japan	33	Wham!	36	Brown	31	Gray	32	Daimler	49	Citroen	38
Spandau Ballet	30	Spandau Ballet	29	Yellow	29	Purple	31	Citroen	36	Austin	34
OMD	30	OMD	26	Maroon	28	Blue	22	Honda	29	Rover	33
Beastie Boys	29	Beastie Boys	25	Turquoise	21	Green	21	Rover	27	Ferrari	29
Bauhaus	13	Bauhaus	24	Yellow	17	Yellow	12	Peugeot	27	VW	23
Ultravox	12	Visage	8	Red	14	Black	5	Porsche	17	Nissan	18
Visage	8	ABC	5	White	11	Beige	5	Austin	15	Daimler	14
Kajagoogoo	4	Kajagoogoo	1	Blue	10	Maroon	5	Tesla	15	Tesla	10
TFF	1	Ultravox	0	Green	5	White	3	Ferrari	11	Porsche	7
ABC	0	TFF	0	Beige	3	Red	0	Nissan	8	Audi	2
				Transparent	0	Transparent	0	Mercedes	3	Mercedes	0

Table 5: Freeman centrality measures

The Freeman centrality measures support what is visually obvious in the SNA graphs: namely that there are a small number of students who are central to each network and a greater number who are peripheral. An additional outcome of the Freeman centrality measures is that of in-degree and out-degree, this highlights that there are some students who are more likely to respond to posts made by others than to start posts themselves.

4.6.4 Chronological analysis of Facebook and WhatsApp data

As all the posts that are made to both Facebook and WhatsApp are 'time stamped' they include data about the date and time the posts were made. The only exception to this relates to a problem with the extraction of the data from Carlisle which meant that the comments from students were not date stamped and so this group's data is excluded from this section. This allows for an analysis of the frequency of posts over the duration of the study period.

Analysis of SNS usage over time

By summing the number of posts made in each week-long period it is possible to see the frequency of posts over time, these are shown in Figure 14, Figure 15 and Figure 16. These charts are overlaid with two additional forms of information: firstly, a trend line to aid the identification of periods of high and low usage by students, and secondly, text boxes to indicate key points in the course. The first of the text boxes shows the date of the start of the course, it can be seen in Figure 14 that this group formed their Facebook group prior to the start of the course, whilst the Fylde group (Figure 15) only formed their group at the point when the course began. There are two text boxes that point to specific dates on the timeline, the first of these is the deadline for the submission of the formative assessment activity for the first module and the second of these is the deadline for the submission of the summative assessment of the first module.

There are also two text boxes that indicate the period during which the Beginning and Developing placements take place. The left-hand end of each box marks the start of each placement whilst the right-hand end marks the end of each placement.

The extending placement and the submission of the summative assessment activity for the second module fall outside the period of this study.

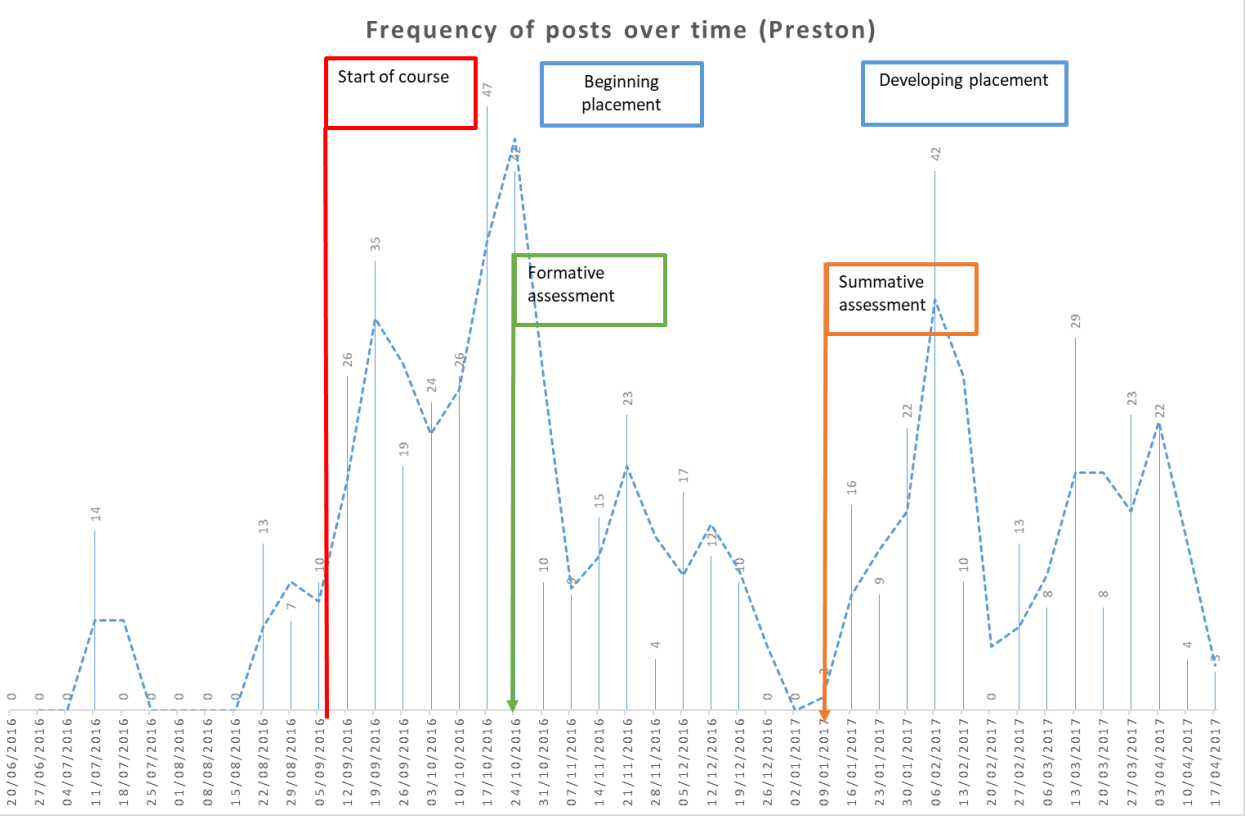

Figure 14: Frequency of posts over time (Preston)

Figure 14 shows that there was a single week of activity within the group between the formation of the group and the start of the course. The start of the course marked a steady increase in use followed by the period of highest use in the weeks preceding the submission of the formative assessment of the first module and the start of the Beginning placement. Usage fell to nothing in the period over Christmas and New Year and rose again afterwards showing a spike of use in the middle of the developing placement.

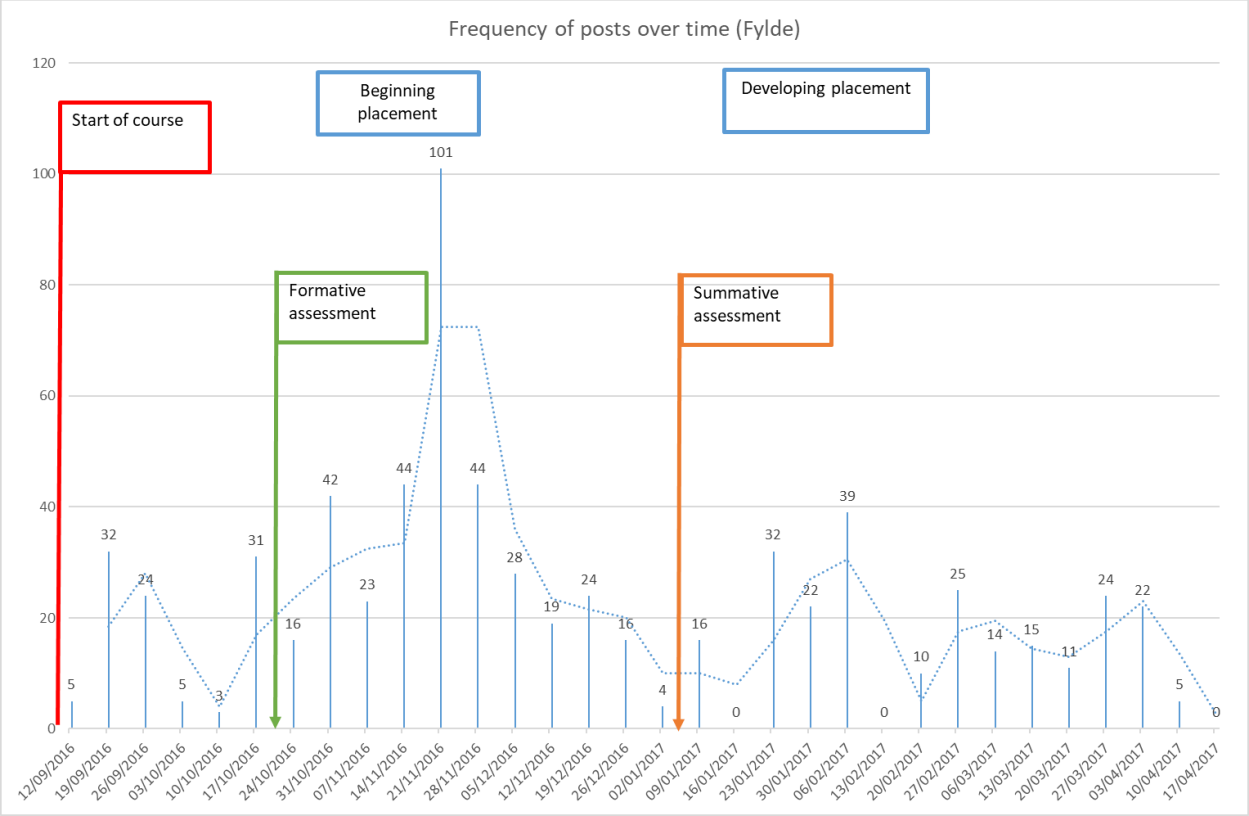

Figure 15: Frequency of posts over time (Fylde)

Figure 15 shows that the Fylde group made moderate use of Facebook following the start of the course. Their usage did not show the spike in use prior to the formative assessment of module one that the Preston group displayed in Figure 14, however, they do show a period of high intensity use during the middle of Beginning placement. Like the Preston group, they show a drop in Facebook use over the Christmas / New Year period but unlike the Preston group, their use from that point on remains steady showing no further marked spikes.

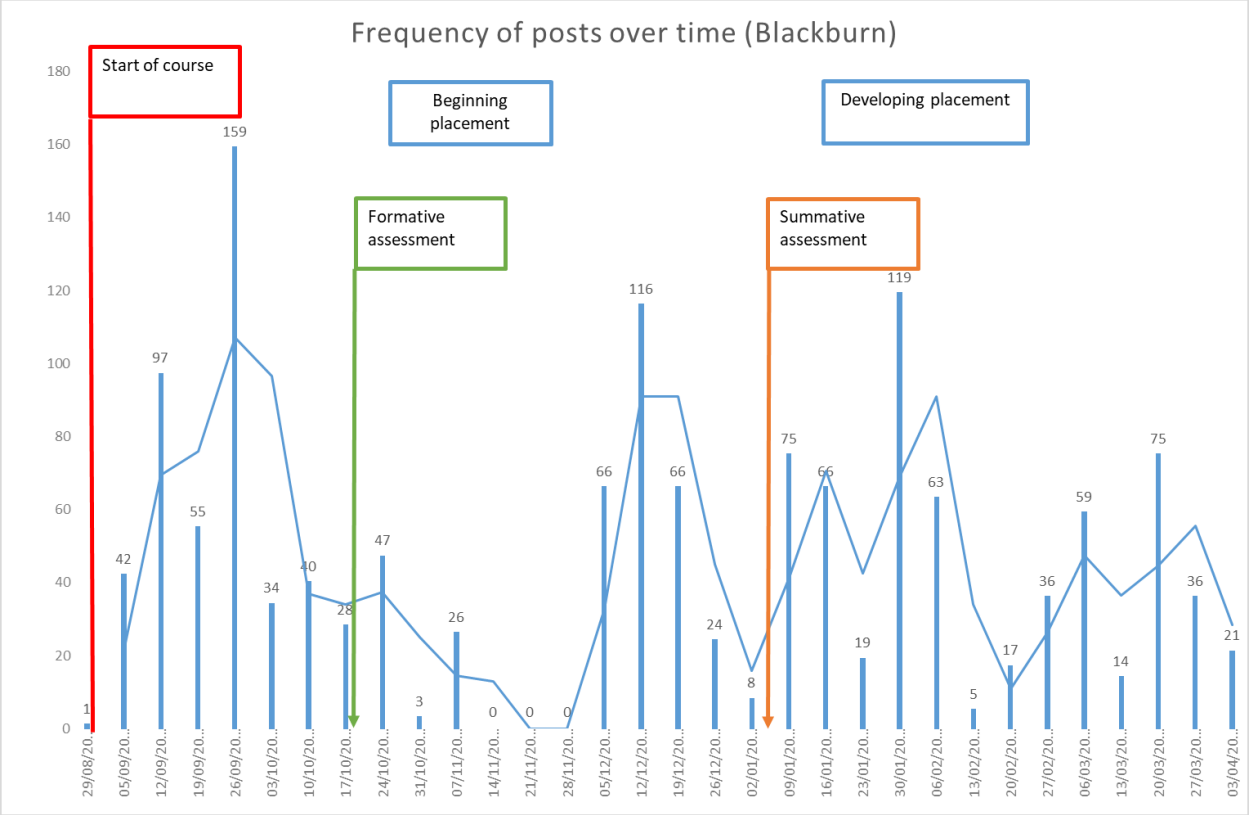

Figure 16: Frequency of posts over time (Blackburn)

Figure 16 shows a pattern that is different from each of Preston (Figure 14) and Fylde (Figure 15) indicating that the way each group makes use of Facebook or WhatsApp is unique and that there are not general trends that are specifically linked to key course activities. The first point to highlight is the peak in use in the period between the start of the course and the formative assessment submission. There is a marked drop in the use of WhatsApp by this group during the period of the Beginning placement which is followed by a sudden rise in use in the period between the end of Beginning placement and the Christmas break. Like the other two groups, there is a quiet period corresponding to the Christmas / New Year period although use does not fall to zero. Finally, there is spike in use in the middle of the Developing placement.

In summary, this section shows that each of the three groups for whom this data is available make different use of SNS at different points in the course and that there is not an obvious pattern to usage. Each group makes use of SNS at different points in the course according to the needs to the members of the group rather than in relation to course activities. An implication of this relates to the claim by Kožuh et al. (2014) that intensity of interactions can be considered as evidence of learning and that students are choosing to use these

interactions in relation to course activities to support their learning. An overview of content analysis of SNS transcripts

A twofold approach has been taken to the analysis of the content of student Facebook and WhatsApp discussions. The first is based on coding of the discussions at a semantic level using codes which have been developed from a combination of the codes used by Aaen and Dalsgaard (2016) and Selwyn (2009). When reading the discussions with these coding structures in mind, it became apparent that they would need to be amended in order to fit both with the content of the discussions and the nature of this study. There appears to be a distinction between Aaen and Dalsgaard's (2016) codes which categorise the *context* of discussions and the codes generated by Selwyn (2009) which categorise the *content* of the discussion. Thus, each semantic section of text was coded using two sets of codes, the first using a context code that was derived from Aaen and Dalsgaard (2016) and the second a content code derived from Selwyn (2009). These codes are presented in Table 6.

Whilst the reliability of coding can be strengthened by the use of multiple coders comparing their results for similarity and accuracy, this has not been possible in this study. One factor that mitigates against this is that only one person has been involved in the coding process meaning that issues of consistency that can arise when there are multiple people working to code discussions are not relevant. A further measure that mitigates against this is the reviewing of the coding outcomes after a period of three months to evaluate the extent to which the codes were deemed accurate and appropriate. This is evidently not a wholly reliable approach but it did confirm that only minimal changes to the coding of the discussions was required which offers an indication that they were accurately attributed.

Given the nature of the coding system, which was developed in order to be relevant to the research question, combined with the format of the data which is structured around interactions on a wide range of topics, it was most appropriate to apply these codes at a semantic level. Thus, through frequent reading and re-reading of the text, blocks of meaning were identified and then coded rather than coding each post which would have resulted in the loss of detail and meaning.

Aspect	Codes	Description	
Context codes	Assignments	Discussions that relate to assignments in any form	On-task interactions
	Placement	Discussions about school placements	
	Jobs	Job searches, vacancies, applications, interviews etc	
	Details	Where the details of times of training, locations etc form the basis of the discussion	
	Workload	Conversations about how much needs doing on the course	Around-task interactions
	Social	Discussions about social activities such as nights out	
	Tasks	Where the topic is related to things that need doing or completing as part of the course	
	Misc	Other discussions that do not fit into the other named categories	
Content codes	Affirmation	Where posts are seeking affirmation from others e.g. Am I doing this right?	
	Banter	Humorous exchange, joking	
	Bonding	Where the aim is to strengthen social bonds e.g. social meetings, emotional support	
	Details	Finding or providing details about the course	
	Help	Where the thread goes beyond simple provision of details and offers support such as ideas for teaching activities	
	Misc	Where the purpose of the thread does not fit any of the other categories	

Table 6: Context and Content codes used to categorise SNS discussions

4.6.5 Content analysis of SNS transcripts based on both content and context of posts

Having started with statistical analysis of the structure of the groups to work out who was talking to whom, the discussion moved onto the content of the discussions with an aim of working out what they are talking about. It will now move onto a more detailed analysis of the content of the discussions.

Drawing on the most frequently occurring combinations of context and content codes in the SNS transcripts allows for the identification of examples of interactions that are most significant to the participants. A selection of these is presented below.

Mary	Anybody else having a complete brain fart about the assignment?!
Veronica	Noooo, sad but true that I'm enjoying myself
Veronica	What are you worried about?
Mary	Just trying to find research that will guide me and I'm struggling. This week after I've done my reading, I'm going to knuckle down. Feeling slightly overwhelmed! 😬😬😬
Veronica	I'm certain that you'll be absolutely fine. Most probably worried as you've not got all the information you want just yet... But when you have everything will fall into place. We have months until submission date so don't let it bother you (extract from Blackburn SNS transcript)

This extract is an example of an on-task exchange as it relates to an assignment. In it the students are reassuring one another about how the formative presentation will go indicating that its content is social in nature.

Orange	Hmmmm...reading/preparing or Bake-Off. The calling is very strong...I've got a little PowerPoint too but (a) it won't disguise the fact that I'm not on top of this and (b) it won't work because it involves IT. Break a leg everyone (then I can say my bit to an empty room)
Purple	I've got some slides but I'm just going to talk, talk and talk...and talk and talk and talk
Brown	Shit I've got guest speakers coming in and the lot
Yellow	Haha yes Turquoise!
Ochre	i must admit, i have a little powerpoint. But it is purely because it was the only way i could find structure in what i was reading! Nothing too snazzy :)
Turqoise	"I would like to present to the cohort collective, (*PPL)* and (*UPL)* my formative proposal on peer assessment within Assessment for Learning.....through the medium of interpretive dance" (extract from Carlisle SNS transcript)

This extract is also an example of a typical on-task discussion, also relating to the formative assessment activity. Here the content is also social in nature but in this example, the content of the exchange is based on humour / banter.

Depeche Mode	Thanks lovely. Cacking it
Japan	cant say i have, only by PPL but hes really cool with everything so i can imagine UPL will be aswell, good luck youll smash it! :)
OMD	Good luck Depeche Mode!!!
Gary Numan	Good luck Depeche Mode (extract from Preston SNS transcript)

The other category of on-task discussion, relates to placements and the above extract is representative of such interactions. In it, the content can be seen to be social in the form of bonding and mutual support. The students are discussing a forthcoming observation for

Depeche Mode, sharing their experiences of observations by other tutors, wishing them luck and asking for feedback both on how the observation goes but also on the format it takes so that others may benefit from this information.

Black	I was totally dippy, was not meant to reveal the picture in the story as the children were meant to draw the scene from their imagination... However I held the book up for them all to see aaarrgghhhhhh! Managed to save myself by reading another scene but was not as good to draw! I'll get there, slow progress!
Gray	I saw you today Mr Black - you were taking the class in at lunchtime (at least I think it was you!)
Orange	Did yours go to plan? I expect you delivered, you've got the knack sir!
Orange	Phonics lesson no. 1 tomorrow. It's gonna be clunky (extract from Carlisle SNS transcript)

This is a second example of an on-task interaction relating to placements, which, like the previous two, has a content which is social in nature. In it, the students are clearly at ease with one another as they are comfortable sharing their experience of a lesson which has not gone well.

All of these examples provide some evidence of the relationship between strong social relationships and informal learning, particularly through the interplay between cooperation, interaction and encouragement that El-Deghaidy and Nouby (2008) discuss.

Chloe	Can anyone help me out. I am teaching creative writing tomorrow and I have been asked to encourage the children to use specific nouns. Can any one
	explain to me what a specific noun is? And provide an example.
	Google is not cooperating
Herbert	Would it be like someone's name? Or a certain thing?
Veronica	http://ourenglishclass.net/class-notes/writing/the-writingprocess/craft/specific-nouns/
Veronica	Try that website Valarie, I hadn't a clue what one was.. think I've a good idea now (extract from Blackburn SNS transcript)

This example is an on-task interaction related to placement in which Chloe is seeking advice from her peers. There are two responses and interestingly, Veronica has used the question as a prompt to develop her own understanding of the question in order to answer Chloe's question.

Peugeot	It takes me about half an hour to get to N****** and I live literally just round the corner from C******. Traffic is usually okay for me in the morning but I'm not sure what it's like coming the other way xx
Daimler	That is not as bad as I thought then thank god for that!! Thank you xxx (extract from Fylde SNS transcript)

This on-task interaction about placement is based on the details of commuting times to placement schools.

Mary	We got them week before last. I'll email them to you x
Mary	Done x
Chloe	Thanks x (extract from Blackburn SNS transcript)

This on-task interaction about assignments shows how students will use SNS to help track down course documentation. It is revealing that the first port of call appears to have been the SNS group rather than contacting the UPL or searching for the document on Blackboard. The rapid response by Mary probably indicates why such an approach is so effective in comparison to searching Blackboard or waiting for a UPL to reply during their office hours.

Gray	Yep, definitely on countdown now!!
Orange	Me too. I can only think of it as having to grit teeth and get through the next 6 days. One day at a time. Need to spend some quality time with the kids. Roll on this time next week. maybe then it will make sense...
Ochre	Good plan! I'm planning a sequence of lessons about exercise.. might jog on the spot for 5 as research!
Orange	Ochre ugh I hate that feeling. take a break, maybe get 5 mins fresh air (have a fag, as they say)
Ochre	You lucky thing, ive been working on the same plan for 3 hours and it still makes no sense at all.
Orange	I struggled to get out of bed as I knew it would be plan, plan, plan until I drop....getting through it now though... (extract from Carlisle SNS transcript)

There were many examples of around-task interactions such as the one above which relates to the workload on the course. This example also illustrates how students would frequently include self-disclosure in their messages as exemplified by the details about family life included, suggestive of relationship between social interactions and knowledge sharing behaviours that Yilmaz (2017) refers to.

Black	You are more than welcome at our house, just having a few friends round. It will be board games, food and drinks... Mx
Purple	Can't help you bud, there'll be a party on every corner I'm sure that you can join in with. Spoons is a good shout Yellow. Me...I'll be taking part in a game of pictionary that over the years has made men cry
Yellow	I'm Brampton bound with (*name of wife)* family for New Year. Just head to Spoons mate
Ochre	I'm afraid I am no help. I'll be amidst an intense monopoly championship... old before my time see (extract from Carlisle SNS transcript)

The examples above and below are indicative of interactions that were neither on-task or around-task and were most appropriately categorised as social in both context and content.

Kathryn	Anything happening for fat fry up/full breakfast Fridays tomorrow?
Veronica	I hope not! My purse is getting lighter by the day 😩
Fester	Me, Bob and Dave are going to the pub after lecture to get some food and do the poster if you and Mary want to join us and do yours at the same time? We can do some collaborative work with each other that way? Just a thought (extract from Blackburn SNS transcript)

What these extracts illustrate is that the use of a matrix type approach to consider both the content and context of student-to-student interactions via SNS reveals that students make use of SNS to support their learning in diverse ways. Discussions about placements and assessments are prevalent contexts for discussions and the content of these discussions is equally diverse. This reflects the way that students have adopted these SNS interactions to focus on student-led learning about things of relevance to them in contrast to the UPL-led learning within the credit-bearing modules.

4.6.6 Content analysis of SNS transcripts based on social presence indicators

There was a high frequency of extracts that were coded as social in relation to their context and content. In order to gain a greater understanding of the role these play and how students develop their social bonds via SNS, an analysis was conducted to explore the way in which the students developed and expressed their social presence via their SNS groups. This

is of importance as SNA measures do not always reveal social presence and there is an argument to support the idea that social presence is an important factor in learning (as discussed in section 2.4)

This second layer of coding took place at a quasi-sentence level purely using an inductive approach. Due to the way the students' course is structured, they only spend a maximum of two or three days per week together as a group (depending on how each alliance arranges its timetable). In addition, during placements (Beginning and Developing) the students are not together as a group at all. This places a great degree of importance on the SNS groups as places of social bonding and cohesion. Consequently, the SNS transcripts were coded using Rourke et al.'s (1999) Community of Inquiry model, Social Presence indicators. These are summarised in Table 7. This helps to provide insight into the way in which students use a virtual space to establish and maintain a social presence online on a course where there is limited whole group face-to-face interaction (although the course is face-to-face / blended as has been mentioned, there is a lot of time when the students are not together as a group).

Domain	**Indicator**	**Description / Example**
Affective Domain	Emotions	Where a poster or respondent expresses emotion e.g. "I'm sorry to hear it went badly for you
	Humour	Where a post is humorous directly, through sarcasm or via emojis e.g. 😊
	Self Disclosure	Where a member of a group reveals personal details in a post e.g. "I can't come out as I am babysitting"
Cohesive Domain	Inclusive Pronouns	The use of pronouns such as *us, we, our* that indicate that all members of the group are a cohesive whole
	Phatics / Saluations	Where a post performs a social function that does not communicate meaning
	Vocatives	Referring to others by name
Interactive Domain	Agreeing	Expressing agreement with an idea of post
	Asking Questions	Either starting a thread with a question or posing a question in response to a post

	Complimenting	Complimenting or thanking another poster for their online contribution
	Continuing	Where a post responds to a previous comment

Table 7: Summary of Rourke et al.*'s (1999) Social Presence indicators*

Rourke et al. (1999) also include quoting from others' messages as an indicator of social presence in the interactive domain. This was excluded as a code when analysing the discussion because it is not relevant to Facebook or WhatsApp discussions that do not utilise quoting tools in the same way that discussion boards within a VLE might.

Affective domain: Emotions

Fester: First day wooooo🍾🍾🍾

Black: I'm definitely staying out later next time, thought of rejoining you all at 9pm, now I'm jealous I didn't!

TFF: Can't believe they told us the wrong date, what a joke! I'm annoyed because I wanted to use Thursday night to finish off and submit! It's my own fault for not starting it yet! X (extract from Blackburn SNS transcript)

These three examples show the range of ways that students express their emotions via Facebook and WhatsApp. Through excitement at starting the course, of feelings of having missed out by not taking part in a social engagement or frustrations with deadlines and the pressure of work.

Affective domain: Humour

Veronica: Hahahaha get an hours kip in! We are only just setting off

Ochre: So true. Haha just kidding. Uni @ 8?

Fester: 💩💩💩💩💩 (extract from Blackburn SNS transcript)

The first two examples show the use of text to convey humour through the use of 'Hahahaha' or 'Haha', there were also many examples of 'lol' (laugh(ing) out loud) in the text or winking faces (😉) as well which indicate that the students are familiar with the potential for misinterpretation that text conversations can have. The third example uses emojis as a humorous response. The use of emojis was widespread.

Affective domain: Self-Disclosure

Beastie Boys: Yea I bet:(oh I kno I've not even done half of that stuff! I'm finding it so challenging and tiring prep wise/ learning things, but feel ok in the classroom. I think I'm just so tired it's making me feel ill. Need to start having more breaks and actually see my family, miss the kids so much! X (extract from Preston SNS transcript)

VW: I've been on the prosecco. Drunk now. (extract from Fylde SNS transcript)

> Brown: Hi, I work at the gym and the membership is well worth the price. We also have a number of fitness classes running at the University. If you live in areas such as xxxxxxxxxx, yyyyyyyyyy or zzzzzzz you can also access the GLL better leisure facilities there. (extract from Carlisle SNS transcript)

The students clearly felt comfortable to engage in self disclosure in their SNS groups as it was frequently coded. Many different aspects would be revealed as these three examples show. Firstly, a disclosure about personal stress which also includes a reference to family life. Secondly, a disclosure about drinking on a night out. Finally, a student is revealing details of their life outside of the course and offering some help / advice to the other students based on knowledge gained.

Cohesive domain: Inclusive pronouns

> Chloe: Are you guys doing a PowerPoint for Thursday or just standing and talking? (extract from Blackburn SNS transcript)

> Orange: I'd love to but have inkling I've got a parents' evening for my wee lass. I'll check but will make every effort - need to have an alcoholic beverage with you fine people! (extract from Carlisle SNS transcript)

> Ochre: Itll be a kind reminder of what it used to be like...before we engaged with this madness! (extract from Carlisle SNS transcript)

There is a very varied use of language that was coded as 'inclusive pronouns' beyond the terms that might commonly be expected such as 'us', 'we', or 'our'. The first example makes use of 'you guys' in a query about a forthcoming presentation. In discussing a social night out in the second example, Orange refers to 'you fine people'. The final example is a more standard use of 'we' used in a comical reflection about the workload pressure on the course.

Cohesive domain: Phatics / Salutations

> Kathryn: Thanks babe. (extract from Blackburn SNS transcript)

> Blue: Yeah pal! (extract from Carlisle SNS transcript)

Phatics were more common than salutations (possibly because of the way that Facebook and WhatsApp conversations were ongoing and so there was little need for students to introduce themselves. These two examples were from the end of discussions that had already been resolved and so the thanks and agreement they express conveys little meaning other than to acknowledge that the previous message had been read.

Cohesive domain: Vocatives

> Beastie Boys: Yea well done OMD, great experience for the next, like with Bauhaus:) xxx (extract from Preston SNS transcript)

Ford: Austin well done on obs and ooh let the speculation begin! Remember it is only 5 weeks of your life. (extract from Fylde SNS transcript)

Students make use of vocatives where they wish to direct a comment to a specific colleague rather than making a comment to the whole group. In the first example, the comment is being directed to OMD following an unsuccessful job interview (this example was selected as it included a second vocative as a form of encouragement to OMD, that patience is needed and that a job will come along eventually). The second example give praise and encouragement to Austin following Austin's comments regarding a recent lesson observation.

Interactive domain: Agreeing

Ochre: Good points, i agree, not really appropriate to have a mentor in the group. I wonder if we can have an active facebook chat or something that involves him instead? (extract from Carlisle SNS transcript)

Ferrari: Great shout. (extract from Fylde SNS transcript)

The use of agreement was not widespread, possibly because of the types of discussions that the students had where the posting of comments or opinions that required agreement or disagreement was not common. However, the first post shows and example of agreement where there has been an exchange about whether to allow a mentor to join the students Facebook group. The second comment is one of the more common forms of this infrequently used code that shows a straightforward agreement about a group decision to buy a tutor a Christmas gift.

Interactive domain: Asking questions

Mary: We did laughter yoga in the staff meeting today. That was a little surreal but fun!
Chloe: Laughter yoga? (extract from Blackburn SNS transcript)

Ochre: Just use 4 sticks to make a frame (bit of masking tape on the corners) and a ton of PVA mixed with a bit of water..You have to drown the picture. They dry really hard and clearish. Then I've just put a loop of string at the top to hang them:-)
Orange: Skills!! What have you mounted them on? (extract from Carlisle SNS transcript)

Audi: Do we need to include a bib[liography] for this submission? (extract from Fylde SNS transcript)

Students would ask questions to seek clarification from others as the first two examples show. In the first, Mary is sharing information about an event that had taken place in school and Chloe asks a question to clarify her understanding. In the second, Ochre has been sharing photos and details of some hand-made Christmas gifts and Orange replies with a compliment accompanied by a question about their construction.

Other examples of the use of questions would be where students would ask questions of the whole group such as the final example where Audi is asking a question about the details of assignment presentation.

Interactive domain: Complimenting

TFF: I haven't but one of the teachers in my school recently did an Italian theme where they brought stuff in to make and taste which could be done without cooking, like olives, garlic bread and god knows what else, loads of stuff! Think she's doing Passport to Europe from the LCC curriculum year 4. Let me know if you want me to find out xx
Bauhaus: Thank you! Yeah I am doing an Italian taster day with them where they are making their own dishes! Just wondered about input for it xx (extract from Preston SNS transcript)

Wham!: Wow...not the most supportive response! But...you are far stronger and far better than this! You will do brilliantly despite your school!
Believe in yourself!!!!! X (extract from Preston SNS transcript)

Different groups made varying use of compliments. Their use shows a developing social presence and creates an atmosphere of mutual support. In the first example TFF is offering to provide help to Bauhaus based on previous school experience. Bauhaus responds to this with a compliment to TFF for this offer.

Compliments would often be supportive and be based on boosting self-esteem by commenting on personal qualities rather than on the content of a post. This is evident in the second example where Wham! is acknowledging unfair treatment of the previous poster and is offering a compliment on their personal strengths.

Some of the social presence indicators were less widely used than others, for example, phatics and salutations were less widely used than humour. However, all of them were present and were frequently observed. This indicates a high degree of social presence which in itself is an indicator of how well the students were able to express themselves and perceive others as 'real' humans within their SNS groups. An example of this is the way that they adopted a wide variety of ways to use inclusive pronouns and language as part of the cohesive domain.

4.6.7 Data from group interviews relating to student-to-student interactions.

The data presented here relates to comments made by students that were coded as being relevant to interactions with other students. An overview of the group interviews is presented in section 4.2.

The exchange below is typical of the responses that students gave about the way that SNS was used during placements. In it the first student suggests that the main use of SNS would be to ask fellow students for details about tasks that needed completing as part of the

placement. The second student recognises the potential danger of 'the blind leading the blind' and points out that for definitive answers to such queries it is better to go directly to a tutor. This highlights the benefits and drawbacks that students perceive in the use of SNS. On the one hand, it is a way to get a quick answer from a colleague without having to reveals one's ignorance to a tutor or mentor, on the other hand, the information gained might not be reliable or accurate.

> Checking arrangements, checking details, what times people need to be places. I think during the placement probably the biggest thing people were asking was 'how many of these forms should I be doing?' 'how many observations?' 'do you know how many evaluations you are supposed to do?'.
> To be honest, if I had any of those questions, I just emailed (UPL), I thought 'I'll just ask (UPL)' (Burton, first group interview)

It was generally felt that SNS was not used as a way to build professional expertise by sharing of pedagogical approaches or lesson ideas as the following extract exemplifies.

> Q - On placement, did you talk about, did you ask about or share ideas about what you were teaching? How you were teaching it? At all
>
> No.
> I don't think it is used in that capacity. (Fylde, first group interview)

In fact, it was generally felt that SNS was used less during placement than at other times and the following comment suggests.

> Q - What about, communications amongst yourselves, […] Did you talk to one another during placement? What kinds of things did you talk about?
> Not as much I don't think
> It quietened down (Burton, first group interview)

The changing patterns of use during the course are something that students have also recognised, there were several examples where students commented on the difference in the way that SNS was used before and after placements. The extract below is typical of these. In it the students acknowledge that things have been different since the placement ended and attempt to suggest reasons for the change. They focus on the tension between achieving personal success and maintaining ongoing social bonds with other course members.

> Q - So, two days out of seven you are together and the other days you are either in school or it is the weekend, yet, there is quite a social […] so how important is it to feel part of this group and to communicate with one another?
> I think we had a great vibe before we went on our placement and I think when we all came back last week there was a vibe change
> Mine was really mad
> It was!
> It murdered it! It didn't seem quite the same, I think people are concentrating on what they are doing
> I do think it is important though, I think if you know you have got someone on your side and I

> think as well because we are not in each other's pockets it is nice just be able to go can you just help me with … I think originally, we were in each other's pockets. (Burton, first group interview)

A similar theme is developed in this extract where the pressure and workload of the course is identified as a reason for the changing patterns of SNS use. In it, the students also recognise that their relationships have developed during the course and this has been reflected in the way they use SNS. They mention the use of sub groups on SNS (the content of these could not be obtained for this study) as a way to have more detailed or specific conversations. These sub groups might be formed around students at a particular school, those all teaching in a specific year group or around developing friendships. This extract uses the example of teaching a history topic to illuminate the way that a sub group might be created.

> Q - Has the way in which you have been using that changed since we last talked?
>
> I would say it is not being used as much, as a whole group. I don't, I think there is the odd question
> I don't think it is because of this, I think it is because we have so much to do
> We have set up our own little groups, which isn't a bad thing, it is just that I'll talk to somebody particular before putting something on the group.
> Yeah, it is kind of, if they don't know then you go to the group
> Yeah, if they don't know then you go to the group. Whereas before, maybe we didn't have those friendships built, like it would just be, put it on the group. So it has probably been, you have less workwise at this time and we all have our little subgroups of communication.
> Just to save spamming everyone with, we are doing William the Conqueror, not everyone needs to hear this, that is probably why we are a bit subdued (Carlisle, second group interview)

Whilst SNS use diminished during placement and the exchanges that did take place were not based on professional development or pedagogy, the usage that did take place was often described as being based on sharing details or tips. An earlier example showed how this might be in relation to course tasks that needed completing on placement, the example below highlights another example which is sharing insider knowledge about how students would be assessed on placement. This has been selected because it shows how the students acknowledge they are part of a community of learners who are willing to share information to support one another through the learning process. There is no suggestion that the information about the observation process would be withheld as it would benefit the holder of the information to the detriment of those without it. In fact, the opposite is the case. It evidently shows how SNS supports and develops social bonds between the students.

> Because I remember when I did, it was my very first day of placement and I had an observation from (PPL) and obviously I thought it might be helpful or useful for other people to know so I just said, make sure you do such-a-thing in your observations because these are the things he

highlighted and these are the things he is looking at and that so I just thought it might be helpful for someone else to do as well.
I think if it is the helpful kind of thing, people do share it
It is something that will help… Everybody (Preston, first group interview)

The role the SNS plays in developing and supporting social bonds was something that was discussed widely by students in group interviews. The example below highlights how it played an important role at the start of the course but students realised that they would have to prioritise their SNS use to fit around the demands of the course.

I think it started off more social, I think during the placement it got very 'needs must' and there wasn't as much …
Too busy
… yeah (Burton, first group interview)

Another factor that appears to be significant is the intensity of discussions as summarised in the example below. The students had clearly been using SNS extensively at the start of the course and the changed pattern of use that came about as a result of the Beginning placement gave rise to a realisation that things didn't have to be that way. This feeling is balanced by a recognition of the importance of the group.

Q - So you have had a bit of space and realised that it didn't need to be that intense

Yes, but it is definitely important.
Yeah, the group chat was just SO intense, it just stresses you out (Burton, first group interview)

The theme of SNS use changing as the group relationships developed and matured over the duration of the course was discussed by several groups. The extract below shows how the students were sensitive about the types of post that they made at the early stage in the course when they didn't know one another very well and how they felt more confident to post without causing offence once they had got to know one another better.

Q - You say that there has almost been a change in the way that you use it, the kinds of comments, the type of thought that you put into the comments. Is that mirroring …

I think because we have got to know each other better we are not quite as 'well I won't put that on Facebook in case if offend somebody' you kind of know people's sense of humour and things like that.
Not that we are putting offensive things on! But you know like, funny picture memes and things like that. There is more of that now then there was (Carlisle, first group interview)

These were not the only students to mention how their use of SNS had changed over the duration of the course in response to the developing social relationships. In the example below, the increasing social use of SNS is mentioned along with a less inhibited approach to posting things as relationships with other members of the group have developed.

> Yeah. I think at this time of year it is completely different to at the beginning. I think it is a lot more social, more informal now than then.
> I used to think twice before putting something on, now it just … um … put it up (Carlisle, first group interview)

One group alluded to the impact that the way other members of the group posted had on the atmosphere and ethos of the group. In the example below, the sharing of anxieties was not felt to raise stress levels and the discussion continues to provide an insight into the role that the tone of posts can have. It appears that a humble approach to sharing outcomes (including assignments grades, placement outcomes etc) contributes to a positive group ethos that helps to minimise stress levels.

> Q - Was everyone worrying about it or did it … other groups have mentioned that, is the reason I'm asking. The more people started asking, the more it built anxiety or did it serve to quell anxiety?
>
> No, I think it made me feel better as well.
> Yeah, I think largely as individuals, we were all sitting there panicking a little bit and then someone posts something on the facebook group and you are like 'it all alright'
> Someone posts something that you are thinking sometimes and you are like 'I'm so glad you asked'
> Nobody has put anything on facebook that … you know, if somebody has shone through their formative assessment and they have had comments that have been glorious, nobody has put anything like 'I'm fine'. Posts on it have been like 'has everyone done as bad as me?' or 'has everybody done this?' it is all supportive …
> There is no bragging
> … there is no stresses because nobody really brags or does that or that kind of stuff. So it is very supportive I think (Carlisle, first group interview)

Students were self-aware of the nature of their SNS conversation and that they tended to focus on what might be termed practical details. The example below acknowledges this but at the same time, a second student points out that this is not the sole reason for its use.

> Q - Would that characterise the majority of discussions that you had via the Facebook group? Sort of checking, admin-y type stuff? What? When? Who? Type stuff?
>
> With the group, it is mostly admin type stuff. I'd say so.
> Not all of it (Burton, first group interview)

The students are evidently sophisticated users of SNS who make informed decisions about when to, or not to, make use of SNS groups to request details. The example below illustrates this as the first student has clearly made the decision that a broadcast request to the group will be most effective but the second student points out that such an approach is not always the most appropriate and that a selective, directed approach might be better if the circumstances were different. This response also shows sensitivity to the other members of the group and the need to avoid overburdening them with messages.

> I came late and I needed a school lunch so I put up ' can someone get me a school lunch please?' because I knew that out of 10 people, someone is going to do it. But quite often, if I know that there is something that (student) wanted, I'd just private message people, rather than involving everyone in the entire group.
> If there is something that you knew that just one person needed, it is easier to just private message people than to get everyone checking up on things that are not relevant (Burton, first group interview)

The issue of being overburdened by messages and messages either contributing to, or relieving stress was regularly raised in the group interviews indicating that it is a matter for concern. The extract below illustrates how frustrating it can be for students if the volume of SNS traffic gets overwhelming.

> That is another thing because we all started getting, everyone would chip into something and you would get like, 50 posts in a row and you'd be like 'oh, this just needs to shut up, I'm going to sleep'
> it was ridiculous. (Burton, first group interview)

However, some students clearly felt it was beneficial to be able to share their anxieties via SNS, particularly if it helped them feel that they were not alone in finding the course workload challenging. In such instances, students reported feeling that it was helpful to know that others were in the same situation as illustrated by the example below.

> If you see a little smiley face or a breaking down face It makes you feel at ease when you know like 'how many words have you done?' or whatever
> Yeah.
> And then you are like 'oh' (sigh of relief)
> Q - Knowing that you are not alone really if you are struggling at various points
> Yeah (Carlisle, first group interview)

Not all students felt this way though. Some felt that such use of SNS actually raised stress and anxiety levels rather than reducing them. This might happen by posts making students aware of what they had not yet done or perhaps forgotten about. The example below shows how this can be manifested as, in the final comment, the student suggests that concerns should not be placed upon the shoulders of peers but would be better directed to the relevant tutor who would be able to offer support without adding to the anxiety of other students.

> I don't think that was a good idea though. It is just my opinion but there were so many people who, I'm sorry to even say this, but I'm not, there were so many people worrying about it that it was making other people worry about it.
> Definitely.
> People are very quiet to say it 'it's annoying me this', 'I'm getting worried about this' but actually, I think it needed to be said that if you are worried about it then speak to the person who it is involves with then. You (tutor). I don't think it necessarily needs to be put on there because it makes other people worry. (Blackburn, first group interview)

Other students suggested that SNS could lead to 'false alarms' about tasks that would increase stress and anxiety. In other words, it could serve as a way to share and perpetuate rumours about tasks as illustrated by the following examples.

> There would be things … what is that? What is that? What is that? Then you get to class and they don't mention the thing that everyone was freaking out about. We have been there before now.
> In the beginning, you have just started and you are anxious and from the word go you are like, we've all got different experiences and we are talking about different things and … I don't know.
> Sometimes people frighten you with things you didn't actually need to know about, which is another thing. Like 'why have you done that?' 'what?' Then it turns out you didn't need to worry about it. (Burton, first group interview)

An earlier example presented the students opinion that a lot of their use of SNS related to practical details; the final comment in that extract was from a student who pointed out that it was not limited to this type of use. Other types of use that students discussed making of SNS included assessment. In fact, this appears to have been a significant driver for SNS use as the following extract illustrates. (It also reinforces the point that students tended not to make use of SNS while they were on placement.)

> Q - You talked about it being quiet on WhatsApp over placement, was it particularly busy on WhatsApp in the run up to placement?
> In the run-up to the assignment it was. (Blackburn, first group interview)

When asked about the types of discussion that they had regarding assignments, it appears that, like their general use of the group, it concerns details or minor points such as word counts, referencing styles, deadlines etc, rather than for a discussion of content related to the module learning outcomes. This is exemplified below where the students acknowledge the increase in use of SNS in the run up to the assignment and, at the same time, point out that this increase was focussed on discussions about what topic to choose for the assignment.

> A few people have posted about the application thing, asking what is actually going on and people were posting about what they had done about their topic sort of thing. So …
> Q - So when you say topic? For the assignments?
> Yeah. For the assignment, yeah.
> Has there been much discussion about the assignment on Facebook.
> No, not really.
> Q - Prior to the formative assessment?
> Yeah.
> Q - What kinds of discussion were taking place? Was it in depth debates about points of view that authors had written
> No
> Q - Or was it word limits and submission dates?
> I think it was more 'what's everyone doing for this?' (Carlisle, first group interview)

The extract below was coded as SMS and it demonstrates how students will switch to alternative, more appropriate forms of technology if it is deemed that SNS is not the best tool for the job. It is another example of how students are aware of the need to keep online traffic purposeful and relevant to those in receipt of messages.

> Yeah, … (unclear) like I will text to (student), if there is something I want to say just to one person, I will say it to that person because it is not something that everyone needs to have information about because, obviously, it is open to every single person. So, if you have got close with somebody, you will probably just talk to that person. (Preston, first group interview)

Likewise, in this example, students are talking about a task which involved different sets of students working on different topics and how it was most appropriate to use individual messages to those concerned in order to divide out tasks and share progress. This was done via SMS messages as well as sub-groups on SNS in order to keep the amount group's Facebook page relevant to everyone.

> (UPLs) thing (EDIT –a group task) and we haven't then all gone and asked each other on that one group so then (student) made a conversation with the four of us in who were in a group for that, so we were not going to talk on the main group about our topic, we had our own little section. And even from that we split it in half so me and (student) were working on the same thing, so we were messaging each other, just us two, because not everybody needs to know that he is reading that part, I'm reading this part. (laughs) Do you know what I mean?
> You kind of filter it down. There is no point us talking about motivation (EDIT - group topic) to everyone else Q so there is the whole group Facebook group and there are almost sub groups and conversations (Preston, first group interview)

This section helps to provide insight into some of the patterns observed in Figure 14, Figure 15 and Figure 16 as students have provided commentaries that explain their reasons for the changing use of SNS during the research period. It shows that students are aware of the benefits that interactions via SNS can bring in terms of things like emotional support or quick responses. However, it also shows that they are astute users of this technology and are aware of its limitations as well as its potential to overwhelm. In response to this, there is also evidence that students will then fragment and fracture their SNS groups to make small groups comprising those to whom the discussion will be relevant.

4.6.8 Data from student surveys relating to student-to-student interactions

Not all the questions in the survey are pertinent to the topic of student-to-student interactions and only those that are relevant are presented here. For full details of the way that this data has been processed, please refer to section 4.3. Figure 17 shows the responses

to the question about contact with other members of the group. The overall pattern is that the majority answer is that most students who responded had been in contact with other members of their group. However, a closer inspection reveals that in survey 3 and survey 5 there was a greater number of respondents who had not been in contact with their group. Reference to Table 3 shows that these surveys coincide with a period directly after Beginning placement (the survey close date was at the end of the placement and so students would have been responding to it during placement) and during Developing placement. Data from the student interviews along with the chronological analysis of SNS transcripts also show that placements were typically periods of low SNS use.

Figure 17: Responses to the question "Have you been in contact with other members of your group"

Students were subsequently asked to respond to a question asking them to identify the communication methods they had adopted when contacting other students. At the time the survey was constructed, it was not known which the SNS tools of choice were and so a number of common ones were presented as options along with an opportunity to specify *other* (and to provide details of what was used). Facebook and WhatsApp were presented as separate options, however, there is little point in separating them out for presentation in Figure 18 as each group adopted either one tool or the other for group communication. Additionally, as there were no responses to the options *Skype* or *Twitter* these have been excluded from the chart.

It is clear from Figure 18 that SNS account for the majority of student-to-student contact methods. SMS is next most frequently used which was also identified by the student interviews.

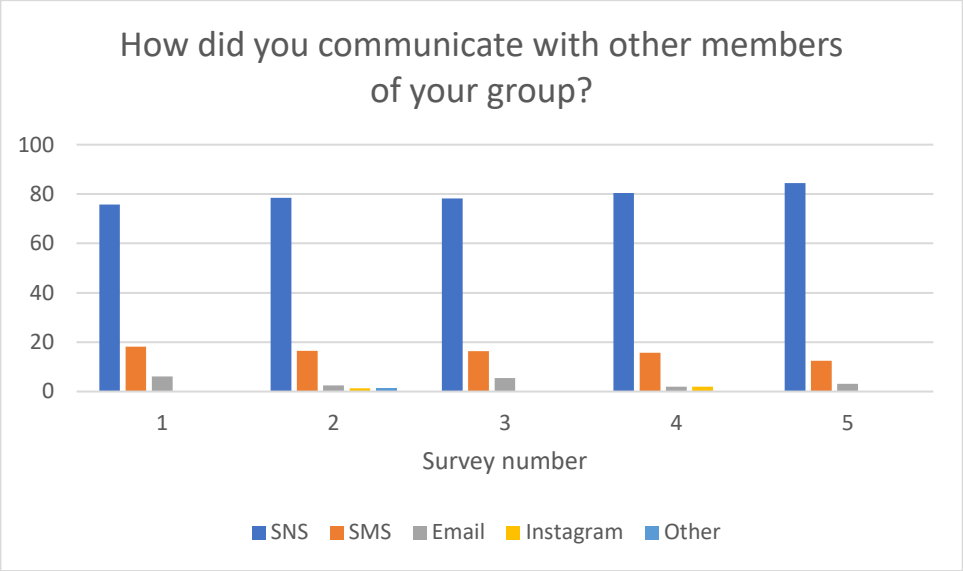

Figure 18: Responses to the question "How did you communicate with other members of your group?"

Students were also asked to select a purpose for their communication with other students. A summary of these responses is presented in Figure 19. As the survey was designed prior to student interview or other data collection methods had been undertaken, it was necessary to make predictions about the possible responses students might wish to give, which explains the categories of data that are displayed. As there are few responses where *other* was selected, it would be reasonable to assume that students felt able to accurately select one of the provided categories to summarise their use.

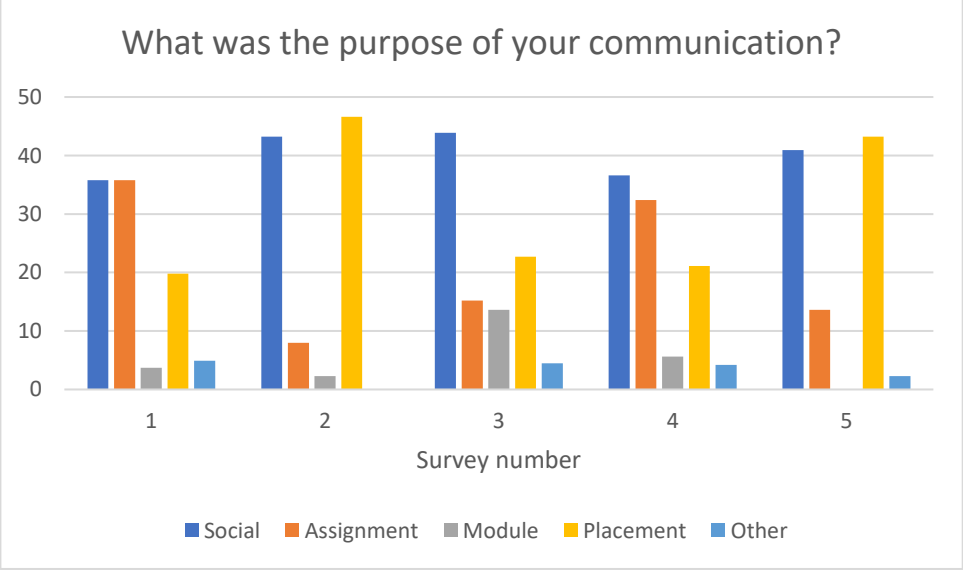

Figure 19: Responses to the question "What was the purpose of your communication?"

The first of the key points that arises from the responses shown in Figure 19 is that social interactions between students remain consistently high throughout each of the surveys. Secondly, there is a strong match between course activity and the purpose of student interaction running alongside social interactions. The matches are as follows:

- Survey 1, prior to B placement and during the period of the first assignment submission sees a peak for these options.
- Survey 2, during B placement sees a peak in interactions about placement.
- Survey 3, between placements, which would have been a period of module teaching and assignment preparation sees these as the purpose.
- Survey 4, in the run up to assignment submission sees this as a significant purpose of interaction with placements following after this. This is aligned to the forthcoming D placement.
- Survey 5 which takes place during D placement, the majority of interactions related to placement. Essay feedback might explain the number of interactions about assignment in this survey.

The elements of the survey that relate to student-to-student interactions shows that most respondents had used a technology to interact with their peers prior to each survey. It also shows that the most frequently used technology used to facilitate this was SNS with a small number using SMS. In terms of the reasons for these interactions, students reported social reasons, assignments and placements as the most likely reasons. Whilst this reflects data from other sources, it hides some of the subtle and varied reasons that students interact with one another for these purposes that the analysis of the SNS content revealed.

Chapter 5 Discussion of results

The discussion of results is structured around each of the three elements of NL which coincide with the sub-questions of this research. These overarching sections are sub-divided according to specific technologies or purposes to which technologies are used.

5.1 Discussion of student-to-artefact interactions

This first section looks at the use of technologies that are adopted and used by students to facilitate their interactions with artefacts. There is a two-fold split in this section between interactions that take place with artefacts via Blackboard VLE and those that take place via internet sources other than Blackboard. A further split between these latter sources is made to differentiate between interactions that support academic learning (relating to the award of PGCE) and those that support professional learning (relating to the award of QTS).

5.1.1 Interactions taking place through Blackboard Virtual Learning Environment

The results relating to interactions with artefacts indicate that the least well utilised and valued are those interactions that take place with artefacts provided via Blackboard VLE. The VLE is the domain of the UPLs as they control the content and is provided in relation to the credit bearing modules that the students work on, and so it is possible to consider these interactions with artefacts on Blackboard as relating to *academic* outcomes for the students (in other words relating to the award of PGCE, rather than *professional* outcomes relating to the award of QTS).

It would appear that UPLs are the major influence in the limited interactions in this domain due to the primacy that they afford to the value of face-to-face interactions. UPLs outlined how they would provide resources (artefacts) on Blackboard and these would be to support face-to-face teaching. Sackey et al. (2015 p113) draw attention to the focus of education research and how it has frequently focussed on formal learning environments (classrooms) and how it is within these that learning takes place which aligns with the findings outlined above. In terms of the way that UPLs use Blackboard to provide electronic access to PowerPoint slides, Meishar-Tal et al. (2012 p35) make the case that it is not unusual for tutor use of course sites to be limited to the provision of teaching materials or for pushing one-way messages to students which is a pattern of use described by UPLs. This model of use has been described as 'broadcast and communication' by Jones and Healing (2010 p371) and by Gherardi et al. (1999 p273) as a view of learning based on the accumulation of facts. Despite

the finding that UPL use of Blackboard is secondary to face-to-face teaching and is characterised by one directional, push notifications, some tutors reported that they would direct students to access artefacts prior to face-to-face sessions where they would be discussed collaboratively, this approach is described by Thompson (2015 p37) as a flipped classroom. As Jones and Healing (2010, p370) point out that NL is a mix of material and digital forms, thus the interactions with artefacts in this area of the course might be considered to take place in a material form and technologies may not play a significant role in it.

The provision of learning artefacts via Blackboard by UPLs can, to some extent, be considered to be a form of blended learning. This is described by Irwin et al. (2012 p1221) as integrating a variety of media to deliver teaching materials, this description is particularly apt as it refers to the *delivery* of materials which aligns with the one directional expectations of UPLs that they provide materials and the students will learn from them without further on-line interaction. Whilst Cheng and Chau (2016, p257) promote the effectiveness of VLEs to provide opportunities for interactions between students and artefacts, the experience of participants on this course is probably better described by Donnelly (2006, p108) who notes that many courses are described as blended but are simply face-to-face courses with copies of lecture material provided online with little or no opportunities for interaction. This restricted use of a VLE would appear to be to the detriment of students as Tik (2015, p2) highlights studies that have shown blended approaches lead to better outcomes, or as Stricker et al. (2011, p105) notes that effective provision of a VLE in addition to face-to-face lectures is beneficial to learning outcomes.

Given that studies have found that blending online access to artefacts for students to interact with can lead to better outcomes, it is worth exploring why students in this study commented so widely that they did not find the materials to be useful in their learning and that they only visited Blackboard when specifically instructed to do so by a tutor.

An explanation of this appears to lie in the misalignment of the use of Blackboard and the type of learning. Cheng and Chau (2016, p261) provide an overview of the different roles that a VLE can provide which include information access, interactive learning, networked learning and materials development (where students build their own artefacts). When viewed against this list, the SD course is limited in its use of Blackboard to the first item: information access. A further perspective on this is provided by Rourke and Anderson (2004, p5) who claim that networked computers should be used, not for presenting learning

materials but to facilitate communication. Again, the SD course is not utilising this potential. However, there are instances where courses have been built to utilise such features but they have not been widely adopted by students, such as the example provided by Munoz et al. (2014 p64) who found that dialogue on a Blackboard site being used as part of teacher education course was virtually non-existent which echoes previous experiences of students' use of VLE hosted discussion boards. Thus, the caution provided by O'Byrne and Pytash (2015 p 138) that simply adding technology to instruction does not lead to interaction with the learning artefacts appears to be relevant.

Whilst there is an argument that the limited interactions with artefacts that take place via Blackboard is due to the way it is used on the course, there appears to also be an argument that VLE in general might not offer tools that are well suited to the task. For example, Irwin et al. (2012 p1221) and Dalsgaard (2006, p7) propose that VLEs are well suited to administrative aspects of HE provision such as assignments, course materials or messages, but they are not well suited to self-governed or problem-based approaches. The tutor controlled nature of the artefacts provided by tutors on Blackboard does not align well with the individualised assignment topics that are student selected and thus echoes the mismatch between the strengths of a VLE and the needs of SD students.

Reasons why students do not value or have extensive interactions with artefacts via Blackboard are suggested by authors who consider the relationship between VLEs and social networking sites (SNS). Miron and Ravid (2015, p371) argue that it is the lack of a seamless interface between the two which is the reason and that users have to move beyond the walled garden of their VLE in order to engage in their daily computerised activities and this acts as a barrier to VLE use. However, other researchers such as Dalsgaard (2006 p9) and Bosch (2009 p186) have found that students are quite happy to work with different systems and they will choose to use the system that best suits their needs. This would appear to be the case for SD students who frequently stated in interviews (see section 4.4.1) that they choose not to use Blackboard and that they select other technologies through which to interact with artefacts and other students.

In summary, the course is not a strong example of blended learning as the provision of artefacts via Blackboard is controlled by tutors who typically only make use of it to provide copies of lecture materials. This approach does not make full use of the opportunities for interaction that VLEs are able to offer and consequently it could be suggested that the course is missing out on opportunities to support better learning outcomes. For whatever

reasons, students evidently do not place great value on the opportunities to interact with artefacts via Blackboard and look elsewhere for them.

5.1.2 Student interactions with Online sources for academic learning

As described above, students do not value and thus do not interact widely with artefacts on Blackboard. This section will discuss how students make use of other technologies to interact with artefacts to support their academic learning.

A key aspect of students' academic learning is the submission of assignments for assessment activities in both credit-bearing modules; assignments by their very nature provide evidence of student learning. These assignments are on topics of the students' choosing and are both level 7, thus the need for students to interact with a wide variety of academic sources is twofold. Firstly, they need to interact with artefacts that relate to their chosen topic and these must be self-sourced. Secondly, they need to interact with a wide enough range of artefacts in order to meet level 7 assessment criteria. One finding that came to light was that some students found the university library search tool, OneSearch, to be valuable in gaining access to such artefacts, others found it to be limited in the search results it provided and thus would turn to online tools such as Google Scholar.

Within the library and information access field, the growing use of Google Scholar by students is well documented and thus the findings of this study are not unusual. For example, Wang and Howard (2012 p106) who found that Google Scholar was the top ranked search tool by students at a San Francisco university. Consequently, Vilelle (2008 p54) argues that there is a need for university libraries to work to integrate Google Scholar into the search results of library search tools. By turning to Google Scholar due to its ease of use, SD students are seemingly prepared to accept the limitations of its search results as highlighted by Herther (2017 p33) who found that from a sample of doctoral bibliographies, 40% of the sources could be found and accessed via Google Scholar.

Studies which look at student behaviour have found similar patterns that suggest that this practice is not unique to SD students. Firstly, Delfino and Persico (2007 p292) in a study of Austrian students found that 60% of social science students reported using their university provided systems to access artefacts 'sometimes' or 'frequently' with the implication that they must have been accessing the information elsewhere. A second study by Tkalac Verčič and Verčič (2013 p601) found that more than half the students in their study would look to friends or other sources for information needed for their studies.

What this section outlines is that SD students appreciate the way that technologies facilitate easy interaction with online sources to support their academic learning. Many of them prefer to turn to Google Scholar in order to search for and access books and journals related to their chosen assignment topics and they are prepared to overlook the shortfalls of its search results in exchange for the ease with which they can access search results.

5.1.3 Interactions with Online sources for professional learning

In the same way that students frequently commented on their preference for online tools to help source artefacts relevant to their academic learning, they provided a range of data which indicates that they do the same regarding access to artefacts that play a role in their professional learning (that which is related to the award of QTS).

The students are all supported by a mentor when on school placement whose role includes providing students with support in developing their professional learning through support with lesson planning and curriculum subject knowledge. However, students regularly commented that they prefer to develop their learning of these things through engagement with artefacts online rather than by approaching their mentor. Reasons for this preference included access to a wider variety of sources and the availability of resources at any time in the day.

There is some support from authors such as Cooper et al. (2014 p40) who propose that a well-designed VLE can provide the sorts of informal professional learning that might take place over a cup of coffee. Likewise, So (2012 p144) looked at the use of online video resources as a way to support students in their acquisition of good teaching practice. In this example, the video resources were provided as part of the course materials rather than being accessed via YouTube but the premise is the same: developing professional competence through interaction with artefacts is an effective approach. The participants in this study do not feel that the interactions facilitated by Blackboard are sufficient to support their professional learning and thus turn to other online sources.

Whilst interaction with online artefacts is practiced by SD students and supported by some researchers, it is worth noting that there is a difference between interaction with artefacts and access to them. This point is emphasised by Munoz et al. (2014 p58) whose study of student teachers argues that there is a mismatch between the simple availability of online resources and the complexity of the learning process for student teachers. This idea is also

raised by Wu et al. (2010 p156) who state that it the subsequent engagement with learning resources that leads to the construction of knowledge. A comparable argument is presented by Dalsgaard (2006 p5) who makes a distinction between resources and learning materials, with the former not becoming the latter until the learner has engaged with them. Thus, it would seem that for SD students, they are substituting interactions with their mentor for interactions with online resources in order to develop their professional learning. This engagement with artefacts is discussed by Kimble et al. (2001 p232) in their study of the establishment of a virtual community of practice that there were many examples of learners being able to translate artefacts across different media and between different settings, thus indicating that there such engagement is possible without the need for a student-to-tutor interaction. Whilst authors such as Petropoulou et al. (2010 p232) have attempted to create instruments to measure the degree of interaction in student-to-artefact exchanges (and by implication the extent to which students are engaging with the learning resources) comments from the SD students suggest that the use of such instruments are not needed. For example, there were many references to the way that students engaged with online artefacts relating to their professional learning. These included, filtering out sources whose American provenance rendered them unsuitable for a UK context, translating artefacts from one year group to another, adapting artefacts so that they would meet the specific learning needs of the children in their class or simply drawing on a wide range of examples in order to develop an informed opinion on their usefulness.

The benefits of access at any-time is mentioned by De Laat and Haythornthwaite (2007 p188) and Rawlins and Kehrwald (2014 p207) who argue that such interactions broaden the repertoire of student teachers by not restricting them to didactic learning models presented by tutors.

Interactions with artefacts to support professional learning was widely reported and forms an important part of students' learning. In doing so, it would seem that students are using these interactions as a substitute for interactions with their mentor and in doing so are widening the scope of their learning network.

5.2 Discussion of student-to-tutor interactions

This section presents a discussion of the data in relation to the sub-question relating to student-to-tutor interactions and their impact on learning. As there are a number of people who act as tutors to SD students, notably UPLs, mentors, and others outside of the course, and that there are different patterns of technology use for each of these, it is logical to discuss each in turn in relation to theory and research.

5.2.1 Interactions between students and UPLs

Some of the strongest results relating to interactions based on technology between students and UPLs is that there is not actually a great deal of such interaction. What interaction there is can be divided into two: feedback on assessments, and other interactions.

Starting with interactions which do not relate to feedback on assessments, the majority of these tend to be tutor-initiated, push-interactions which take place via email. The remainder of them which are ongoing two-directional interactions relate to pastoral support for students. This is aligned with the message from Nkhoma et al. (2015 p88) who suggest that out-of-class communication in blended courses can consist of structured and unstructured interactions. In the case of the SD course, the structured interactions would represent the messages from tutors about tasks to be completed before or after face-to-face sessions and the unstructured interactions would be those of a pastoral nature. Whilst they may support learning in face-to-face teaching sessions, the technology is not supporting learning directly as it is the subsequent face-to-face interaction where the learning occurs.

Given that NL incorporates three elements and one of these is the contribution that interactions between students and tutors can play it is worth considering the role of these before examining the paucity of such exchanges on the SD course. Beldarrain (2006 p139) discusses the role that technology can play in interactions between students and tutors and notes that it has the potential to distort the concept of distance between learner and instructor. She goes on to suggest that it allows learners to access education not just at any place but also at any time. The timing of student-tutor interactions will be discussed subsequently. Whilst Beldarrain was writing over a decade ago and referring to fully online provision, others have considered the benefits of student-tutor interactions within a blended environment. One such example is the finding by Junco (2011 p163) that educational environments that emphasise close interactions are linked to improved critical thinking. A possible reason for this is implied by Richardson and Swan (2003 p69) who note

that online interactions between students and tutors can encourage a change in pedagogical approach where the tutor's role switches from lecturer to facilitator with a reciprocal change in learning by students towards an increasingly active approach. Further support for the role of student-tutor interactions is offered by Nkhoma et al. (2015 p89) who propose that the relationship between the two is strengthened by the use of communications via technology tools.

Clearly, the list of sources in the preceding paragraph is not exhaustive but it helps to outline the case for the benefits that the use of technologies to support interactions between tutors and students can bring about. Yet, despite these cited benefits, SD students do not engage in significant amounts of interaction with their UPL through technologies. As all the student groups established social media groups amongst themselves, this is clearly a technology tool that they are happy to utilise, so it is worth exploring why it might not have been adopted by the participants in this study to facilitate student-to-UPL interactions in relation to other studies that have looked into be role that SNS can play in student-tutor interactions.

Some studies, such as Irwin et al. (2012 p1127) or Soomro et al. (2014 p281) have looked explicitly at the use of SNS and found that it enhanced communication and interaction between students and tutors. In addition to studies of this nature, are comments such as by Galan et al. (2015 p287) who suggest that the prevalence of SNS has resulted in a significant change in the way that tutors can interact with students. A more tentative approach is taken by Hew (2011 p663) who notes that advocates of SNS present a positive picture of the role they can play in communications between students and tutors but that such claims are not always supported by empirical findings. Clearly there are circumstances where the benefits to student-to-tutor interaction through SNS use are exploited, but in this study, this is not the case. A possible reason is put forward by Bentley et al. (2015 p502) who comment on the tension between creating a supportive, relaxed community of learners (comprising students and tutors) and the need to have high academic standards. The data from this study suggests that there are two factors contributing to this. The first of them relates to issues of privacy and professional relationships and the second to do with tutor views towards face-to-face interactions.

There were several results from this study indicating that tutors did not feel that SNS was an appropriate channel of communication between tutors and students. This view is supported by research such as the findings of Maisher-Tal et al. (2012 p38) that tutors are not interested in engaging in the level of exposure about their social life to students that SNS

would involve. Likewise, Kio and Negeriros (2013 p74) noted that many tutors feel uncomfortable sharing personal information with students for reasons of privacy, ethics and conduct. Some studies cite privacy reasons on the part of students as the reason for this finding, e.g. Soomro et al. (2014 p29), Donlan (2014 p6) Manasijevic et al. (2016 p444) and Meishar-Tal et al. (2012 p38). There was evidence in the data from this study of this reason when one group of students discussed an accidental request from a mentor to join their Facebook group: the students jointly agreed that the request should be declined. The other main reason identified by research relating to the resistance of students to the use of SNS for communications with tutors lies in the separation of social reasons from formal teaching purposes (Madge et al. (2009 p17). A possible reason for this lies in the work of Paechter and Maier (2010 p293) who found that students prefer face-to-face contact with tutors when the purpose of the exchange is to develop knowledge, in addition they also found that students prefer face-to-face contact when establishing interpersonal relationships.

Given that the students in the study had weekly, face-to-face contact with their UPL for teaching sessions (outside of placement times) it could be the case that they were happy to wait until the next face-to-face encounter to initiate interactions with their tutor. This is borne out by evidence from the results where a student pointed out that they would not bother to email a tutor for advice about a forthcoming assignment as they would simply ask them face-to-face in two days' time. A similar pattern was identified by Bicen et al. (2014 p538) in their study of a blended teacher education course where students used face-to-face time to interact with their tutor.

Several other studies have found that students give preference to face-to-face interactions with tutors when it is an option alongside interactions facilitated by technologies. For example, Price et al. (2007 p16) found that personal feedback and interaction were prized by students leading them to state a preference for face-to-face interactions and to make use of technologies in between times or when face-to-face was not an option. Additionally, Wisneski et al. (2015 p19) found, in a comparison of online and face-to-face tutoring that relations with tutors were less good online. These two points combined give additional support for the suggestion that students in this study have decided that it is not worth the effort to establish ongoing interactions with their UPL via technologies as a face-to-face encounter will present itself in due course.

Reciprocating the opinions of the students are the views of the UPLs who appear to privilege face-to-face teaching and learning activities more than online. This is a finding echoed by

Jones et al. (2008 p91) and indicates that the UPLs do not embrace the use of technologies to support NL and that they prefer to work within a teacher centred model of teaching and learning. This is further evidenced by their comments relating to emails with students which typically concern work that is to be done by students before or after face-to-face sessions. These emails are one-directional and place the tutor in control of the students' learning. A contrasting situation would be one where tutors followed up face-to-face sessions with communications that facilitated students' self-directed learning. This scenario has been described by Jones and Healing (2010 p321) who found a similar situation where tutors were not using teaching methods to encourage participation.

The approaches of UPLs, whilst not fully aligned with the principles of NL, are not unique. For example, Petrovic et al. (2013 p414) found that some tutors believe that traditional instructions are better placed to convey meaning than online alternatives, whilst Wisneski et al. (2015 p18) found that two-thirds of those in their study believed that outcomes from online versions of courses were inferior to those of comparable face-to-face ones.

However, there are those involved in NL research, such as Manasijevic et al. (2016 p443) who argue that online only interactions are not sufficient and that human-human interaction is an essential part of NL. This gives some credence to the approach taken by UPLs indicating that their approach may not be fully outside the realm of NL approaches.

The UPLs in this study demonstrate that they give priority to face-to-face exchanges but they also have expressed that when they do communicate with students, they typically make use of email as the technology of choice. Terzi and Çelik (2005, p55) noted in their study that email was the communication technology of choice for tutors, a more recent study by Manca and Ranieri (2013 p490) found a similar pattern of tutors being more likely to use email. A reason for this longstanding preference is suggested by Roblyer et al. (2010 p135) who note that tutors might be likely to adopt a technology if they perceive it will facilitate communication with students. In the case of this study, it is feasible that tutors have considered the technology tools which will facilitate communication and made the decision that email is the most appropriate. However, an equally plausible proposal can be found elsewhere in the work by Roblyer et al. (2010 p135) which is that it may lie in the reluctance of tutors to adopt new technologies.

It was mentioned earlier that a benefit of using technology tools to support interactions between tutors and students is that they can take place at any time, a view supported by the views of Skramstad et al. (2012 p184). However, it is a finding of this research that tutors

frequently inform their students that they should not expect to have around the clock access to tutors. Bicen et al. (2014 p530) suggest that although it is possible for learners to learn anywhere and anytime in an online context, it is not possible for tutors to be always online to support them. De Laat and Haythornthwaite (2007 p188) also note that it is not realistic for tutors to be available 24/7, however, they cite this as an argument for strengthening the importance of peer-to-peer interactions. This does not seem to be a factor in the decisions of UPLs as (as has already been discussed) they typically manage student learning in a teacher-centred model.

Whilst the results showed that there was little use of technologies to support student-to-UPL interactions, some students reported ongoing and sustained interactions with their UPL which was at odds with the views of the majority of participants. In these cases, the students commented how the interactions had been to provide pastoral support rather than for teaching and learning exchanges. The use of technologies to support such interactions is discussed by Paechter and Maier (2010 p293) who highlight the variety of tasks that tutors must undertake which includes stimulating and sustaining students' motivation to engage in learning activities. Likewise, Paran et al. (2004 p345) draw attention to the importance of affective factors and how these can be of particular significance for some students as it helps them to generate a feeling of belonging. The fact that different students have differing needs was highlighted by the tutors in this study and other researchers, such as Richardson et al. (2016 p7) have found similar things. They noted that some instructors in their research acknowledged the instructor presence carried a greater significance for some students, particularly those facing challenges and that the increased instructor presence was influential in assisting such students to persevere with their studies.

A final aspect where technologies played a role in supporting interactions between students and UPLs is through the assessment process where students would submit work via Turnitin and receive feedback from their tutors via the same system. Such interactions have been identified by Richardson et al. (2016) as an important communication strategy between tutors and students. Students reported that as well as the convenience of being able to submit electronic copies of assignments and eliminating the need to travel to campus, this system provided valuable feedback to guide their future learning. It was noted that the way that Turnitin allows tutors to give different types of feedback, such as short comments within the text to highlight specific features of the writing and the use of a summative description to give an overview of the work was particularly helpful. This exchange between students and UPLs is highlighted by Donnelly (2006 p110) as a factor that helps to build

interpersonal and social bonds. Other researchers have found that the convenience factor of electronic assessment processes is appreciated by students, such as Paeschter and Maier (2010 p295) who offered students a choice between face-to-face feedback and online feedback and found that students preferred the online feedback. However, not all research is aligned on this topic as Karimi et al. (2013 p205) who worked with teacher education students and found lower levels of student satisfaction when assessment was carried out in a blended environment. What was interesting were the comments from UPLs who had said that they were happy to provide feedback to students using Turnitin and felt that the technology allowed them to interact with students about their work, but they were less comfortable with this process when it came to supporting students whose work in need of significant improvement. Ajjawi et al. (2013 p527) propose that dialogue is essential otherwise tutors may invest time in generating feedback for students that will be wasted if the students do not understand this. This gives credence to the need for ongoing dialogue about feedback on assessments. However, the examples provided by UPLs revealed the primacy they give to face-to-face interactions as they talked about arranging face-to-face meetings with particular students, or even making the offer of a face-to-face meeting available to all students to give them a chance to talk through their feedback. Thus, there are mixed views on the role of technologies to support the assessment process with students; students appreciate the convenience it offers and find the feedback to be helpful, whilst tutors feel it allows them to give the feedback that they want to provide but they have concerns that it may not be interpreted in the way it was intended.

This section has highlighted that technologies are not widely used to facilitate interactions between UPLs and students and the related impact on learning. It has presented an outline of some of the benefits that can arise from such interactions as well and discussing reasons relating to privacy which have played a role in technologies such as SNS not being adopted by tutors and students. It also considers the data relating to the use of Turnitin which does offer interaction between students and UPLs but whose use is limited seemingly by tutor preference for face-to-face interactions rather than those facilitated by technologies.

5.2.2 Interactions between students and mentors

One of the most striking differences between the use of technologies to facilitate interactions between students and UPLs, and between students and mentors was in the frequency such interactions and the types of technology used for them. Whilst interactions between students and UPLs were characterised by tutor-initiated, tutor-centred, push

emails, interactions between students and mentors were more two directional, more frequently student-initiated and student-centred.

One marked difference between interactions with UPLs and interactions with mentors was in the use of SNS for these interactions. All the UPLs responded to say that engaging with students via SNS was not appropriate or professional. It seems that most mentors felt the same and that a protection of privacy and the separation of social from learning as discussed by Meishar-Tal et al. (2012 p38), Soomro et al. (2014 p291) and Rap and Blonder (2016 p64) is equally relevant to the majority of student – mentor interactions. However, there were some cases cited where students and mentors did make use of SNS to facilitate interactions about professional learning. This seems to indicate that mentors and students, in these cases, establish a different form of relationship that is characterised by a different power dynamic where there is greater equality between both and less need to maintain privacy and separation.

The other marked difference in interaction patterns relates to the frequency and timing of interactions. Whilst students acknowledged that they should not expect round the clock interactions with their mentors, such exchanges were not limited to office hours in the same way that UPLs restricted their availability. The challenges of time commitments of round the clock access were discussed by Wisneski et al. (2015 p19) yet it would seem that when it comes to interactions between students and mentors, mentors are willing to accommodate such interactions despite the pressures of primary school teaching and the need to have lessons ready for the following day.

Students regularly commented on how they would have frequent and ongoing interactions with their mentors and these would cover matters of professional learning, administrative details and pastoral matters. What stood out as a difference between these and the interactions that students had with UPLs was the use of technologies that were used. The place of SNS in these interactions has already been mentioned as an occasionally used tool, but it is email and text messages (SMS) that formed the majority of these interactions. Emails would be used where the interaction involved discussions that were longer in length or had attachments such as lesson plans but it was the immediacy of SMS messages that was cited as the reason for their use. Dockter (2016 p77) discusses how emails are typically more formal than face-to-face conversation and are also slower, likewise Paran et al. (2004 p345) cite a comment from a student: "*There's nothing worse than waiting for an email*". Thus it would seem that the pressure to have lessons prepared for the following day of placement

acts as a driver for students and mentors to reduce the transactional distance between them as much as possible by adopting technologies that enable this. Transactional distance is described by Moore (1997 p22) as being a factor of the structure of the programme, the interactions between tutors and learners and the degree of self-directedness of the learner. While there are some, such as Wikeley and Muschamp (2004 p186) who have found that a tighter structure regarding the expectations of interactions led to an increased level of dialogue, it is generally assumed that a looser structure reduces transactional distance. The role of transactional distance was combined with teacher immediacy by Aragon (2003 p57) who found that they were both factors in establishing an effective online community. It would seem that frequent and regular interactions between mentors and students that make use of the rapid communications facilitated by SMS, combined with the high degree of self-directed learning that takes place on placements results in a low transactional distance.

Whilst students engaged in widespread use of technologies to interact with their mentors, there were some limits to this, particularly when asking for ideas and advice. Students expressed how they didn't wish to expose their professional ignorance to their mentors and so would often seek to use interactions with web-based artefacts to build their understanding prior to engaging in interactions with their mentor. A similar concern about making gaps in understand evident to tutors was identified by Paran et al. (2004, p345) who found students unwilling to email tutors if they felt the relative differences in knowledge were too great. In addition to engaging with online artefacts, students reported that they would sometimes engage with others in the role of tutor via networks that were external to the course. These will be discussed in the next section.

This section has highlighted the difference in the role that technologies play in interactions between students and mentors when compared to interactions between students and UPLs. There is a greater range of technologies used and these are used to facilitate interactions comprising a variety of different forms of communication.

5.2.3 Interactions with others

One outcome of the data which highlighted the challenges of neatly setting the boundaries of a case study related to the network connections that students establish with people outside of the course. Typically, these would be in the form of online communities facilitated by technologies such as Facebook and associated with a website providing access to online artefacts (such as http://www.twinkl.co.uk/). Students valued these as they provided opportunities to interact with other professionals who would act in the role of tutor by

virtue of having gained QTS and being practicing classroom teachers. Jones et al. (2008 p91) describe such connections as weak ties or links to those outside the main group. In a similar way, Ryberg and Larsen (2008 p103) discuss the importance of such weak ties and how their value can often be overlooked when viewing networks from a community of practice perspective which would typically omit connections with people outside the community.

An interesting finding is presented by Carr and Chambers (2006 p143) who found that teachers didn't value interactions in such online communities as they lacked a commonality of purpose, however the views of De Laat and Haythornthwaite (2007 p186) present a contrary opinion as they point out that for informal learning and professional development, people often rely on weak ties with competent people they trust. In the case of this study, the participants in such external networks by qualified teachers confers on them a trusted status. Further support for the value of such interactions is provided by Lin et al. (2013 p40) and Pilli (2014 p91) who both cite the value that engagement with experts from a wider community can provide additional learning opportunities.

This section outlines the challenges of neatly binding a case study but also highlights how weak ties to those outside the course are valued by students and how technologies play a role in supporting these to support student learning.

5.3 Discussion of student-to-student interactions

As mentioned in the presentation of results section, student-to-student interactions were the richest in data and consequently, the discussion of this data is more extensive than the discussion relating to the previous two sub-questions. The discussion begins by considering who is talking to whom through the use of SNA before moving on to discuss what is being talked about and why. As social interactions form a large part of student-to-student communications, the role of these in learning will be considered which will be followed by a discussion of how students build and maintain social presence through technologies.

5.3.1 Who is talking to whom – a discussion of SNA

The application of SNA to the networks created on SNS by the students provided an understanding of the way that the students interacted with one another. This analysis took the form of a whole network perspective, that is looking at the structure of the network as opposed the perspective of each network from the perspective of specific participants (De Laat and Haythornthwaite 2007 p189). This analysis provided an understanding of each network in terms of the importance of each member within the network (centrality) (De Laat et al. 2007a p4) and (Mazur et al. 2010 p2). What was most revealing about the patterns of

the networks that this analysis provided was the similarities between each group's network. Another aspect that this analysis emphasised was the lack of correlation between these measures and a straightforward measure of the frequency of posting. The approach of drawing on usage statistics as a proxy for SNA was adopted by Hramiak (2010 p53) yet the findings from this study would suggest that such an approach is not reliable. The discrepancy between the two indicates that there are some students who interact a great deal but their impact on the group is not as significant as those who post less but to a wider group of people.

One of the other aspects of network dynamics that SNA can help to reveal is the existence of strong and weak ties. De Laat and Haythornthwaite (2007 p186) highlight how important an extended network is for personal and professional development. They go on to discuss how strong ties based on lasting friendships and community members are important for learning. Whilst the content of the SNS posts was not dominated by discussions related to learning, the strong ties established help to generate a supportive group culture and to facilitate effective face-to-face learning. In addition to strong ties, there are weak ties which are held with acquaintances. The SNA analysis was confined to the participants' SNS groups so it could not reveal anything about such ties outside the groups but other data revealed that these play a role in supporting students' professional development, particularly in the form of lesson ideas. Such use of connections made via technologies to others outside the students' groups would fall into the category of providing new perspectives as described by Ellison et al. (2007 p1146). Within each group, there was a proportion of students whose role could be described as peripheral and it would be easy to assume that they had weak ties to the rest of the group. Some students described how they would only go to the SNS group if they needed particular information, in these cases it would be appropriate to describe their tie to other group members as weak. However, for other students, they described how they would turn off notifications in order to not feel overwhelmed by the traffic on SNS, in these cases it would be less appropriate to assume their tie is weak. The issue of students being overwhelmed by the amount of traffic in a network is touched upon by De Laat and Haythornthwaite (2007 p186) who note how it can be difficult to cultivate communities and equally difficult to keep successful communities working well. This can be a particular problem if there is a strong core which dissuades participation by others.

Whilst the use of SNA approaches is useful, Ryberg and Larsen (2008 p106) comment that on its own, it does not tell you enough about what is going on in a network. This is a view supported by Gewerc et al. (2014 p58) who note that SNA leads to quantitative

understanding of networks with little opportunity to make qualitative comments. Going a little further than this, Shea et al. (2010 p17) argue that SNA measures of centrality are poor indicators of productive interaction. For all these reasons, the use of SNA has been combined with content analysis to gain a deeper understanding of what is happening within each of the groups' networks. Such an approach was adopted by Haya et al. (2015 p307) who used comments and network ties to explore the quality of interactions in a network.

5.3.2 What are they talking about - Context analysis of students' SNS interactions

Having discussed patterns of interaction between students, this section will consider the content and purpose of students' interactions. It will firstly consider interactions which can be considered to be on-task, or related to learning, before moving onto around-task interactions.

On-task interactions between students via SNS

It should firstly be noted that because there are no tasks that form part of the SD course which are required to be completed online, it could be considered that none of them are 'on-task'. However, one finding that arose from the analysis of the data was that some of the students' interactions with other students via SNS were rooted in the learning process. Examples of these would be exchanges about assignment topics, discussions about professional practice or conversations about pre- or post-session activities. Similar patterns of the use of Facebook for academic work were found by Madge et al. (2009 p13) who noted as few as 10% of students using it for such purposes. Consequently, it is a meaningful distinction to make to discuss on-task interactions separately from around-task interactions.

A pattern that was identified within the data was the increased amount of SNS traffic around periods preceding assessments. Here also, there are correlations with other studies. For example, Kio and Negreiros (2013 p71) found a strong correlation between page activity and assignment due dates. They propose that this shows that students were actively engaging with the learning community at times of need. They were not the only ones to note such findings, Hew (2011 p663) also notes findings that students use SNS to share information about assignment details, as did Maleko et al. (2013 p85). What is particularly relevant about Maleko et al.'s (2013 p85) findings is the fact that students also used SNS to discuss their results, including when the results were disappointing. The participants in this study also used SNS to interact with one another to discuss assignment feedback and they did so in an open and honest way, such a willingness to expose grades and to one another suggests a robust and supportive group environment. The benefits of such an ethos within SNS groups

is discussed by Karimi and Khodabandelou (2013 p116) who note that it allows students to move beyond simply using it as a social network and motivates students to use it for peer-to-peer learning. It is also indicative of the knowledge sharing behaviour that Yilmaz (2017) found emerges from strong social groups.

One feature of the SNS groups used by SD students is that they are formed independently of their UPL. This is of interest as authors such as Munoz et al. (2014 p58) claim that interactions between student and tutors are at the core of education, yet in this study, interactions with tutors are not taking place via SNS. A perspective on this is offered by King (2010 p237) who claim that as interactions between peers increases, it leads to a reduced dependency on the tutor, thus for the SNS groups in this study, the students have established such widespread interactions that they have reduced their tutor dependency to nothing. Support for student-to-student interactions leaning to learning is discussed by Belangee et al. (2015 p124) who consider the benefits of communal wisdom which arises out of social groups and in a similar way, Kim et al. (2015 p291) comment on the benefits that can arise from knowledge sharing. Both of these consider student-to-student interactions as providing learning benefits.

However, as El-Deghaidy and Nouby (2008 p989), Goodyear et al. (2005 p65) and Petropoulou et al. (2010 p232) all note, it is not as straightforward as either interactions with tutors or without, it is the interrelationship between the three dimensions of NL that result in learning. The interactions between students via SNS all support the claim of Smith and Peterson (2007 p278) that knowledge is not constructed in a vacuum, rather it is the result of interactions and communications between learners that take place across a network. One finding from the data provided by the Carlisle group was the way they had established a mutually supportive environment where there was no 'bragging', showing that students are perfectly capable of building an effective online community without the need for tutor intervention. This is in contrast to the findings of both Cabero-Almenara and Marin-Diaz (2014 p168) and Guldberg and Pilkington (2007 p62) who suggest that tutors have a role to play in online groups, particularly in relation to establishing groups and setting ground rules. What is most noticeable about the SD course, is that VLE tools such as blogs or wikis have not been widely adopted in the past and the participants in this study have all self-selected SNS tools without the need for tutor intervention to establish such interactions amongst themselves. This is contrary to the views of Beldarrain (2006 p142) who promotes the provision of tools such as blogs or wikis as part of the learning environment for students

to build interaction. Likewise, Meishar-Tal et al. (2012 p34) propose the use of similar tools embedded in learning management systems or VLEs. Whilst Shaltry et al. (2015 p23) discuss the use of Facebook groups for students, they suggest that these should be created by tutors for their students.

There have been a number of studies that suggest that social networks facilitate student-to-student interactions with resultant positive benefits. For example, Tess (2013 pA63) noted that they led to improved student satisfaction and Soomro et al. (2014 p282) refer to the interaction which they regard as fundamental to the learning process. For some authors, there is no doubt that SNS groups offer educational opportunities. Wong et al. (2015 p763) argue that they are an effective educational tool, whilst Sharma and Ankita (2016 p342) state that Facebook offers 'exceptional' opportunities for students to engage in collaboration. One of the ways that they can facilitate this is by the nature of the being learner-centred and open which is a point made by Petropoulou et al. (2010 p233). Another way in which they can achieve the claims made of them is proposed by Ng (2008 p326) who argues that it is the combination of formal and informal learning that makes them so powerful. However, Donlan (2014 p6) found that when students use SNS for peer-to-peer discussions, it was often not perceived by students as 'learning'.

One of the features highlighted by analysis of student-to-student interactions via SNS was the discussions that took place around professional learning. This has parallels to the finding by Erjavec (2013 p120) who found that participants saw a connection between their use of Facebook and the things that were valued by teachers in school. A similar finding is noted by Manca and Ranieri (2013 p120) who see value in the use of social networks when applied to real problems. For the participants in this study, the professional learning taking place en-route to gaining QTS is very much a real problem which can be supported by interactions with other students. Such interactions would be described by Cuesta et al. (2016 p61) as positive interactions within a learning community. Whilst Leggatt (2016 p441) found that SNS allowed learners to engage in deep reflection on their practice, there was little evidence of this taking place amongst the participants in this study, their interactions were generally more technical in nature or in the form of peer-tutoring. The development of peer-tutoring networks was found in a study by Vivian et al. (2014 p2).

A further benefit was found by Sharma and Ankita (2016 p350) and Sendurur et al. (2015 p191), which was that students would make use of Facebook for sharing resources such as files amongst themselves. However, in this study, this was only an occasional use which students made of SNS. Where information or resources were shared, it would typically be in the form of links to web sites or the relevant location of the VLE. However, there were some instances of students requesting information that would then be emailed directly to the requestee or where images of relevant documents would be shared with the group to clarify understanding.

However, as has been mentioned, the amount of on-task interaction that took place via SNS was minor in relation to the around-task interaction. This reflects the findings of Jones and Healing (2010 p382) whose study found students' discussion tended to focus on technical details such as assignment details rather than more meaningful knowledge construction. The relationship between on-task interactions and around-task interactions is explored by Kreijns et al. (2013 p231) who propose a matrix in which these two elements form one axis and cognitive interactions and social / emotional interactions form the other axis of the matrix. This is a helpful model as it helps to provide an overview of the way that all the elements interact. Such a matrix helps to explain the significance of around-task interactions of a social / emotional nature to more cognitive, on-task interactions by establishing an understanding that they all form part of the learning process. It is the around-task interactions that will subsequently be discussed.

The main messages arising from this section are that students have been able to form effective communities through SNS without tutor involvement and that they have used these at times of need such as around assessment periods or in response to specific issues relating to placements to support their learning. Student interactions that take place via SNS that relate to on-task activities are frequently intermixed with around-task interactions that highlight the relationship between cognitive interactions and social / emotional interactions.

Around-task interactions between students via SNS

De Laat and Haythornthwaite (2007 p189) help to provide clarity over the distinction between on-task and around-task activities by explaining that around-task activities are informal, spontaneous things that students arrange amongst themselves to support their on-task learning. Bicen et al. (2014 p540) found that students appreciated having access to friends for information sharing and being able to tap into their knowledge and ability to

support their learning. Whilst authors such as Fewkes and McCabe (2012 p93) make powerful claims about the contribution that interactions that take place on SNS can make to formal aspects of student learning, Selwyn (2007 p5) offers a more realistic perspective noting that students are most likely to use SNS technologies to facilitate interactions for informal aspects of their education. This pattern of use is supported by the content analysis of the participants' SNS interactions and is aligned with the comments of Madge et al. (2009 p12) who note the attractiveness of SNS lies in the ease with which students can interact with one another.

One of the ways in which participants made use of SNS for around-task interactions was to share information about schools where they would be for placements. Discussions around this topic was more noticeable prior to the second placement as students could draw on the bank of experience that had been gained by the group during the first placement, particularly because there is a fixed number of schools used by each alliance and students move around between them. In a study of the use of Facebook amongst pre-service teachers, Sendurur et al. (2015 p191) found that such exchanges of information were common among their participants indicating that the finding of this study are not unique.

One of the issues that arose from the group interviews was that some students began to feel overwhelmed by the volume of traffic on SNS and some took measures to reduce this feeling such as turning off notifications, turning the app off, not checking the SNS or simply adopting a sceptical view of the discussions. The usage data support such comments as each group had several students who were at the core and the majority at the periphery which could be interpreted to mean that there is a section of students making extensive use of SNS and, as a result, some of the remaining students feel overwhelmed by this degree of use. Such findings are not unique for example, Petrovic et al. (2013 p419) found that in addition to students regarding Moodle as better for learning than Facebook, that Facebook use is a distraction from learning. Likewise, Kirschner and Karpinski (2010 p1243) report that Facebook use can be a distraction but it occupies a unique place in students' minds as they do not feel that they are 'not working', in other words they are able to justify time spent on Facebook as being related to academic purposes. A caution against excessive use with a particular focus on excessive interactions with key students is provided by Smith and Peterson (2007 p279) who found that students who hold a prestigious status within groups are frequently called upon by classmates for help and support. This had the impact of leading to poorer academic performance as those with prestigious status were distracted from their work. There was only one related comment within one group in this study where

a single student had become particularly knowledgeable about a specific job application process and consequently had become the student that everyone else turned to. However, this only covered a short period of time so was unlikely to have had an impact on performance.

A final perspective to be considered in this section is offered by Gray (2013 p260) who found that in addition to acting as a useful place to conduct around-task interactions, SNS also acted as a proxy for the staff coffee room amongst a group involved in adult education. It was the combination of around-task learning combined with this social function which made the SNS so valuable for them. This reflects the findings of this study that the social use of SNS was significant for the participants and constituted a large proportion of the students' posts. Thus, the social use of SNS for student-to-student interactions will be discussed next.

5.3.3 Social aspects of learning

In addition to the context analysis of student interactions, content analysis was also carried out. The codes that were adopted for this can readily fall into a broader category of social interactions. Rather than discussing each of the different elements of the content of student interactions via SNS, the wider category of social interactions will be considered.

The importance of social aspects of student-to-student interactions has long been recognised for example Wegerif (1998 p34) argued for their importance. Subsequently, Kreijns et al. (2004 p156) have also emphasised their significance. However, they make a second interesting observation that whilst students may engage in high levels of interaction via SNS this level of interaction is hard to replicate in CSCL environments. It is possible that students take the view proposed by Kio and Negreiros (2013 p71) that students feel that SNS are for social reasons not for teaching purposes and that any attempts to replicate this within VLEs as proposed by Meishar-Tal et al. (2012 p35) is likely to be unsuccessful. Whatever the reasons, it is a finding of this study that students sustain high levels of social interaction within their self-managed SNS groups.

Whilst opportunities exist for SD students to engage in social interactions without any face-to-face contact, it is the use to build and reinforce existing face-to-face relationships that is their most common use. This mirrors the findings of Manca and Ranieri (2013 p3) that students typically use SNS to support existing social relationships. The importance of interactions which include a social element is proposed by Donnelly (2006 p109) who suggests that learning interactions draw upon both issue-based discussion and conversation. The use of SNS to build social relationships was evident from the outset of the course all

groups formed either prior to, or immediately at the outset of the course and there were many comments in the initial stages of the groups about the registration day when students had to attend campus to formally register on the course. SNS was used to facilitate face-to-face meetings for the first time when prior to this, students had only known one another online. This mirrors the findings of Manca and Ranieri (2013 p5) who found that students used SNS to help them negotiate the ins and outs of college life.

The link between face-to-face interactions and online interactions facilitated by SNS is explored further by Karimi and Khodabandelou (2013 p115) who note that the interactions that take place via SNS reflect the kinds of interactions that would otherwise take place in corridors or canteens. Likewise, Kreijns et al. (2013 p230) argue that face-to-face interactions must mirror online discussions in order to foster social interaction and effective group learning. This aspect is particularly important for the participants in this study who only meet face-to-face for two or three days per week at most.

Jones and Healing (2010 p382) report on findings that most student discussion took place face-to-face compared to online. Whilst this study does not have data on the volume of face-to-face interactions in relation to interactions via SNS, the use of SNS to build and sustain social cohesion is evident and plays an important role. Another comment from Jones and Healing (2010 p382) is that, of the interactions that did take place online, much of it was playful. This reflects an outcome of the content analysis of this study, that humour and banter form a significant volume of student-to-student interactions that take place via SNS. However, one of the risks of high levels of humour is that it can lead to in-jokes and the establishment of cliques as highlighted by Clark (2003 p2). Students in all the groups indicated that they would create sub-groups via SNS if there was something they wished to discuss that was not relevant to the whole group. These are examples of the sensitivity of students regarding 'spamming' one another with irrelevant information rather than example of cliques forming. There was evidence of in-jokes taking place particularly in the discussions following evening social events involving only a sub-set of the group. In these instances, the SNS discussions would be dominated by interactions relating to the evening; however, there is no evidence from student interviews to suggest that other members of the group felt like a clique was forming. There is, however, data to suggest that some students made fewer contributions to SNS than others, although there is no supporting evidence to help identify whether this is due to feelings of exclusion, alternate participation in sub-groups invisible to this study or vicarious participation (Sutton, 2001 p27). An alternate possibility is proposed by Jones et al. (2007 p92) who put forward the notion of latent links, or links which have the

potential to exist but have not yet formed. It might well be the case that at the start of the course, all students in each group felt that they would join the group for the potential benefits that it offered, in other words, to establish latent links. As the course has progressed, they might not have felt the need to activate and make use of these latent links.

There are a number of researchers that point to the importance of strong social bonds formed through social, student-to-student interactions. Wu et al. (2010 p158) point to the importance of facilitating human interaction through online collaboration, whilst Garrison et al. (2000 p91) propose that a strong sense of community amongst learners has an impact on higher order thinking. Whilst this claim cannot be supported by the data from this study, their findings that social interaction can impact on learning has some parallels in this study. They suggest that reassurance from classmates in relation to events such as assessments can lower anxiety and consequently facilitate better performance. There were many examples of this taking place prior to assessments of academic learning, professional learning on placement or prior to job interviews. In addition, most students commented in group interviews that such exchanges were helpful in reducing anxiety with only a handful of students reporting that such exchanges actually increased anxiety levels in the group as a whole.

The impact of social aspects on learning is questioned by Dalsgaard (2014 p99) who found, in a study of the use of Facebook to support groups of learners, that some groups had a majority of posts relating to academic content whilst others were more focussed on social aspects. He concluded that the educational potential of Facebook was not primarily related to socialising; however, is this study, there was no such discrepancy and the balance of discussions was similar across all groups with social aspects having greater prominence than academic elements.

A final theme arising from research is the impact of social bonds on resilience. Pilli (2014 p93) reports that SNS can help to reduce attrition from courses by providing social support to peers. Such issues were identified in the content analysis of SNS interactions. For example, where students were facing challenges, they would often disclose these to their group and, in response, the group would respond with encouragement or support. Another example was a group where a student did leave the course, in this case the students commented in the group interview how this impacted on the atmosphere in the SNS group and how they subsequently resolved to support one another to help enable positive outcomes for all.

Thus, it appears that the social interactions that take place between students via SNS play an indirect but important role in student progress through the course. Given the apparent important role that social interactions play in student progress, it is relevant to consider the way in which social interactions via SNS are sustained, consequently, the next section will consider social presence and its role in learning in greater detail.

Social presence

The meaning of social presence is described by Garrison et al. (2000 p89) as the ability of those within a community of inquiry to project their characteristics into the community, an alternate way of expressing this is offered by Richardson and Swan (2003 p70) who propose that it can be defined as the degree of salience of the other person in an interaction and how this salience affects interpersonal relationships. Nkhoma et al. (2015 p88) offer some insight into the meaning of such salience as they suggest that it lies in the ability of participants to present themselves and to connect with one another. For a high degree of social presence to be established, Preece (2001 p4) argues that three factors are required: purpose, people and protocols. In the case of the SD course, the purpose is to provide an online community to support face-to-face relationships and the people are evidently the students. When it comes to the protocol or the established norms of behaving, this is something that the participants have created independently of any tutor input. There were cases where this was explicitly mentioned in the group interviews, for example the Carlisle group referred to the way the all members of the group resisted talking about assignment grades in a 'bragging' way which helped everyone feel comfortable and sustained positive relationships.

Whilst explanations of what it is are reasonably straightforward, an additional challenge is presented when it comes to identifying social presence within the content of students' SNS interactions with one another in order to gain an understanding of the degree of presence that exists. Bentley et al. (2015 p497) reviewed a number of different protocols for measuring social presence which serves as a useful reminder that there is no single, agreed system for doing so. This study has adopted the approach of Garrison et al. (2000 p99) and Rourke et al. (1999 p6) whose categories of indicators are: emotional expression or affective responses, open communication or interactive responses, and group cohesion or cohesive responses. Whilst other authors such as Sung and Mayer (2012 p1739) propose more

complex models of the dimensions of social presence, these were poorly suited for use with the type of exchanges that students held via SNS and so were rejected. The discussion will subsequently focus on each of the three indicators of social prescence.

Social presence indicators in students' SNS interactions: affective responses

Garrison et al. (2000 p99) explain that this category includes the expression of emotion, the use of humour and self-disclosure. Rourke et al. (1999 p6) make the tentative suggestion that humour's role in social presence will impact on learning. It is argued that this is because it allows differences between group members to be presented without them being serious challenges to the group as a whole. Humour was widespread in the student-to-student interactions that took place via SNS. It was also present in a number of different formats (which made the SNS transcripts entertaining to read!) and thus indicates that the students were relaxed in their groups and happy to express humour with the consequent implication that this raised the degree of social presence amongst the members.

After humour, the most dense affective response indicator was self-disclosure. Garrison et al. (2000 p100) point out self-disclosure leads to the building of trust and reciprocal self-disclosure. This would certainly seem to have been the case in participants' student-to-student interactions via SNS where students were comfortable to share personal details and to disclose information such as poor performance in assignments or placements.

The combination of these two illustrates how SD students make widespread use of humour and self-disclosure as examples of affective responses to build social presence.

Social presence indicators in students' SNS interactions: interactive responses

This category of indicators relates to examples of reciprocal and respectful exchanges (Garrison et al. 2000 p100) upon using these, it became evident that they had been devised for the analysis of interactions that might take place within an online discussion board rather than a SNS format. One of the biggest differences being that the indicators proposed by Rourke et al. (1999 p7) which included quoting others' posts in a reply was not relevant as this approach was not used at all, either because it was not needed or because the media did not support it. In a similar, but opposite way, the indicator of continuing the discussion was not valuable as an indicator. An online discussion board might have several discussions running parallel to one another and so how they are continued would be an indicator of an interactive response. However, in a SNS group discussion, there is a single 'thread', the topic of which changes over time and so every post that was made was a continuation of the one

before it. For this reason, the majority of posts were categorised as continuing and its value was minimal and subsequently omitted from the analysis.

The remaining indicators were *asking questions* and *complimenting* both of which were strongly present indicating a high degree of social presence. The only notable difference was for the Blackburn group which had a higher density of asking questions. It is not possible to identify whether this is because of a higher degree of social presence in this group of whether their choice to use WhatsApp rather than Facebook meant there was something about the way that discussions were presented that meant that users were more likely to pose questions to other users.

What the data indicates is that the use of SNS does not require users to continue on from another's post or to quote from previous posts in order to establish social presence. What was identified was that students would show interaction through asking questions and providing complimentary comments to one another.

Social presence indicators in students' SNS interactions: cohesive responses

Rourke et al. (1999 p8) clarify that this category of indicators is exemplified by interactions that build and sustain a group commitment. It includes phatics, salutations, vocatives and inclusive language such as 'we', 'us', or 'our'. It was found that there were far fewer of examples of phatics and salutations than there were vocatives and inclusive language. Indeed there were fewer examples of vocatives than there were of inclusive language. This is interpreted to be as a result of the frequent and ongoing nature of interactions between students on SNS so the use of salutations such as 'hi' become redundant as the entire content of the SNS discussion appears as one single interaction rather than a series of discrete interactions that each need a salutation to start. The low level of vocative use is understood to be a result of the feature of the way that SNS interactions are presented on screen, as each comment in accompanied by the users' name and avatar, and because of the way that discussions are presented as nested threads, there is a reduced need to use vocatives in order to direct the discussion to specific members of the group. One example where vocatives were used widely was when students were offering sympathy, for example if a student had disclosed that they had been unsuccessful at a job interview. In such cases, the sympathy offered by the other students would frequently include the student's name. The assumption here is that this adds emotional weight to the comment by personally directing it to the student in question.

The cohesive response indicator of social presence that was most frequently observed was that of inclusive language. It was clear that the students were aware that the SNS group was an online community and consequently, they moderated their use of it to align it with the norms of group discussion and interaction. There were a wide variety of ways in which students expressed inclusive language beyond obvious terms such as 'we' or 'our'. This suggests that there was a strong sense in each of the groups that the online space was theirs and was for all of them to use. However, it should be noted that not all students made equal amount of use of the SNS groups and it would be an interesting study to explore any relationship between the use of inclusive language and the frequency of posting on such groups.

This section highlights how the students have selected ways of using cohesive responses which are appropriate to SNS (as opposed to discussion boards) and that they are sophisticated users of these, for example, adopting vocatives when expressing sympathy. Another key finding is the way that inclusive language plays a significant role in establishing social presence.

The importance of Social presence

Having discussed the constituent parts, and the ways in which students have expressed these within their interactions, it follows to relate these to the impact that they have. Belangee et al. (2015 p124) make the point that participating in social media maintains connections within the community and builds responsibility to the community. However, it is unlikely that this is the sole reason for students developing social presence. Meishar-Tal et al. (2012 p35) suggest that, as well as creating mutual support, such interactions serve to increase motivation for learning and encourage constructive learning. When it comes to trying to establish connections between the degree of social presence demonstrated and learning outcomes, opinions appear to be generally positive. For example, Bentley et al. (2015 p494) propose that is has a central influence on teaching and learning success whilst Munoz et al. (2014 p58) go a little further and argue it has direct academic implications. Other writers, such as Kožuh et al. (2014 p224) note that increased density of social presence indicators results in increased perceived learning by students but that this connection is not supported by final grades. Likewise, Richardson and Swan (2003 p79) also note the relationship between social presence and perceived learning but do not attempt to correlate this to actual learning outcomes. Nevertheless, there is support for the notion that social presence is a positive factor in student learning.

In addition to consideration of direct impacts on learning outcomes related to the degree of social presence, it is claimed that there are indirect impacts on student performance. For example, Vivian et al. (2014 p3) state that it can have a positive impact on students' social experience at university and overall well-being. A similar point is made by Erjavec (2013 p119) who notes that learners tend to persist in education when they feel a strong sense of social belonging and connectedness. A caution is noted by Beldarrain (2006 p149) that social presence is not the same as interaction but they do support one another. The participants in this study have high levels of interaction via SNS and there is evidence of significant levels of social presence both of which would support the idea that this will be beneficial to perseverance and well-being. Indeed, there were examples of students using SNS interactions to express concerns about challenges they were facing and to draw upon the responses of their colleagues to help motivate them to continue adding support to these claims about the indirect benefits of social presence.

In addition to the equivalency theory referred to earlier, Garrison et al. (2000 p95) suggest that cognitive presence is more easily sustained when social presence has been established. Whilst the participants in this study do not need to establish an online cognitive presence, their well-established social presence is likely to impact positively on their group cohesion in their face-to-face sessions. This is a view supported by Bentley et al. (2015 p502) who make the point that social presence is not exclusive to online environments and, as such, has relevance to face-to-face teaching and learning. The relationship between face-to-face interaction and online interaction is discussed by Paechter and Maier (2010 p296) who note that students prefer the former when deeper learning is the desired outcome. This would provide an explanation why there was a high density of social presence indicators in the participants' SNS discussions but very few instances of learning related discussion taking place. In other words, students were opting to use SNS for social purposes because they preferred face-to-face interactions, which were available on a regular basis, for deeper, learning related interactions. Support for this perspective is provided by Kio and Negreiros (2013 p71) who propose that face-to-face interactions and online relationships work together in a self-reinforcing nature.

Chapter 6 Conclusion

This section draws conclusions from the data and discussion in relation the research question and associated sub-questions. As introduced in section 1.2, this study attempts to answer the following question and sub-questions:

How do technologies support School Direct students' learning on a PGCE with Qualified Teacher Status within a Networked Learning model?

- How do students make use of technologies to support student-to-artefact interactions?
- How do students use technologies to support student-to-tutor interactions?
- How do students use technologies to support student-to-student interactions?

One of the overarching conclusions is that SD students are sophisticated and widespread users of technologies and that they make pragmatic choices about which technologies they use in relation to their learning needs, time constraints and the technologies used by others.

6.1 Sub question one: How do students make use of technologies to support student-to-artefact interactions?

The most significant conclusion in relation to this sub-question is that SD students typically eschew Blackboard, the institutionally provided VLE, as the technology of choice to facilitate their interactions with artefacts. It would appear that UPL views which place greater value on face-to-face interactions than on those facilitated via technology play a role in this. In other words, because UPLs make little use of Blackboard as an interactive learning environment, students look elsewhere in order to interact with learning resources. One exception to this is seen in the assessment process where the use of Turnitin for the submission and marking and feedback of assignments is valued as a technology to support interaction about assignments and subsequent learning.

This sub-question highlights the pragmatic choices that students make when making decisions about which technologies to use to facilitate learning interactions with artefacts. The use of Google Scholar to facilitate access to books and journals is a prime example. When faced with a choice between a wider range of search results but a cumbersome user interface (OneSearch) and a reduced range of search results but fewer access issues (Google Scholar), SD students typically opt for the one which provides the fewest frustrations. SD

students are studying on an intensive course and complete assignments alongside a full timetable of course activities and placements in school, thus they make decisions such as this in response to the pressures of the course.

A further finding of this sub-question is that it highlights how students will execute a degree of 'substitution' between one element of NL and another. In this case, students forgo face-to-face interactions with mentors regarding their subject knowledge and substitute this with interactions via technologies such as YouTube in order to develop their subject and pedagogical knowledge. This is another example of the sophisticated choices that students make; they do so in order to avoid revealing gaps in their knowledge to their mentor and apply wide ranging critical filters to the results of such interactions to confirm the value of them to their practice.

6.2 Sub-question two: How do students use technologies to support student-to-tutor interactions?

Given that interactions in a network have the potential to be interlinked and given the way that students 'substitute' interactions between one NL element and another (as discussed in section 6.1 above) it is not surprising that some of the key conclusions in relation to this sub-question have already been discussed. To build on that earlier discussion, a key finding is that students interact with a number of different people who fall into the role of tutor and these networked interactions do not overlap. In other words, the interactions that students have with mentors do not take place within a network that is accessible by UPLs. Again, this highlights the complex way that SD students draw upon technologies to support their learning by moving between different technologies as needed and by applying their own critical filters to the outcomes of these interactions, particularly because they are not interlinked and the interactions with each person in the role of tutor is not subject to interactions with others in the role of tutor.

SD students are able, capable and willing to respond to the different expectations of interactions via technology. This is most striking in the comparison between the virtually exclusive use of email by UPL which is typically restricted to office hours only in contrast to interactions with mentors. This is characterised by a more even distribution of power in the relationship with the technology used to facilitate interactions being mutually agreed. Further examples of this come from the range of responses about who initiated the sharing of contact details and preferred form of technology.

As mentioned in section 6.1 the technology used most for interactions between UPLs and students is Turnitin. Whilst students valued the interactions about their assessment activities that this facilitated, the views of UPLs were less favourable and showed the bias towards face-to-face interactions that characterised UPL opinions of interactions via technology. For UPLs, the feedback via Turnitin was seen as the starting point which was to be followed up via face-to-face interactions if needed. Whilst students perceived it as a valuable way of interacting about their learning.

Students make use of interactions with artefacts to develop their subject and pedagogical knowledge in relation to their progress towards QTS rather than drawing on interactions with their mentor. However, this does not mean that they have no need for such interactions. In fact, such interactions were very prevalent, much more so than interactions with their UPL. This is in spite of the fact that students would typically have much more frequent face-to-face interactions with their mentor than their UPL. This is explained by the nature of such interactions which were often pastoral in nature, related to around-task interactions or concerned with plans for forthcoming lessons. In each of these sits alongside the development of students' subject and pedagogical knowledge and concerns how this is applied within a classroom setting. Classrooms are fast paced and students regularly have to amend future plans based on the outcomes of the most recent lesson, this can lead to crises of confidence and the need for last minute changes and adaptations, all of which are facilitated by email and SMS interactions with mentors.

6.3 Sub-question three: How do students use technologies to support student-to-student interactions?

This final sub-question was the richest in data and gives credence to the idea that students will substitute interactions within a NL environment or community of inquiry as needed. In light of this, the density of interactions between students can be seen as a compensation for the lower density of student-to-artefact and student-to-UPL interactions. The networks that students create are dense, self-generated and self-managed.

One of the strongest findings in relation to this sub-question relates to the importance that social interactions have for students. The high volume of data provided by the study alongside wide ranging theoretical support shows that students rely on technologies in the form of SNS to build and sustain interactions with peers from their group (but not with

students from other groups). These social relationships support student learning through peer support which takes many forms. It can be in the form of encouragement or consolation in response to teaching placements or job applications. However, in its most widespread form it is through maintaining social connections between students when they are not interacting in face-to-face situations. There are some instances of these interactions being used to arrange social events but the analysis of social presence indicators within SNS transcripts shows that it is through the use of humour and inclusive pronouns that social cohesion is most strongly maintained.

Alongside the role of social cohesion, the use of technologies to support student-to-student interactions supported several *around-task* activities. These play an important role for students in helping to ease students through the requirements of student life. Examples around the details of how to submit work through Turnitin or how to view feedback were widespread. Likewise, there were many examples of how these interactions helped students be aware of placement related needs such as locations or timings. Whilst none of these are central to student learning, on a busy course with a full timetable and both academic and professional learning elements, the need to minimise areas of stress or concern is of great importance to students.

The final conclusion from this sub-question is that although students interact widely with one another via technologies, there is only a small proportion of this interaction which could be effectively classed as directly related to learning (or on-task). Whilst students have created and self-managed groups through the use of technologies, they do not make extensive use of these as a learning community. What examples there were of them being used for on-task interactions were more likely to relate to professional learning rather than academic learning.

6.4 Implications for Networked Learning

The decision to adopt NL as a theoretical framework for this research has been justified in pragmatic terms by the role it has played in providing a structure to the collection and analysis of the data. This case study, like many others, has drawn on an extensive range of data which had the potential to have been overwhelming. However, NL provided a framework to break this down into manageable areas and to provide a consistent focus for my attentions.

Outside of its pragmatic value, there has been a two-way interaction between NL and this study. Firstly, there has been the contribution it has made to the understanding of the way

that students use technologies to support different aspects of their learning and relative importance of each of these to the learning process. It has been particularly helpful in identifying and understanding the importance that student-to-student interactions play and how these include both learning interactions which are of primary importance as well as social interactions which are of secondary importance but equally valuable. Secondly, there has been an opportunity to apply NL to an area where it has not been widely used and to apply it to a situation where the course was not built with NL principles in mind. It is this which provides the strongest contribution to NL theory as it provides support for the flexibility of this theory to be applied more widely to situations where learners are making use of technologies to facilitate their learning interactions in a piecemeal, self-selected manner.

6.5 Contributions to the field

This work brings a number of contributions to the field. Firstly, it has deepened understanding of the way that students make use of technologies to support their learning. It does so by drawing together a number of areas which have been richly researched including blended learning, the importance of social interactions to learning and the role of technologies in learning. More so than this, it has provided a rich and detailed description of the role that technologies play in the learning of SD students. This is important because SD is a relatively new route in teaching (as discussed in section 1.1) and it has not been widely researched. Given the way that my institution has implemented SD courses which leads to geographically dispersed, discrete cohorts it would not be appropriate to assume they interact in an NL environment in the same as other SD students from other institutions or in the same way as campus-based PGCE students on traditional, university led courses.

In addition, it provides further depth to the field of NL by showing how it can be applied to teacher education particularly where the course was not designed along NL principles. This study has shown that it is possible to use a NL framework to analyse student interactions within a learning network where the interactions are dispersed across a range of technologies, the majority of which are student selected and not provided as part of the suite of tools on the course.

6.6 Contributions to practice and policy

The conclusion that students are sophisticated users of technologies who make well-reasoned choices about the types of technologies they will use to support different types of interaction is of importance to pedagogical practice in the design of the SD course as well as

those tutors who work with students on it. The fact that students self-select technologies that will facilitate their interactions is a strong indication that the technologies provided by the course (Blackboard VLE) are deemed as less valuable by students than those which are available elsewhere. This has an implication for course designers who should consider whether to modify their VLE use to better meet the needs of students or whether to support students to enable them to better find and evaluate external sources.

Likewise, there is a contribution to the professional practice of tutors who work on the course based on the differences that this study identified between the technologies that students utilise to interact with mentors and those used to interact with UPLs. It will provide a valuable stimulus for reflection amongst UPLs who will be able to use it to self-evaluate their interactions with students and the appropriateness of giving primacy to face-to-face interactions. In addition to this, UPLs will be able to draw on the findings of this study to evaluate the appropriateness of their one-directional interactions via email in comparison to the greater use of two-directional interactions via a range of technologies that students have with mentors.

A final contribution to practice and policy comes from the significant role of student-to-student interactions that takes place via SNS. This appears to play a significant role in students' learning and social aspects of learning. Attempts to bring this interaction into the VLE are unlikely to be successful but this does not mean that it can be ignored. Course designers and tutors can benefit from recognising the role that these interactions play and making this explicit to students in order that they can appreciate their value. Course designers and tutors might also provide guidelines to students on how best to make effective use of such interactions even though they will not have a direct role in facilitating them.

6.7 Limitations of this study

There are three limitations to this study. Firstly, there is the appropriateness of the NL framework to this research. As was discussed in section 6.5 it demonstrates another field to which the NL framework can be applied, however, at the same time it should be recognised that it is not a perfect fit with the SD course. This is because the SD course has not been designed along NL principles (as discussed in section 2.1 and 6.5) and as such this research has had to respond to the challenges that this presents. However, the NL framework is

robust and flexible enough that it has allowed this study to generate a number of conclusions arising from the application of the framework to the research context.

A further limitation arises from a common issue in case studies: that of bounding the case. It is acknowledged that section 4.5.2 includes data relating to student interactions with those in the role of tutor who are not part of the university or school staff and as such should, technically, not form part of the data set for this study. However, in relation to the other data in that section and the discussion of it in section 5.2.3 it was felt necessary to include it as it helped to shed light on how students made use of technologies to develop their professional learning when they needed to go beyond interactions with their mentor or online artefacts.

There are two limitations which relate to the data set for this study. Firstly, that there was no data collected from mentors about their use of technologies to interact with students. As was explained in section 3.2 this was for practical reasons to do with the numbers of mentors and the logistics involved if their data were to have been considered. Nevertheless, it cannot be ignored that the inclusion of data from such sources would have resulted in a richer case. Secondly, that there is a gap in the usage statistics from Blackboard resulting in the time period for which Blackboard maintains such data (covered in section 4.4.1). Whilst not a critical omission, the fact that there is a gap in the data is not ideal.

6.8 Further work

What is noticeable by its omission is the use of technologies that support video-conferencing being used to facilitate student-to-tutor interactions. Some UPLs expressed a wish to make use of such technologies but there was no mention of their use by students at all. The reasons for this are unknown and worthy of further enquiry.

As highlighted in section 6.7 the bounds of this case study excluded any sustained focus on the role that learning interactions with those outside of the course play. Student participants widely commented on the role of SNS groups which included qualified teachers and the use of YouTube resources to support subject knowledge development. The fact that their use was widely reported suggests that they are of importance to students and consequently further study to explore and understand the role that these interactions play would be justified.

Section 6.7 also draws attention to the exclusion of mentors. An expansion of this study would be to plan for research which could collect data from this group in a manageable yet

meaningful way. Given the numbers of mentors involved in supporting student learning allied to the difficulty of bringing them together for group interviews, the most realistic approach would be to adopt some carefully selected purposive sampling strategies to identify participants.

A final related area of study would be to use an action research approach to guide and structure the development of Blackboard for future cohorts of students. This research has highlighted both the minimal use that UPLs make of this and the minimal value that students have of it as a place to interact with learning artefacts. Given the potential that VLEs have to support student learning then research to guide and assess the development of course Blackboard use has the potential to lead to improved student learning.

References

AAEN, J. and DALSGAARD, C., 2016. Student Facebook groups as a third space: between social life and schoolwork. Learning, Media and Technology, 41(1), pp. 160-186.

ABBASI, I., 2016. Get social. Talent Development, 70(3), pp. 26-28.

ABEDIN, B., DANESHGAR, F. and D'AMBRA, J., 2012. Do Nontask Interactions Matter? The Relationship between Nontask Sociability of Computer Supported Collaborative Learning and Learning Outcomes. British Journal of Educational Technology, 43(3), pp. 385-397.

AJJAWI, R., SCHOFIELD, S., MCALEER, S. and WALKER, D., 2013. Assessment and feedback dialogue in online distance learning. Medical Education, 47(5), pp. 527-528.

AKKOYUNLU, B. and SOYLU, M.Y., 2008. A study of students' perceptions in a blended learning environment based on different learning styles. Educational Technology & Society, 11(1), pp. 183-193.

ANDERSON, T., 2003. Getting the Mix Right Again: An updated and theoretical rationale for interaction. International Review of Research in Open and Distance Learning, 4(2), pp. 1-14.

ANDERSON, T., ROURKE, L., GARRISON, D.R. and ARCHER, W., 2001. Assessing Teacher Presence in a Computer Conferencing Context. Journal of Asynchronous Learning Networks, 5(2), pp. 1-17.

ARAGON, S.R., 2003. Creating social presence in online environments. New Directions for Adult and Continuing Education, 2003(100), pp. 57-68.

ASPDEN, L. and HELM, P., 2004. Making the Connection in a Blended Learning Environment. Education Media International, 41(3), pp. 245-252.

BAKIR, N., 2016. Technology and Teacher Education: A Brief Glimpse of the Research and Practice That Have Shaped the Field. TechTrends: Linking Research and Practice to Improve Learning, 60(1), pp. 21-29.

BALAKRISHNAN, V., 2014. Using social networks to enhance teaching and learning experiences in higher learning institutions. Innovations in Education and Teaching, 51(6), pp. 595-606.

BARAN, B., 2010. Facebook as a formal instructional environment. British Journal of Educational Technology, 41(6), pp. 146-149.

BARNES, N., PENN-EDWARDS, S. and SIM, C., 2015. A dialogic about using Facebook status updates for education research: a PhD student's journey. Educational Research and Evaluation, 21(2), pp. 109-121.

BAYNE, S., GALLAGHER, M.S. and LAMB, J., 2014. Being "at" University: The Social Topologies of Distance Students. Higher Education: The International Journal of Higher Education and Educational Planning, 67(5), pp. 569-583.

BELANGEE, S., BLUVSHTEIN, M. and HAUGEN, D., 2015. Cybersocial Connectedness: A Survey of Perceived Benefits and Disadvantages of Social Media Use. The Journal of Individual Psychology The Journal of Individual Psychology, 71(2), pp. 122-134.

BELDARRAIN, Y., 2006. Distance Education Trends: Integrating new technologies to foster student interaction and collaboration. Distance Education, 27(2), pp. 139-153.

BENTLEY, K.J., SECRET, M.C. and CUMMINGS, C.R., 2015. The Centrality of Social Presence in Online Teaching and Learning in Social Work. Journal of social work education, 51(3), pp. 494-504.

BICEN, H., OZDAMLI, F. and UZUNBOYLU, H., 2014. Online and Blended Learning Approach on Instructional Multimedia Development Courses in Teacher Education. Interactive Learning Environments, 22(4), pp. 529-548.

BLANKENSHIP, M., 2011. How Social Media Can and Should Impact Higher Education. Education Digest, 76(7), pp. 39-42.

BLATTER, J. and HAVERLAND, M., 2012. Designing case studies: explanatory approaches in small-n research. New York: Palgrave Macmillan.

BONZO, J., 2012. A social media networked learning ecology perspective. Networked Learning Conference.

BOOTH, S., 2008. Researching learning in networked learning - phenomenography and variation theory as empirical and theoretical approaches. Networked Learning Conference.

BOSCH, T.E., 2009. Using online social networking for teaching and learning: Facebook use at the University of Cape Town. Communicatio, 35(2), pp. 185-200.

BREULEUX, A., LAFERRIERE, T. and BRACEWELL, R., 1998. Networked Learning Communities in Teacher Education. Technology and Teacher Education Annual. pp. 1170-1175.

CABERO-ALMENARA, J. and MARIN-DIAZ, V., 2014. Educational possibilities of social networks and group work. university students' perceptions. Media Education Research Journal, 21(42), pp. 165-172.

CAIN, J. and POLICASTRI, A., 2011. Using Facebook as an Informal Learning Environment. American Journal of Pharmaceutical Education, 75(10).

CARR, N. and CHAMBERS, D.P., 2006. Teacher professional learning in an online community: the experiences of the National quality schooling framework pilot project. Technology, Pedagogy and Education, 15, pp. 143-157.

CHENG, G. and CHAU, J., 2016. Exploring the relationships between learning styles, online participation, learning achievement and course satisfaction: An empirical study of a blended learning course. British Journal of Educational Technology, 47(2), pp. 257-278.

CHEUNG, C.M.K., CHIU, P.Y. and LEE, M.K.O., 2011. Online social networks: Why do students use facebook? Computers in Human Behavior, 27(4), pp. 1337-1343.

CHOU, A.Y. and CHOU, D.C., 2011. Course Management Systems and Blended Learning: An Innovative Learning Approach. Decision Sciences Journal of Innovative Education, 9(3), pp. 463-484.

CLARK, J., 2001. Stimulating collaboration and discussion in online learning environments. The Internet and Higher Education, 4(2), pp. 119-124.

CLARK, T., 2003. Disadvantages of collaborative online discussion and the advantages of sociability, fun and cliques for online learning. The IFIP Working Groups 3.1 and 3.3 Working Conference: ICT and the Teacher of the Future.

CLOUGH, P. and NUTBROWN, C., 2012. A student's guide to methodology. 3rd edn. London: Sage.

COHEN, L., MANION, L. and MORRISON, K., 2011. Research methods in education. 7th edn. London; New York: RoutledgeFalmer.

COOPER, S., GROVER, S. and SIMON, B., 2014. Building a virtual community of practice for K-12 CS teachers. Communications of the ACM, 57(5), pp. 39-41.

CUESTA, M., EKLUND, M., RYDIN, I. and WITT, A., 2016. Using "Facebook" as a Co-Learning Community in Higher Education. Learning, Media and Technology, 41(1), pp. 55-72.

DA SILVA, V. C. M. and SIQUEIRA, S.W.M., 2016. Analysing Students' Interactions through Social Presence and Social Network Metrics. International Association for the Development of the Information Society.

DALSGAARD, C., 2014. Students' use of Facebook for peer-to-peer learning. 2014 2014, Networked Learning Conference.

DALSGAARD, C., 2006. Social Software: e-learning beyond learning management systems. European Journal of Open, Distance and e- Learning, 2.

DAVID, D., 2007. Case study methodology: fundamentals and critical analysis. Cognition, Brain, Behaviour, XI(2), pp. 299-317.

DE LAAT, M., 2006. Networked learning. 1 edn. [S.l.]: Politieacademie.

DE LAAT, M. and HAYTHORNTHWAITE, C., 2007. Social Networks and Learning Networks: Using Social network perspectives to understand social learning. Aalborg University.

DE LAAT, M. and LALLY, V., 2004. It's not so easy: Researching the complexity of emergent participant roles and awareness in asynchronous networked learning discussions. Journal of Computer Assisted Learning, 20(3), pp. 165-171.

DE LAAT, M. and LALLY, V., 2003. Complexity, theory and praxis: Researching collaborative learning and tutoring processes in a networked learning community. Instructional Science, 31(1), pp. 7-39.

DE LAAT, M., LALLY, V., LIPPONEN, L. and SIMONS, R.J., 2007a. Investigating patterns of interaction in networked learning and computer-supported collaborative learning: A role for Social Network Analysis. International Journal of Computer-Supported Collaborative Learning, 2(1), pp. 87-103.

DE LAAT, M., LALLY, V., LIPPONEN, L. and SIMONS, R.J., 2007b. Online teaching in networked learning communities: A multi-method approach to studying the role of the teacher. Instructional Science, 35(3), pp. 257-286.

DE LAAT, M., LALLY, V., LIPPONEN, L. and SIMONS, R.J., 2006. Analysing student engagement with learning and tutoring activities in networked learning communities: A multi-method approach. International Journal of Web Based Communities, 2(4), pp. 394-412.

DELFINO, M. and PERSICO, D., 2007. Online or face-to-face? Experimenting with different techniques in teacher training. Journal of Computer Assisted Learning, 23(5), pp. 351-365.

DEPARTMENT FOR EDUCATION, 2012-last update, New school led teacher training programme announced. Available: https://www.gov.uk/government/news/new-school-led-teacher-training-programme-announced.

DEPARTMENT FOR EDUCATION, 2011-last update, Teachers' Standards. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/283566/Teachers_standard_information.pdf.

DIRCKINCK-HOLMFELD, L., HODGSON, V. and MCCONNELL, D., 2014. Exploring the theory, pedagogy and practice of networked learning. London: Springer.

DOCKTER, J., 2016. The Problem of Teaching Presence in Transactional Theories of Distance Education. Computers and Composition, 40, pp. 73-86.

DONLAN, L., 2014. Exploring the views of students on the use of Facebook in university teaching and learning. Journal of Further and Higher Education, 38(4), pp. 572-588.

DONNELLY, R., 2006. Blended problem-based learning for teacher education: lessons learnt. Learning, Media & Technology, 31(2), pp. 93-116.

EISENHARDT, K.M., 1999. Building theories from case study research. Qualitative research, 14(4), pp. 532-550.

EL-DEGHAIDY, H. and NOUBY, A., 2008. Effectiveness of a blended e-learning cooperative approach in an Egyptian teacher education programme. Computers & Education, 51(3), pp. 988-1006.

ELLISON, N.B. and BOYD, D., 2013. Sociability through Social Network Sites. In: W.H. DUTTON, ed, The Oxford handbook of Internet studies. Oxford: Oxford University Press, pp. 151.

ELLISON, N.B., STEINFIELD, C. and LAMPE, C., 2007. The Benefits of Facebook "Friends:" Social Capital and College Students' Use of Online Social Network Sites. Journal of Computer-Mediated Communication, 12(4), pp. 1143-1168.

ERJAVEC, K., 2013. Informal learning through Facebook among Slovenian pupils. Comunicar, 21(41), pp. 117-126.

ESS, C.M., 2009. Internet research ethics. In: A.N. JOINSON, K. MCKENNA, T. POSTMES and U. REIPS, eds, The Oxford handbook of Internet psychology. Oxford; New York: Oxford University Press, pp. 1-29.

FEWKES, A. and MCCABE, M., 2012. Facebook: Learning Tool or Distraction? Journal of Digital Learning in Teacher Education, 28(3), pp. 92-98.

FIDEL, R., 1984. The case study method: a case study. LISR, 6, pp. 273-288.

FLYVBJERG, B., 2006. Five Misunderstandings About Case-Study Research. Qualitative Inquiry, 12(2), pp. 219-245.

FULLER, A., HODKINSON, H., HODKINSON, P. and UNWIN, L., 2005. Learning as peripheral participation in communities of practice: a reassessment of key concepts in workplace learning. British Educational Research Journal, 31(1), pp. 49-68.

GALAN, M., LAWLEY, M. and CLEMENTS, M., 2015. Social media's use in postgraduate students' decision-making journey: an exploratory study. Journal of Marketing for Higher Education, 25(2), pp. 287-312.

GARRISON, D.R., ANDERSON, T. and ARCHER, W., 2000. Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. The Internet and Higher Education, 2(2-3), pp. 87-105.

GHERARDI, S., NICOLINI, D. and ODELLA, F., 1999. Toward a social understanding of how people learn in organizations: the notion of situated curriculum. Human Resources Abstracts, 34(2), pp. 273-297.

GOODYEAR, P., JONES, C., ASENSIO, M., HODGSON, V. and STEEPLES, C., 2005. Networked Learning in Higher Education: Students' Expectations and Experiences. Higher Education, 50(3), pp. 473-508.

GORGHIU, L.M., GORGHIU, G., BIZOI, M., SUDUC, A., OLTEANU, R.L. and DUMITRESCU, C., 2014. An overview of issues concerning students' and tutors' involvement in the "Designing TEL Course". Journal of Science and Arts, 26(1), pp. 65-72.

GRAY, C., 2013. Bridging the teacher/researcher divide: Master's-level work in initial teacher education. European Journal of Teacher Education, 36(1), pp. 24-38.

GULDBERG, K. and PILKINGTON, R., 2007. Tutor Roles in Facilitating Reflection on Practice through Online Discussion. Educational Technology & Society, 10(1), pp. 61-72.

HARLAND, T., 2014. Learning about Case Study Methodology to Research Higher Education. Higher Education Research and Development, 33(6), pp. 1113-1122.

HARRELL, P.E. and HARRIS, M., 2006. Teacher Preparation Without Boundaries: A Two-Year Study of an Online Teacher Certification Program. Journal of Technology & Teacher Education, 14(4), pp. 755-774.

HAYA, P.A., DAEMS, O., MALZAHN, N., CASTELLANOS, J. and HOPPE, H.U., 2015. Analysing Content and Patterns of Interaction for Improving the Learning Design of Networked Learning Environments. British Journal of Educational Technology, 46(2), pp. 300-316.

HAYTHORNTHWAITE, C., 2002. Strong, Weak, and Latent ties and the impact of new media. The Information Society, 18, pp. 385-401.

HERTHER, N., 2017. Google Scholar: Library Partner or Database Competitor? Online searcher, 41(5), pp. 30-30.

HEW, K.F., 2011. Students' and teachers' use of Facebook. Computers in Human Behavior, 27(2), pp. 662-676.

HICKEY, C., MCALEER, S.J., KHALILI, D., HICKEY, C., MCALEER, S.J. and KHALILI, D., 2015. E-learning and traditional approaches in psychotherapy education: Comparison. Archives of Psychiatry and Psychotherapy, 17(4), pp. 48-52.

HODGSON, V. and REYNOLDS, M., 2005. Consensus, Difference and "Multiple Communities" in Networked Learning. Studies in Higher Education, 30(1), pp. 11-24.

HOSTETTER, C., 2013. Community Matters: Social Presence and Learning Outcomes. Journal of the Scholarship of Teaching and Learning, 13(1), pp. 77-86.

HRAMIAK, A., 2010. Online learning community development with teachers as a means of enhancing initial teacher training. Technology, Pedagogy and Education, 19(1), pp. 47-62.

HYETT, N., KENNY, A. and DICKSON-SWIFT, V., 2014. Methodology or method? A critical review of qualitative case study reports. International Journal of Qualitative Studies on Health and Well Being, 9.

HURST, B., WALLACE, R. and NIXON, S.B., 2013. The impact of social interaction on student learning. Reading Horizons, 52(4), pp. 375-398.

IRWIN, C., DESBROW, L., BALL, B. and LEVERITT, M., 2012. Students' Perceptions of Using "Facebook" as an Interactive Learning Resource at University. Australasian Journal of Educational Technology, 28(7), pp. 1221-1232.

JONES, C., 2004. Networks and learning: communities, practices and the metaphor of networks. ALT-J: Research in Learning Technology, 12(1), pp. 81-93.

JONES, C. and HEALING, G., 2010. Networks and locations for student learning. Learning, Media and Technology, 35(4), pp. 369-385.

JONES, C.R., FERREDAY, D. and HODGSON, V., 2008. Networked learning a relational approach: weak and strong ties. Journal of Computer Assisted Learning, 24(2), pp. 90-102.

JUNCO, R., 2011. The relationship between frequency of Facebook use, participation in Facebook activities, and student engagement. Computers and Education, 58, pp. 162-171.

KARIMI, L. and KHODABANDELOU, R., 2013. Perspective of Iranian University Students about Academic Use of Social Networking Sites: A Study of Facebook. International Journal of Academic Research in Progressive Education and Development, 2(3), pp. 113-123.

KARIMI, L., TUNKU, A. and TUNKU, B., 2013. Perceived Learning and Satisfaction in a Blended Teacher Education Program: An Experience of Malaysian Teacher Trainees. Contemporary Educational Technology, 4(3), pp. 197-211.

KEAR, K., 2010. Social presence in online learning communities, , 2010 2010, NLC.

KEAR, K., CHETWYND, F. and JEFFERIS, H., 2014. Social Presence in Online Learning Communities: The Role of Personal Profiles. Research in Learning Technology, 22, pp. 1-15.

KEHRWALD, B., 2010. Being online: social presence as subjectivity in online learning. London Review of Education, 8(1), pp. 39-50.

KIM, J., LEE, C. and ELIAS, T., 2015. Factors affecting information sharing in social networking sites amongst university students. Online Information Review, 39(3), pp. 290-309.

KIMBLE, C., HILDRETH, P. and WRIGHT, P., 2001. Communities of practice: going virtual. In: Y. MALHOTRA, ed, Knowledge management and business model innovation. London: Idea Group Publication, pp. 220-234.

KING, K.P., 2002. Identifying success in online teacher education and professional development. The Internet and Higher Education, 5(3), pp. 231-246.

KIO, S.I. and NEGREIROS, J., 2013. Facebook as an Informal Learning Space Channel: The São José, Macao Cases, Learning and Teaching in Computing and Engineering (LaTiCE), 2013, 2013 2013, IEEE, pp. 70-76.

KIRSCHNER, P.A. and KARPINSKI, A.C., 2010. Facebook® and academic performance. Computers in Human Behavior, 26(6), pp. 1237-1245.

KOŽUH, I., JEREMIĆ, Z., SARJAŠ, A., LAPUH BELE, J., DEVEDŽIĆ, V. and DEBEVC, M., 2014. Social presence and interaction in learning environments : the effect on student success. Educational Technology & Society, 18(1), pp. 223-236.

KREIJNS, K., KIRSCHNER, P.A., JOCHEMS, W. and VAN BUUREN, H., 2004. Determining sociability, social space, and social presence in (a)synchronous collaborating groups. CyberPsychology and Behavoiur, 7(2), pp. 155-172.

KREIJNS, K., KIRSCHNER, P.A. and VERMEULEN, M., 2013. Social Aspects of CSCL Environments: A Research Framework. Educational Psychologist, 48(4), pp. 229-242.

LAFERRIERE, T., ERICKSON, G. and BREULEUX, A., 2007. Innovative models of web-supported university-school partnerships. Canadian Journal of Education, 30(1), pp. 211-238.

LAMPE, C., WOHN, D.Y., VITAK, J., ELLISON, N.B. and WASH, R., 2011. Student use of Facebook for organizing collaborative classroom activities. International Journal of Computer-Supported Collaborative Learning, 6(3), pp. 329-347.

LEAFMAN, J.S., MATHIESON, K.M. and EWING, H., 2013. Student Perceptions of Social Presence and Attitudes toward Social Media: Results of a Cross-Sectional Study. International Journal of Higher Education, 2(1), pp. 67-77.

LEGGATT, S., 2016. Overcoming the barriers of distance: using mobile technology to facilitate moderation and best practice in initial teacher training. Journal of Further and Higher Education, 40(3), pp. 432-446.

LIN, M.G., HOFFMAN, E.S. and BORENGASSER, C., 2013. Is Social Media Too Social for Class? A Case Study of Twitter Use. TechTrends, 57(2), pp. 39-45.

LOWENTHAL, P.R. and DENNEN, V.P., 2017. Social presence, identity, and online learning: research development and needs. Distance Education Distance Education, 38(2), pp. 137-140.

MADGE, C., MEEK, J., WELLENS, J. and HOOLEY, T., 2009. Facebook, social integration and informal learning at University: 'It is more for socialising and talking to friends about work than for actually doing work'. Learning, Media and Technology, 34(2), pp. 141-155.

MALEKO, M., NANDI, D., HAMILTON, M., D'SOUZA, D. and HARLAND, J., 2013. Facebook versus Blackboard for supporting the learning of programming in a fully online course: the changing face of computing education. IEEE computer society.

MANASIJEVIC, D., ZIVKOVIC, D., ARSI, C.S. and MILOSEVIC, I., 2016. Exploring students' purposes of usage and educational usage of Facebook. Computers in Human Behavior, 60, pp. 441-450.

MANCA, S. and RANIERI, M., 2016. Facebook and the others. Potentials and obstacles of Social Media for teaching in higher education. Computers & Education, 95, pp. 216-230.

MANCA, S. and RANIERI, M., 2013. Is it a tool suitable for learning? A critical review of the literature on Facebook as a technology-enhanced learning environment. Journal of Computer Assisted Learning, 29(6), pp. 487-504.

MAZUR, A., DORAN, C. and DORAN, P., 2010. The use of social network analysis software to analyze communication patterns and interaction in online collaborative environments. The Centre for Information Technology in Education, Hong Kong University.

MEISHAR-TAL, H., KURTZ, G. and PIETERSE, E., 2012. Facebook Groups as LMS: A Case Study. International Review of Research in Open and Distance Learning, 13(4), pp. 33-48.

MIRON, E. and RAVID, G., 2015. Facebook groups as an academic teaching aid: Case study and recommendations for educators. Educational Technology & Society, 18(4), pp. 371-384.

MOORE, M.G., 1997. Theory of transactional distance. In: D. KEEGAN, ed, Theoretical Principles of Distance Education. London: Routledge, pp. 22-38.

MOTTERAM, G., 2006. 'Blended' education and the transformation of teachers: a long-term case study in postgraduate UK Higher Education. British Journal of Educational Technology, 37(1), pp. 17-30.

MUNOZ, L.R., PELLEGRINI-LAFONT, C. and CRAMER, E., 2014. Using Social Media in Teacher Preparation Programs: Twitter as a Means to Create Social Presence. Perspectives on Urban Education, 11(2), pp. 57-69.

MURPHY, L.M., SHELLEY, M.A., WHITE, C.J. and BAUMANN, U., 2011. Tutor and Student Perceptions of What Makes an Effective Distance Language Teacher. Distance Education, 32(3), pp. 397-419.

NAVARRO, P. and SHOEMAKER, J., 2000. Performance and perceptions of distance learners in cyberspace. American Journal of Distance Education, 14(2), pp. 15-35.

NCTL, 2014. Initial teacher training criteria. London: National College for Teaching and Leadership.

NG, E.M.W., 2008. Engaging Student Teachers in Peer Learning via a Blended Learning Environment. Issues in Informing Science & Information Technology, 5, pp. 325-334.

NKHOMA, M., CONG, H.P., AU B., L., T., RICHARDSON, J., SMITH, R. and EL-DEN, J., 2015. Facebook as a tool for learning purposes: Analysis of the determinants leading to improved students' learning. Active Learning in Higher Education, 16(2), pp. 87-101.

NOLEN, A.L. and VANDER PUTTEN, J., 2007. Action Research in Education: Addressing Gaps in Ethical Principles and Practices. Educational Researcher, 36(7), pp. 401-407.

O'BRYNE, I. and PYTASH, K.E., 2015. Hybrid and Blended Learning. Journal of Adolescent and Adult Literacy, 59(2), pp. 137-140.

PAECHTER, M. and MAIER, B., 2010. Online or face-to-face? Students' experiences and preferences in e-learning. The Internet and Higher Education, 13(4), pp. 292-297.

PAECHTER, M., MAIER, B. and MACHER, D., 2010. Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction. Computers & Education, 54(1), pp. 222-229.

PARAN, A., FURNEAUX, C. and SUMNER, N., 2004. Computer-mediated communication in distance MA programmes: the student's perspective. System, 32(3), pp. 337-355.

PETROPOULOU, O., ALTANIS, I., RETALIS, S., NICOLAOU, C.A., KANNAS, C., VASILIADOU, M. and PATTIS, I., 2010. Building a tool to help teachers analyse learners' interactions in a networked learning environment. Educational Media International, 47(3), pp. 231-246.

PETROVIC, N., VELJKO, J., MARKO, C., ZORAN, R. and NEMANJA, M., 2013. Facebook Vs Moodle: What do students really think? International Conference on Information, Communication Technologies in Education.

PILLI, O., 2014. LMS Vs. SNS: Can Social Networking Sites Act as a Learning Management Systems? American International Journal of Contemporary Research, 4(5), pp. 90-97.

POON, J., 2013. Blended Learning: An Institutional Approach for Enhancing Students' Learning Experiences. Journal of Online Learning & Teaching, 9(2), pp. 271-289.

PREECE, J., 2001. Sociability and usability in online communities: determining and measuring success. Behaviour and Information Technology, 20(5), pp. 347-356.

PRICE, L., RICHARDSON, J.T.E. and JELFS, A., 2007. Face-to-face versus online tutoring support in distance education. Studies in Higher Education, 32(1), pp. 1-20.

RAP, S. and BLONDER, R., 2016. Let's Face(book) It: Analyzing Interactions in Social Network Groups for Chemistry Learning. Journal of Science Education and Technology, 25(1), pp. 62-76.

RAWLINS, P. and KEHRWALD, B., 2014. Integrating Educational Technologies into Teacher Education: A Case Study. Innovations in Education and Teaching International, 51(2), pp. 207-217.

RICHARDSON, J.C. and SWAN, K., 2003. Examining Social Presence in Online Courses in Relation to Students' Perceived Learning and Satisfaction. Journal of Asynchronous Learning Networks, 7(1), pp. 68-88.

RICHARDSON, J.C., BESSER, E., KOEHLER, A., LIM, J. and STRAIT, M., 2016. Instructors' perceptions of instructor presence in online learning environments. International Review of Research in Open and Distance Learning, 17(4), pp. 82-104.

ROBLYER, M.D., MCDANIEL, M., WEBB, M., HERMAN, J. and WITTY, J.V., 2010. Findings on Facebook in higher education: A comparison of college faculty and student uses and perceptions of social networking sites. The Internet and Higher Education, 13(3), pp. 134-140.

ROURKE, L. and ANDERSON, T., 2004. Validity in Quantitative Content Analysis. Educational technology research and development, 52(1), pp. 5.

ROURKE, L., ANDERSON, T., GARRISON, D.R. and ARCHER, W., 1999. Assessing social presence in asynchronous text-based computer conferencing. Journal of Distance Education, 14(2), pp. 50-71.

RULE, P. and JOHN, V.M., 2015. A Necessary Dialogue: Theory in Case Study Research. International Journal of Qualitative Methods, 14(4) pp. 1-11.

RYBERG, T. and LARSEN, M.C., 2008. Networked identities: understanding relationships between strong and weak ties in networked environments. Journal of Computer Assisted Learning, 24(2), pp. 103-115.

SACKEY, D.J., NGUYEN, M. and GRABILL, J.T., 2015. Constructing learning spaces: What we can learn from studies of informal learning online. Computers and Composition, 35, pp. 112-124.

SATAR, H.M. and AKCAN, S., 2018. Pre-Service EFL Teachers' Online Participation, Interaction, and Social Presence. Language Learning & Technology, 22(1), pp. 157-183.

SAVIN-BADEN, M. and HOWELL MAJOR, C., 2013. Qualitative Research: The essential guide to theory and practice. London: Routledge.

SELWYN, N., 2009. Faceworking: exploring students' education-related use of Facebook. Learning, Media and Technology, 32(2), pp. 157-174.

SELWYN, N., 2007. 'Screw Blackboard... do it on Facebook!': an investigation of students' educational use of Facebook. Institute of Education, University of London.

SENDURUR, P., SENDURUR, E. and YILMAZ, R., 2015. Examination of the social network sites usage patterns of pre-service teachers. Computers in Human Behavior, 51(1), pp. 188-194.

SEUFERT, M., HOSFELD, T., SCHWIND, A., BURGER, V., and TRAN-GIA, P., 2016. Group-based communication in WhatsApp. IFIP Networking Conference. University of Vienna, pp. 536-541.

SHALTRY, C., HENRIKSEN, D., WU, M.L. and DICKSON, W.P., 2013. Situated Learning with Online Portfolios, Classroom Websites and Facebook. TechTrends, 57(3), pp. 20-25.

SHARMA, S.K. and ANKITA, S.H., 2016. A multi-analytical approach to predict the Facebook usage in higher education. Computers in Human Behavior, 55(2), pp. 340-353.

SHEA, P., HAYES, S., VICKERS, J., GOZZA-COHEN, M., UZUNER, S., MEHTA, R., VALCHOVA, A. and RANGAN, P., 2010. A re-examination of the community of inquiry framework: Social network and content analysis. The Internet and higher education., 13(1), pp. 10-21.

SHEN, Y.W., REYNOLDS, T.H., BONK, C.J. and BRUSH, T.A., 2013. A Case Study of Applying Blended Learning in an Accelerated Post-Baccalaureate Teacher Education Program. Journal of Educational Technology Development & Exchange, 6(1), pp. 59-78.

SKRAMSTAD, E., SCHLOSSER, C. and ORELLANA, A., 2012. Teaching Presence and Communication Timeliness in Asynchronous Online Courses. Quarterly Review of Distance Education, 13(3), pp. 183-188.

SMITH, R.A. and PETERSON, B.L., 2007. “Psst … What Do You Think?” The Relationship between Advice Prestige, Type of Advice, and Academic Performance. Communication Education, 56(3), pp. 278-291.

SO, W.W., 2012. Quality of Learning Outcomes in an Online Video-Based Learning Community: Potential and Challenges for Student Teachers. Asia-Pacific Journal of Teacher Education, 40(2), pp. 143-158.

SOOMRO, K.A., KALE, U. and YOUSUF, Z.S., 2014. Pre-service teachers’ and teacher-educators’ experiences and attitudes toward using social networking sites for collaborative learning. Educational media international, 51(4), pp. 278-294.

STACEY, E., 2002. Social Presence Online: Networking Learners at a Distance. Education and Information Technologies, 7(4), pp. 287-294.

STAKE, R.E., 1995. The art of case study research. Thousand Oaks: Sage.

STENHOUSE, L., 1980. The Study of Samples and the Study of Cases. British Educational Research Journal, 6(1), pp. 1-6.

STRICKER, D., WEIBEL, D. and WISSMATH, B., 2011. Efficient learning using a virtual learning environment in a university class. Computers & Education, 56(2), pp. 495-504.

SUN, P., TSAI, R.J., FINGER, G., CHEN, Y. and YEH, D., 2008. What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. Computers & Education, 50(4), pp. 1183-1202.

SUNG, E. and MAYER, R.E., 2012. Five facets of social presence in online distance education. Computers in Human Behavior, 28, pp. 1738-1747.

SUTTON, L.A., 2001. The Principle of Vicarious Interaction in Computer-Mediated Communications. International Journal of Educational Telecommunications, 7(3), pp. 223-242.

SWAN, K., 2005. Social presence and e-learning, , 2005 2005, IADIS.

TERENZINI, P.T., CABRERA, A.F., COLBECK, C.L., PARENTE, J.M. and BJORKLUND, S.A., 2001. Collaborative Learning vs. Lecture/Discussion: Students' Reported Learning Gains*. Journal of Engineering Education, 90(1), pp. 123-130.

TERZI, S. and ÇELIK, A., 2005. Teacher-Student Interactions in Distance Learning. The Turkish Online Journal of Educational Technology, 4(1), pp. 54-56.

TESS, P.A., 2013. The role of social media in higher education classes (real and virtual) - A literature review. Computers in Human Behavior, 29(5), pp. A60-A68.

THANH, N.C. and THANH, T.T.L., 2015. The Interconnection Between Interpretivist Paradigm and Qualitative Methods in Education. American Journal of Educational Science, 1(2), pp. 24-27.

THOMAS, G., 2013. From Question to Inquiry: Operationalising the Case Study for Research in Teaching. Journal of Education for Teaching: International Research and Pedagogy, 39(5), pp. 590-601.

THOMPSON, G., 2015. 13 Keys to successful blended learning. Times Higher Education, 26-27.

TIK, C.C., 2015. Community of Inquiry of Graduate Certificate in Higher Education: A case study. The 5th Multidisciplinary Academic Conference in Prague 2015.

TKALAC VERČIČ, A. and VERČIČ, D., 2013. Digital natives and social media. Public relations review, 39(5), pp. 600-602.

TOYN, M., 2015a. How do post-graduate trainee teachers develop an online community using social media? Lancaster University. Unpublished essay/assignment: ED.S823 Researching Technology Enhanced & Networked Learning Communities.

TOYN, M., 2015b. Student perceptions of ICTs to support Networked Learning in a School Direct PGCE programme. Lancaster University. Unpublished essay/assignment: ED.S825 Researching Technology Enhanced/Networked Learning, Teaching and Assessment.

TOYN, M., 2014. What value to students place on the online element of a blended learning environment of a PGCE programme? Lancaster University. Unpublished essay/assignment: ED.S821 Research methods in education and social science settings. Philosophy, methodology and tools.

TU, H., MCISAAC, M., SUJO-MONTES, L. and ARMFIELD, S., 2012. Is There a Mobile Social Presence? Educational Media International, 49(4), pp. 247-261.

TURNITIN, 2018-last update, Turnitin. Available: www.turnitin.com.

UNIVERSITY OF Cxxxxxx, 2015-last update, Education Partnerships. Available: http://www.cxxxxxxx.ac.uk/Courses/SubjectAreas/Education/Partnerships/Home.aspx. (full details omitted to preserve anonymity)

VAN WYNSBERGHE, R. and KHAN, S., 2007. Redefining Case Study. International Journal of Qualitative Methods, 6(2), pp. 1-10.

VAUGHAN, N. and GARRISON, D.R., 2005. Creating cognitive presence in a blended faculty development community. Internet and Higher Education, 8(1), pp. 1-12.

VILELLE, L., 2008. Join the conversation: Show your library's google scholar and book search expertise. Journal of Library Administration, 46(3-4), pp. 53-64.

VIVIAN, R., BARNES, A., GEER, R. and WOOD, D., 2014. The Academic Journey of University Students on Facebook: An Analysis of Informal Academic-Related Activity over a Semester. Research in Learning Technology, 22.

WANG, Y. and HOWARD, P., 2012. Google Scholar Usage: An Academic Library's Experience. Journal of Web Librarianship, 6(2), pp. 94-108.

WASOH, F., 2016. Exploring the Roles of Blended Learning as an Approach to Improve Teaching and Learning English. MAC Prague Consulting.

WEBB, E., JONES, A. and BARKER, P., 2005. Using e-learning dialogues in higher education. Educational Administration Abstracts, 40(1), pp. 93-103.

WEGERIF, R., 1998. The Social dimension of synchronous learning networks. Journal of Asynchronous Learning Networks, 2(1), pp. 34-49.

WIKELEY, F. and MUSCHAMP, Y., 2004. Pedagogical Implications of Working with Doctoral Students at a Distance. Distance Education, 25(1), pp. 125-142.

WISDOM, T.N., SONG, X. and GOLDSTONE, R.L., 2013. Social Learning Strategies in Networked Groups. Cognitive Science, 37(8), pp. 1383-1425.

WISNESKI, J.E., OZOGUL, G. and BICHELMEYER, B.A., 2015. Does teaching presence transfer between MBA teaching environments? A comparative investigation of instructional design practices associated with teaching presence. The Internet and Higher Education, 25(2), pp. 18-27.

WONG, C.H., TAN, G.W.H., LOKE, S.P. and OOI, K.B., 2015. Adoption of mobile social networking sites for learning? Online Information Review, 39(6), pp. 762-778.

WOODGATE-JONES, A., 2012. The student teacher and the school community of practice: an exploration of the contribution of the legitimate peripheral participant. Educational Review, 64(2), pp. 145-160.

WU, J., TENNYSON, R.D. and HSIA, T., 2010. A study of student satisfaction in a blended e-learning system environment. Computers & Education, 55(1), pp. 155-164.

YILMAZ, F.K.G., 2017. Social Presence and Transactional Distance as an Antecedent to Knowledge Sharing in Virtual Learning Communities. Journal of Educational Computing Research, 55(6), pp. 844-864.

YIN, R.K., 2014. Case study research: design and methods. 5th edn. Thousand Oaks: Sage.

YOUNG, A. and LEWIS, C.W., 2008. Teacher education programmes delivered at a distance: An examination of distance student perceptions. Teaching and Teacher Education, 24(3), pp. 601-609.