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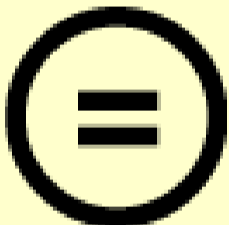
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Developing a new blended approach to fostering  
information literacy.

by

Geoffrey Lee Walton

Doctoral Thesis

Submitted in partial fulfilment of the  
requirements  
for the award of

PhD of Loughborough University

(May 2009)

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## **Abstract**

This thesis examines how to engage UK based undergraduate students in Sport & Exercise in the process of becoming information literate in their subject area. The Main Study focused on three groups of students enrolled on a core subject based module. The module in question was delivered via a blended learning approach where part of the delivery was face-to-face and part online via discussion board within the Blackboard Virtual Learning Environment (VLE). Acquiring a rigorous understanding of how to deliver information literacy (IL) required four things to be achieved: an understanding of the field of IL; an appreciation of the information behaviour (IB) processes underpinning IL, an awareness of current theory and practice in the area of teaching and learning and finally, an understanding of current thinking and scholarship in e-learning. In particular the thesis adopted notions of: constructivist approaches to learning recommended by Mayes & de Freitas (2004), community of practice (Wenger, 1999), scaffolding (JISC, 2004), and managing online discourse (Goodyear, 2001) to create a workable, theoretically and empirically grounded model for testing. An in depth investigation of methodological theory was carried out in order to devise a robust research strategy to thoroughly test this new model. This strategy has a number of unique characteristics: it uses an IB model (Hepworth, 2004), a cognitive theory of learning (Bloom et al, 1956) and a notion of metacognition defined by Moseley et al (2004) to code and analyse qualitative data. The model was tested in a Pilot Study, substantially modified and then re-tested in a Main Study. The key findings generated from this indicated the importance of task, role and norms in the IL pedagogical process and that the new model for delivering IL teaching and learning via a blended approach engendered higher order thinking in particular analysis, synthesis and evaluation. Data also indicated four discrete levels of information discernment which suggest a possible format for the structuring of an evaluation of information assessment rubric. It is envisaged that this new model has a broader application beyond Higher Education (HE) and Sport & Exercise. Whilst the study has a number of limitations it can be concluded that the research undertaken here provides a significant contribution to the existing body of knowledge in IL, IB, learning and e-learning scholarship. However, it is recognised that any apparent solution is only provisional in a rapidly developing information landscape and, as a consequence, a number of future avenues for research are recommended.

## **Acknowledgements**

I have learnt a great deal in doing this PhD and it has been long and interesting journey. Fortunately I have received a great deal of help and guidance along the way from a number of people. I am particularly grateful to Dr Mark Hepworth for his wisdom, inspiration and friendship and for introducing me to the concept and scholarship of information behaviour. I would also like to thank him for encouraging and assisting me in publishing various aspects of this thesis. I'm indebted to Dr Derek Stephens for his intellectual input, support, meticulous attention to detail and for giving his time to read through various drafts of this thesis. The fieldwork would not have been possible without the support and encouragement from Dr Jamie Barker who facilitated all of the learning and teaching interventions and interviews. For intellectual input and proof reading, I'd like to thank Prof Alan Roulstone. I'd like to thank Alison Pope for working with me in co-authoring a number of publications which have included some of the findings presented here.

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I dedicate this thesis to Lily Walton and the memory of Wilfred Walton.

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## Bibliography

## List of Abbreviations

ACRL	American College and Research Libraries
ALA	American Library Association



ANOVA	Analysis of Variance
ANZIIL	Australia & New Zealand Institute of Information Literacy
BECTA	British Educational Communications and Technology Agency
CAUL	Council of Australian Librarians
CIBER	Centre for information Behaviour & the Evaluation of Research
CILIP	Chartered Institute of Library & Information Professionals
EDULIB	Educational Development for Higher Education Library Staff
ELICS	Effective Learning Information & Communication Skills
EU	European Union
FE	Further Education
HE	Higher Education
HEFCE	Higher Education Funding Council for England
IB	Information Behaviour
IFLA	International Federation of Library Associations
IL	Information Literacy
IRPA	Instant Reflective Practice Activity
IT	Information Technology
JISC	Joint Information Systems Committee
NHS	National Health Service
OCL	Online Collaborative Learning
PSYCINFO	Psychological information (brand name of an abstracting and indexing online database)
QAA	Quality Assurance Agency
SCONUL	Society of College & New University Libraries
SOLO	Structure of Observed Learning Outcomes
SPSS	Statistical Package for the Social Sciences (software)
UCL	University College London
UK	United Kingdom
UNESCO	United Nations Educational, Scientific & Cultural Organisation
URL	Uniform Resource Locator
USNCLIS	United States National Commission on Library and Information Science
VLE	Virtual Learning Environment
ZPD	Zone of Proximal Development

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# **1 Introduction**

## **1.1 Overview**

Information literacy (IL) is a term with which most librarians working in Higher Education (HE) would admit to having some familiarity. IL has become a tool, and is seen by some as panacea, to address the many issues associated with how students, especially but not exclusively undergraduates, deal with information in order to navigate their way through an award to its completion. IL is also regarded as the means by which students can transfer their skills learnt at undergraduate level into the world of work and so instil the virtues of lifelong learning. It is seen as way of alerting students and academic staff to a way of teaching students how to obtain good quality information, read around the subject and avoid the perennial problem of plagiarism.

It is argued that if subject librarians are to convince their academic colleagues, and faculty generally, that IL is more than just ‘a good thing’ it seems that any learning and teaching pedagogical intervention should be based on a bedrock of sound learning theory and pedagogical practice. Furthermore, the expanding field of information behaviour (IB) offers a great deal of empirical research regarding how people go about seeking and using information. It seems that IB offers opportunities for further intellectual rigour to the task at hand. Finally, in an ever changing learning and teaching environment it appears that the rapid developments in e-learning offer another rich seam of pedagogical possibility with which to articulate a sound framework for delivering IL. In recognition of these issues, this thesis seeks to bring together these information and educational domains in a new way in the hope of providing a signpost to how IL should be delivered to undergraduates within HE.

However, this thesis recognises that none of these should be taken at face value and as such seeks to offer a critical overview of the most pertinent scholarship in the areas

identified. By undertaking this detailed and thorough examination of a number of distinct but related fields of academic endeavour, that of IL scholarship, teaching and learning theory, e-learning scholarship and information behaviour (IB) research, this thesis has attempted to assemble the most effective ways of delivering information literacy (IL) teaching and learning interventions in the higher education (HE) sector<sup>1</sup>. This initial examination aims to unearth the intersections, commonalities, parallels and differences that these areas of expertise bring to teaching of IL. In addition, it is intended that the appropriate theoretical grounding, empirical findings and best practice from each of these areas is distilled. In undertaking this examination it is envisaged that a new model for delivering IL in the HE sector would be devised. Given the nature of this human activity and interaction that exemplifies teaching and learning it will be necessary to examine in some detail how this model should be evaluated. It is proposed that this new model be rigorously tested in a real setting with a view to shaping it for practical application across subject areas in HE.

Before these detailed issues are addressed this thesis will seek to overview the context in which these sit, from the very broad to the more specific, and from this an aim and objectives will be put forward. Finally, the research questions which these suggest will be stated.

## ***1.2 Information and literacy***

This thesis recognises the problematic nature of information and the myriad definitions it provokes and the subsequent plethora of IB models which have ensued (Case, 2007). A usefully broad definition is offered by Case (2007, p40), ‘any difference that makes a difference to conscious human mind’. By the same token the definition of literacy has its own history and sets of definitions (Owusu-Ansah, 2003). Bawden & Robinson (2002) illustrate the link between information and literacy by quoting Kulthau (1987):

---

<sup>1</sup> IL, IB, learning and e-learning are all defined in Chapter 2.

‘What does it mean to be literate in an information society? Information literacy is closely tied to functional literacy. It involves the ability to read and use information essential for everyday life’.

Kulthau (1987, quoted in  
Bawden & Robinson, 2002, p297)

Hence, these two terms put together as information literacy (IL) have taken on a new and distinct meaning.

This thesis recognises that there is, in a sense, a ‘jigsaw’ or plurality of other emerging literacies which includes academic, digital, scientific, media, visual, IT and ‘e’ literacy and these bear some similarities and overlap with IL (Bawden & Robinson, 2002; Martin, 2003a). It seems that by placing the term ‘literacy’ as a suffix to any subject, or notion, serves to render the term into new and metaphorical meaning, that of ‘competence’ (Martin, 2003b). Hence, for example, ‘scientific literacy’ is short hand for being competent on the science domain. It is, however, beyond the scope of this thesis to examine these other literacies with their similarities and differences to IL. Rather, this thesis follows the view of Pope & Walton (2008) that IL is not simply a complement to these but is ultimately the overarching framework that provides a sense-making structure which underpins all literacies.

### ***1.3 The wider context: Why the interest in information literacy?***

Outside the professional sphere in the UK there is an emerging context that of the ‘skills agenda’ brought into recent sharp focus by the Leitch Review (Great Britain: HM Treasury, 2006) and the government response to it (Great Britain: HM Government, Department of Innovations, Universities and Skills, 2007). These two documents emphasise the critical importance of ensuring that the HE sector put the acquisition of skills at the heart of their educational agenda. It should be noted that Cheuk (2002), Feldman (2004) and Breivik & Gee (2006) have all argued that even though the

information landscape has become ever richer studies show that the workforce has a deficit in functional IL leading to a demonstrable lack of efficiency. Furthermore, the recent study on young people's IB (UCL, 2008 – also known as the 'CIBER Report') shows that pre-university students are unable to construct effective searches and use the narrowest of criteria to evaluate their newly found information. What these separate but related studies reveal is that there is a need for IL to underpin students' intellectual development so that the successful graduate has the skills to survive in the workplace. Indeed, Pope and Walton (2008) argue that:

'In order to try to prepare students for this future world in which information grows at an alarming rate and in which skills are one of the keys to employability and career success, institutions like Staffordshire University must now begin to take a strategic approach to integrate the acquisition of information literacy skills directly into the students' timetable.'

(Pope & Walton, 2008, n.p.)

It is posited, therefore that IL can be seen as an addition to students existing academic skills allowing them to become more attractive to employers and by doing so address the concerns raised in the Leitch Review.

## **1.4 The professional context**

Information professionals are familiar with the term *information literacy* and it has seen wide and varied use since its inception in 1974<sup>2</sup> (Bruce, 1995; Andretta, 2005). It has been noted that that the information profession has, and continues to, put forward the IL cause with a near-missionary zeal whilst others regard it as a dangerously ambiguous concept which, though neatly packaged, is not literally applicable or easily interpretable

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<sup>2</sup> This thesis notes that a great deal of scholarship (as identified by Lorenzen, 2003) in the area of 'library instruction', and 'bibliographic instruction' (including for example, Lubans and Sharma in the UK and Fjallbrant in Europe) pre-dates and informs much of existing information literacy practice discussed here.

(Owusu-Ansah, 2003). Whilst there is a minority view which questions the actual worth of IL as an educational endeavour (Wilder, 2005; Williams, 2006) it should be noted that a more scholarly critique of IL is emerging for example, Whitworth (2007). There now exist many definitions of IL and it is a term which is recognised throughout the world (Andretta, 2007). There has been much debate regarding the terms *information* and *literacy* and the arguments for and against using these terms (Owusu-Ansah, 2003), whether they should be used together (Loveless & Longman, 1998) and what they mean (Case, 2002; Lloyd, 2003; Saranto & Hovenga, 2004; Andretta, 2005). Despite this, IL continues to be discussed and this debate has reached the global arena in which there have been several pronouncements. The *Prague Declaration* (resulting from a UNESCO-sponsored conference and reported in USNCLIS, 2003) and reiterated by the *Alexandria Proclamation* (UNESCO, 2005) has added weight to the importance of the concept and seeks to argue that IL as not only an important set of skills to enable information to be gathered and used but also essential for effective participation in the 'information society' and a basic human right reminiscent of Kulthau (1987, quoted in Bawden & Robinson 2002, p297) mentioned above.

There is a continued growth in the number of textbooks devoted to advising practitioners, from a range of disciplines, sectors and professions, on how to teach information literacy for example, Grassian & Kaplowitz (2001), Shiness & Walter (2003), Webb & Powis (2004), Cook & Cooper (2006) and Secker, Boden & Price (2007). It is generally recognised that IL instruction requires a shift from teaching specific resources to a set of critical thinking skills involving the use of information (Kasowitz-Scheer & Pasqualoni, 2002) and this is reflected in some of the models analysed below and in recent research in IL and teaching and learning (Bordinaro & Richardson, 2004 and Walker & Engel, 2004). The most significant IL initiatives have taken place in the United States and Australia/ New Zealand (Virkus, 2003). There are also references to IL developments in specific countries such as, China, Japan, Mexico, Namibia, Singapore, South Africa (Virkus, 2003), Canada (Julien & Boon, 2002) and Turkey (Kirbanoglu, 2004). IFLA (the International Federation of Library Associations) are developing a definition (Lau, 2006) which is intended for application in any national context. Within the European



Union (EU) there were two high profile European Commission funded projects (namely EDUCATE and DEDICATE) as well as a number of IL initiatives reported in local EU languages for example, Danish, Dutch, Finnish, French, German, Norwegian and Spanish amongst others (Virkus, 2003). Finland in particular is regarded as world leader devising an IL policy which has been implemented within its education system (UNESCO, 2005).

In the United Kingdom (UK) increased interest and activity in IL is reflected in a number of major developments: the Librarian's Information Literacy Annual Conference (LILAC) which was inaugurated in 2005 and set up by the Information Literacy sub-group, itself a recent development of the Community Services Group (CSG), which is part of the Chartered Institute of Library & Information Professionals (CILIP); the quarterly meetings of the Staffordshire University Information Literacy Community of Practice (SUILCoP<sup>3</sup>) which commenced in 2006; special issues and themes in the CILIP journal *Update* from 2005 onwards which has published at least one issue entirely devoted to the subject. Within the United Kingdom (UK) IL activity (research and practice) can be found in higher education (HE) (Howard & Newton, 2005; Walton, 2005; Smart, 2005; Parker, 2005; Bent, Higgins & Brettle, 2006; Stubbings & Franklin, 2007), Further Education (FE) (Arthur, Stewart, & Irving, 2005; Jackson & Banwell, 2005), the NHS (Brettle, 2003; NHS Education for Scotland, 2008), schools (Loveless & Longman, 1998; Smith & Hepworth, 2005) and the business sector (Lloyd, 2003; Abell & Skelton, 2005). Scotland now has its own information literacy framework (Irving & Crawford, 2007). Recent new research and practice has turned to the possible benefits of 'Web 2.0'<sup>4</sup> in delivering IL teaching and learning across a range of sectors (Godwin & Parker, 2008).

IL models vary in scope from those narrowly focussed on the process of searching for and using information such as, the Big Blue Project taxonomy (Big Blue Project, 2002), through to models which are much broader in scope, for example Hepworth (2000), that

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<sup>3</sup> Originally named Information Literacy Community of Practice at Staffordshire University – ILCofPSU and reported as such in Andretta (2007).

<sup>4</sup> In brief Web 2.0 is online applications, particularly social networking tools such as Facebook and Really Simple Syndication (RSS) feeds and wikis which allow individuals to interact, create and share information (Godwin, 2008; Kelly, 2008).

encompass the ways in which people are expected to learn IL via thinking processes, communication, intellectual norms and information tools in the broadest sense. Each model appears to unpack these features in a slightly different fashion. This thesis proposes that a new model for teaching IL should encompass all these features. A detailed examination of existing IL models is given in section 2.2 and the proposed new model for delivering IL in section 2.5.1.

## ***1.5 Information Behaviour overview***

There is an emerging a set of theories which seek to explain information seeking behaviour, whilst not couched in the language of IL (though there are similarities) they are, nevertheless, important to this field because they incorporate contextual ideas such as learning philosophies, pedagogy, theories regarding learning styles, learning approaches and cognitive theories of thinking which are vital factors to consider in building an understanding of how students may learn to become information literate individuals. Ford (2004), building on Wilson's evaluation of many current and widely used models of information behaviour (Wilson, 1999), is critical to understanding this area for two reasons: one, because his analysis is extensive regarding learning philosophies and theories of information behaviour and two, he reviews the whole field and offers a useful model of information behaviour. Hepworth's model complements these and gives us two other important dimensions to consider in examining the concept of information behaviour: his research indicates that information behaviour differs depending on the locus of study, that is, a group, an individual or a moment of interaction (Hepworth, 2004) and the nature of information sources is also identified, that is, whether they are organisations, individuals or information objects. It is argued that the notion of IB and its empirical research enables a deeper understanding of IL to be achieved and that is why the notion of IB must be included in this thesis. IB is discussed in detail in section 2.3.

## **1.6 Learning overview**

If a coherent theoretically grounded educationally context specific IL programme is to be delivered then it seems sensible to consider the teaching and learning structures which may be used to support the delivery of an IL model to enable students to become information literate individuals. Therefore, it is essential that learning theory and pedagogy are examined in some detail to give us a more informed view regarding this issue.

MacKeracher (2004) argues that human beings are predisposed to learn and that everyone experiences learning to a greater or lesser degree throughout their lives both formally and informally. It is this experience that underpins the ways in which people perceive, understand and make meaning in the world (Fry, Ketteridge & Marshall, 1999). Learning can be about many things: abstract principles, factual information, acquisition of methods, techniques and approaches, ideas, behaviour appropriate to types of situations and recognition and reasoning. There are numerous models of learning and the educational debate surrounding these approaches is long-lived and continuing (Ford, 2004). With this in mind, it will be useful to examine the most common learning theories in a little more detail.

Fry et al (1999) identify three schools of learning: 'constructivism' (particularly 'cognitive and social constructivist' approaches); 'rationalism/ idealism' and 'associatism' (also known as 'behaviourism'). Squires (1994) identifies two further theories but states that these ('social' and 'humanistic') schools have much in common with constructivist approaches. Race (2001a) in parallel with Fry et al (1999) and Squires (1994) identifies two the behaviourist and cognitive schools. In addition to these Ford (2004) identifies four further schools of thought (the 'liberal tradition', 'realism', the 'progressive tradition' and the 'radical tradition').

Rationalism or idealism is concerned with the idea that learning takes place via a biologically predetermined direction (Fry et al, 1999). It is characterised by the notion that learning involves understanding rather than simply regurgitating facts.

Ford (2004) succinctly summarises the remaining four traditions: the liberal tradition emphasises the development of the individual via a 'well rounded' education which encompasses the cognitive, moral and emotional spheres; realism centres on the notion of learning via empirically proven facts; the progressive tradition stresses the links between education and society via the development of community related vocational skills and the radical tradition views the role of education as an agent for fundamental societal, cultural, political and economic change. Mayes & de Freitas (2004) argue that all these learning theories can be usefully classified into three broad areas namely 'behaviourist', 'constructivist' and 'situated'. These three broad areas are discussed in detail in section 2.4.

## **1.7 E-learning overview**

Current writers in the field of e-learning including Mayes & de Freitas (2004; 2007) state that there is, as yet, no theory of e-learning *per se* but simply a set of enhancements to existing learning models. Walker (2003) notes that e-learning and traditional distance learning have much in common particularly regarding the issue of learner isolation. Indeed, Fowler & Mayes (2000) state that e-learning initiatives have failed to innovate because of the absence of theory-based practice. However, many (Teles, 1993; Jonassen et al, 1995; Fowler & Mayes, 2000; Goodyear, 2001; Martin, 2003a and Garrison; Anderson & Garrison, 2003; McConnell, 2006) have attempted to identify the ways in which current learning theory and pedagogy can be re-used or 'mapped' (JISC, 2004) into an e-learning context. In essence, what is now extant is a set of theoretical heuristics which attempt to map theory into the e-learning environment. What appears to be emerging from current work is a focus on two broad strands:

- (1) How to plan carefully what students actually do during their online learning endeavours. This has two sub strands: mapping theory to e-learning practice and how the role of online tutor differs from traditional delivery;
- (2) How to prepare the learner for this relatively new approach.

These strands are examined in detail in section 2.4.7.

It is imperative that all of these areas are examined in detail in order to inform the provisional design of an effective IL blended intervention.

Now that we have a context for the thesis it is now important and necessary to state its Aim & Objectives precisely to enable the provisional intervention to be properly devised and tested.

## **1.8 Aim & Objectives**

The *Aim & Objectives* of the research are as follows.

### **1.8.1 Aim**

This research aimed to find out how best to deliver information literacy learning opportunities using a blended<sup>5</sup> approach.

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<sup>5</sup> The term 'blended' is defined in section 2.1

## **1.8.2 Objectives**

- 1. Derive, via a literature review, a theoretical model of information literacy blended provision for a real setting within a higher education disciplinary context of Sport & Exercise;**
- 2. Test the components of the theoretical model in a real setting of the Level 1 core module Effective Learning, Information and Communication Skills (ELICS) in Sport & Exercise at Staffordshire University using identified methodologies;**
- 3. From the findings generated derive a new model for delivering information literacy learning opportunities using a blended approach.**

A set of research questions arising from the literature review were devised to address these:

- 1. Does the teaching of information literacy in a blended environment (using face-to-face and online collaborative learning [OCL] IL learning opportunities) structured using a scaffolded<sup>6</sup> approach improve students' learning of IL?**
  - a. What kinds of reflective practice questions best aid students in collaborating online?**
  - b. Are tutor online interventions (specifically summaries of online postings from the group) perceived by students as a useful way of distilling output from the group for later use?**
- 2. How do psychological states associated with information behaviour and thinking help explain the learning processes in an information literacy blended learning and teaching intervention?**

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<sup>6</sup> The term 'scaffolded' is defined in section 2.4

### 3. Hypothesis A

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater degree of knowledge in information literacy at the end of a module than at the outset than students who have not been exposed to OCL (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001).

### 4. Hypothesis B

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater ability to apply evaluation criteria in their assessed work than students who have not been exposed to online collaborative learning (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001). This will be manifest in two ways:

- (i) students who participate in OCL will tend use a greater variety of evaluation criteria in their assessed work and
- (ii) will tend, on average, to use these criteria more frequently.

How these objectives and research questions are to be addressed is set out below.

## **1.9 Structure of this thesis**

The thesis is structured in the following fashion. **Chapter 2** is a *literature review* based on the focus of the research; the intersection of four separate but related areas of activity that of *information literacy, information behaviour, teaching and learning theory* and scholarship in *e-learning*. Section 2.2 of this chapter seeks to examine in detail information literacy as a concept, through examining its history, definitions and

structures. This thesis continues with the theme of information in section 2.3 which attempts to thoroughly examine information behaviour theory and its empirical research. It is argued that this more robustly grounded approach to information can assist in analysing IL itself in order to give a better understanding of what IL is. This analysis of IL models is offered using Hepworth's IB Behaviour Model (Hepworth, 2004) as an analytical tool. Teaching & learning theory and finally e-learning scholarship are also examined in detail in section 2.4 and the parallels and inter-relations between these and IL and information behaviour are indicated. Finally how these can be brought together in *a provisional model for the teaching and learning of IL in a blended setting* is put forward and discussed in section 2.6.

**Chapter 3** restates the research questions (section 3.2) and furnishes a detailed methodology which examines the important philosophical principles underpinning research in general (section 3.3), the research strategies they imply (section 3.4) and relevant ethical considerations (section 3.5) which should be taken into account when research of this kind is undertaken.

**Chapter 4** sets out the research strategy for the Pilot Study in order to test out and analyse an initial implementation of this *provisional model for the teaching and learning of IL in a blended setting*. This includes a detailed description of the design, procedures, participants, techniques and the data gathering instruments used.

**Chapter 5** provides a detailed account of the Pilot Study, including a discussion of the main findings (section 5.2) and recommendations for changes to the Main Study design, which are set out in section 5.4.

The research strategies and their implementation in the Main Study are set out in **Chapter 6** with the quantitative research strategy set out in section 6.1 and the qualitative strategy set out in section 6.2.



**Chapter 7** sets out the quantitative findings and states to what extent they uphold Hypotheses A and B. Diagnostic test analyses can be found in section 7.2, assessed work evaluation criteria analysis in section 7.3, variety of evaluation criteria used in section 7.3.1 and finally frequency of evaluation criteria used are analysed in section 7.3.2.

**Chapter 8** examines the findings from the qualitative data and what implications they have for research questions 1 and 2. Findings from qualitative data regarding the face-to-face element of the model are analysed in section 8.2 and findings from the OCL element of the model are analysed in section 8.3.

**Chapter 9** discusses the significance of the findings in the light of the literature review and draws out its major themes. From this discussion a new model for delivering IL to level 1 undergraduate students in blended fashion is proposed which recognises six dimensions: role and norms (section 9.2.1), teaching and learning environment (section 9.2.2), pedagogical intervention (section 9.2.3), face-to-face workshop (section 9.2.4), online collaborative learning activities (section 9.2.5) and written assignment (section 9.2.6). How this model contributes to existing knowledge is discussed in section 9.3.

**Chapter 10** is the *conclusion and recommendations* which summarises the key findings (section 10.2) and states to what extent the research questions have been answered (section 10.3). It also offers a reflection on the study and identifies its limitations (section 10.4). A set of recommendations which emerged from the research are put forward in section 10.5. Recommendations for future research are set out in section 10.6. Finally, a set of concluding remarks are made in section 10.7.

## **2 Literature Review**

### **2.1 Introduction**

The purpose of this chapter is to address Objective 1 set out in section 1.8 above which states that this thesis intends to:

Derive a theoretical model of information literacy blended provision for a real setting within a higher education disciplinary context via an extensive literature review. This objective was addressed by considering the following issues:

- a. If the concept of IL and how students, in HE, become information literate is to be understood it seems reasonable to assume that a systematic evaluation of IL models (in tandem with a detailed consideration of the broader learning context in which it takes place) is undertaken. In addition, it is also regarded as necessary that an examination of the emerging body of research regarding information behaviour and how this may complement models of IL is carried out. Therefore, this review will focus on and consider a number of broad areas for analysis namely: models of IL, information behaviour and e-learning and theories of learning and thinking. Finally, how these can be brought together and synthesised into a new model for the delivery of IL via face-to-face, electronic learning (e-learning<sup>7</sup>) or blended<sup>8</sup> delivery will be put forward.
- b. What is meant by the term information literacy? To answer this question the main information literacy models currently in use will be examined. Section 1 below addresses this issue;

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<sup>7</sup> By e-learning this thesis means the 'use of technologies in learning opportunities [...] and as a communications and delivery tool between individuals and groups, to support students and improve the management of learning' HEFCE (2005, p6).

<sup>8</sup> Blended learning occurs when part of a teaching and learning intervention takes place face-to-face and part takes place online (Gulc, 2006).

- c. How we may gain a more ‘fine grained’ understanding of information literacy by considering the issue of information behaviour. Research into the issue of information behaviour is an emerging field which provides a number of pre-theoretical constructs regarding information searching and information seeking (particularly Ford, 2004; Hepworth, 2004). It will be argued that these are important component within models of information literacy themselves. This is covered in section 2.2;
- d. How the learning process (including learning philosophies and the subsequent pedagogical theories students may be exposed to, as well as the closely related issues of students’ approaches to their own learning, the learning styles they bring with them and the thinking strategies they deploy in the learning situation) may influence how students learn to become information literate individuals and indeed how information literacy programmes may be delivered. Delivery may be in the form of traditional face-to-face means, via e-learning or blended. With this in mind an examination of current thinking in this area will be undertaken to determine whether this has any additional bearing on the delivery of student learning. This is discussed in section 2.3.

A new theoretically grounded provisional model for delivering IL teaching and learning in an online setting is offered and discussed in section 2.6.

## ***2.2 Models of information Literacy (IL)***

### **2.2.1 Introduction**

This section will attempt to define IL, overview the development of the notion of IL and attempt to draw parallels that exist between these models. As well as mapping the historical development of IL it will be useful to examine to what extent IL models reflect

theories of thinking, learning, pedagogy and theories regarding information behaviour within their structures.

### **2.2.2 The American Library Association's (ALA) IL definition**

The ALA (1989) has provided an often quoted (Big Blue Project Project, 2002) description of an information literate person:

**'To be information literate an individual must recognise when information is needed and have the ability to locate, evaluate and use effectively the information needed [...]. Ultimately information literate people are those who have learned how to learn because they know how information is organised, how to find information and how to use the information in such a way that others can learn from them.'**

**ALA (1989, p.1)**

This model is based upon 5 'standards':

- 1. The information literate student determines the nature and extent of the information needed;**
- 2. The information literate student accesses needed information effectively and efficiently;**
- 3. The information literate student evaluates information and its sources critically and incorporates information into his or her knowledge base and value system;**
- 4. The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose;**
- 5. The information literate student understands many of the economic, legal and social issues surrounding the uses of information and accesses the information ethically and legally.**

This model of information literacy is based firmly in cognitive thinking and learning theory:

‘In implementing these standards, institutions need to recognise that different levels of thinking skills are associated with various learning outcomes – and therefore different instruments or methods are essential to assess those outcomes. For example, both ‘higher order’ and ‘lower order’ thinking skills, based on Bloom’s Taxonomy of Educational Objectives<sup>9</sup>, are evident throughout the outcomes detailed [...].’

ACRL (2000, p6)

These 5 ‘standards’ are regarded as separate but linked components each with its own thinking skills hierarchy. This model concentrates firmly on a list of disaggregated goals which need to be achieved before moving from one stage to the next.

In this model recommendations are made towards the assessment of IL skills:

‘It is strongly suggested that assessment methods appropriate to the thinking skills associated with each outcome be identified as an integral part of the institution’s implementation plan.’

ACRL (2000, p6)

They argue that the abundance of information available will in itself not cause citizens to be more informed unless they have the ability to use the information effectively. This model is seen as embracing the notion of life long learning in that it enables learners to assume greater control over their own learning.

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<sup>9</sup> Bloom’s taxonomy (Bloom, Engelhart, Furst, Krathwohl and Hill, 1956) is discussed in section 2.4.5.

This model like others recognises the importance of IT skills but regard IL as a distinct and broader area of competence (unlike IT skills or 'computer literacy' which focus on technology) and an intellectual framework for understanding, evaluating and using information - achieved in part in fluency with IT, in part by sound investigative methods. As with SCONUL (1999) the ACRL (2000) seeks to disaggregate IT skills (literacy and or fluency) from the concept of IL. Therefore, the ACRL (2000) regard IL as initiating, sustaining and extending lifelong learning through abilities which may use technologies but are ultimately independent of them.

The ACRL (2000) regard IL as contributing to the goal of instilling reasoning, critical thinking, learning to learn because it augments students' competency with evaluating, managing and using information. This is demonstrated by the fact that several educational agencies in the US consider IL a key outcome for college students (ACRL, 2000). The ACRL (2000) regards this model as dependent on the notion of collaboration between faculty, librarians and administrators. In particular they regard administrators as key players in the process in that they, 'create opportunities for collaboration and staff development among faculty, librarians and other professionals who initiate IL programmes and provide ongoing resources to sustain them' (ACRL, 2000, p4).

The ACRL (2000) indicate that undergraduate education in the US is moving towards a student-centred learning environment where enquiry, problem-solving and critical thinking should become the norm and note that their IL competencies dovetail with this goal. They argue that IL increases the opportunity for self-directed learning and that this should be 'woven into the curriculum content, structure and sequence' and therefore most definitely not a separate set of generic skills to be learnt outside the subject area. Indeed they go further and regard integrating IL into the curriculum as affording 'many possibilities for furthering the influence and impact of such student-centred teaching methods as problem-based learning, evidence based learning and inquiry learning' (ACRL, 2000, p5). In other words to take the fullest advantage of problem-based learning, students must often use thinking skills requiring them to become skilled users of information sources.

The ACRL (2000) model provides an assessment framework and so offers a triangulated approach that is, learning outcomes - teaching interventions – assessment as recommended by Biggs (1999) and generally accepted as good practice. This approach is also followed by the ANZIIL framework (Bundy, 2004).

The model also draws attention to the need for students to be sensitised to their own metacognitive<sup>10</sup> and reflective processes<sup>11</sup>. Moseley, Baumfield, Higgins, Lin, Newton, Robson, Elliot and Gregson (2004) regard this as an essential component of thinking skills in that students need to be explicitly aware of the actions they need to take to gather, analyse and use information. Moseley et al's analysis of thinking skills frameworks (Moseley et al, 2004) is examined in detail in section 2.4.5. Here the model specifically recognises the *iterative* (or recursive) nature of IL. This iterative dimension is also identified as important in information behaviour (Wilson, 1999; Ford, 2004; Hepworth, 2004) and learning (Kolb, Rubin & Osland, 1991; Race, 2001a; Moseley et al, 2004).

The model retains a degree of flexibility and recognises that students don't all learn in the same way, to the same level nor at the same speed recognising that learning and therefore IL and information behaviour can be highly individual and context specific activities.

The model also allows for flexibility of approach to accommodate the differing needs of each subject area in that it is accepted that some 'may place emphasis on the mastery of competencies of certain parts in the process and therefore certain competencies would receive greater weight than others in any rubric for measurement' (ACRL, 2000, p6).

The 5 standards are further divided into 22 performance indicators which can also be regarded as a set of specific *learning outcomes*. These outcomes allow for each standard to be assessed appropriately and separately. The learning outcomes are constructed using Bloom's taxonomy as a guide (Bloom et al, 1956). To illustrate how these are woven

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<sup>10</sup> Metacognition is discussed in section 2.4.5

<sup>11</sup> The notion of reflection is examined in section 2.4.2

into the ACRL (2000) standards the first and last sub-sets of skills identified within Standard 1 are selected here for analysis. For example, in Standard 1 all of Bloom's cognitive thinking levels (Bloom et al, 1956) indicated in bold below are evident:

### Standard 1

The information literate student determines the nature and extent of the information needed.

#### Performance Indicators:

1. The information literate student defines and articulates the need for information.

#### *Outcomes Include:*

- a. Confers with instructors and participates in class discussions, peer workgroups, and electronic discussions to identify a research topic, or other information need (**facts to investigate – Knowledge**)
- b. Develops a thesis statement and formulates questions based on the information need (**questions to consider – Comprehension**)
- c. Explores general information sources to increase familiarity with the topic (**make use of – Application**)
- d. Defines or modifies the information need to achieve a manageable focus (**taking apart – Analysis**)
- e. Identifies key concepts and terms that describe the information need (**putting together – Synthesis**)
- f. Recognizes that existing information can be combined with original thought, experimentation, and/or analysis to produce new information (**putting together – Synthesis**)

[...]



4. The information literate student re-evaluates the nature and extent of the information need.

*Outcomes Include:*

- a. Reviews the initial information need to clarify, revise, or refine the question (**learning to review – Evaluation**)
- b. Describes criteria used to make information decisions and choices (**judging and assessing – Evaluation**)

ACRL, 2000, p9

Examples of the ACRL (2000) IL model in use can be found at the University of Texas, California State University, University of Washington and the University of Oregon amongst others (Kasowitz-Scheer & Pasqualoni, 2002).

In summary this is an outcomes based model in that it focuses on what students should do to become information literate. It is also a prescriptive tool detailing how an IL programme should be structured and delivered. Using cognitive models of learning as its foundation (Bloom et al, 1956) it recognises the importance of metacognition and critical thinking/ problem-solving in the overall process. Therefore, it has a strong theoretical base with a detailed structure and contains recommendations for delivery and assessment.

### **2.2.3 The Big6**

The 'Big6' is as an information literacy model and also described as a 'metacognitive scaffold' (Lowe & Eisenberg, 2005), or an information problem-solving strategy which attempts to link information, problem-solving and critical thinking (Wolf, Brush & Saye, 2003). The Big6 is reported by Hyman (1999) to be the most widely-known and widely-used approach to teaching information and technology skills in the world which (when applied) provides an essential framework to approach any information-based questions (Hyman, 1999). For example, simply knowing that the *Encyclopaedia Britannica* exists

involves a low level of cognition. Incorporating knowledge and the use of this encyclopaedia within an overall problem-solving strategy represents a higher level of cognitive learning. Traditional library skills focus on knowledge and understanding of specific sources (lower cognitive skills) versus the Big6 approach which concentrates upon the ability to use critical thinking and manipulate information into a meaningful solution (Hyman, 1999).

The Big6 is structured in the following way:

## **1. Task Definition**

1.1 Define the information problem

1.2 Identify information needed in order to complete the task (to solve the information problem)

Using a school assignment as an example, students need to know the questions that need to be answered and what kind of information is needed to answer these questions.

## **2. Information Seeking Strategies**

2.1 Determine the range of possible sources (brainstorm)

2.2 Evaluate the different possible sources to determine priorities (select the best sources)

Once the problem is clearly articulated, attention turns to the range of possible information sources. Information Seeking Strategies involve making decisions and selecting sources appropriate to the defined task.

## **3. Location and Access**

3.1 Locate sources (intellectually and physically)

3.2 Find information within sources

Once students have decided upon the appropriate strategy, this strategy must be carried out. This is the physical part and receives the most attention in traditional library curricula. Examples include: use of access tools such as *PsycINFO*<sup>12</sup>, arrangement of materials, parts of a book and strategies for searching an online catalogue or similar artefact. In this model the act of obtaining information follows logically from the initial steps taken regarding the subject area for which information is needed to where one might go to find that information.

#### **4. Use of Information**

4.1 Engage (for example, read, hear, view, touch) the information in a source

4.2 Extract relevant information from a source

Once students are able to locate and access a source they must be able to read, view listen or interact with the information and decide what is valuable for their particular situation. They must extract the information that they need using notes, copies, citations etc.

#### **5. Synthesis**

5.1 Organize information from multiple sources

5.2 Present the information

Synthesis is the restructuring or repackaging of information into new or different formats to meet the requirements of the task. Synthesis can be as simple as relaying a specific fact. Synthesis can be very complex involving several sources, a variety of media or presentation formats and the effective communication of abstract ideas.

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<sup>12</sup> PsycINFO is a database of psychology and related information produced by the American Psychological Association (APA).

## **6. Evaluation**

**6.1 Judge the product (effectiveness)**

**6.2 Judge the information problem-solving process (efficiency)**

Evaluation determines how effectively the information problem-solving process was conducted. The primary concern of evaluation is to answer these questions:

Was the information problem solved?

Was the information need met?

Was the decision made?

Was the situation resolved?

Does the product satisfy the requirements as originally defined?

(adapted from Hyman, 1999, n.p.)

Other considerations in evaluating the efficiency of this process include the amount of time spent on useful activities and whether there was any miscalculation in the amount of time needed to complete the task. This self-evaluation by the student will improve their overall ability to solve future information problems.

People work through these Big6 stages, consciously or no, when they seek or apply information to solve a problem or make a decision and the structure appears to enhance levels of engagement in students when they are working on a task (Wolf et al, 2003). It is not necessary to complete these stages in a linear order, and a given stage does not necessarily take a great deal of time. Hyman (1999) has found that in almost all successful problem-solving situations all the stages outlined above tend to be addressed.

This model echoes many of the features and language displayed by other models. Its succinct style provides a straightforward structure to follow. It has an iterative aspect and its central function is that of problem-solving. It doesn't display some of the ethical features of other models nor does it appear to contain a collaborative element.

## 2.2.4 Bruce's 'Seven faces of IL'

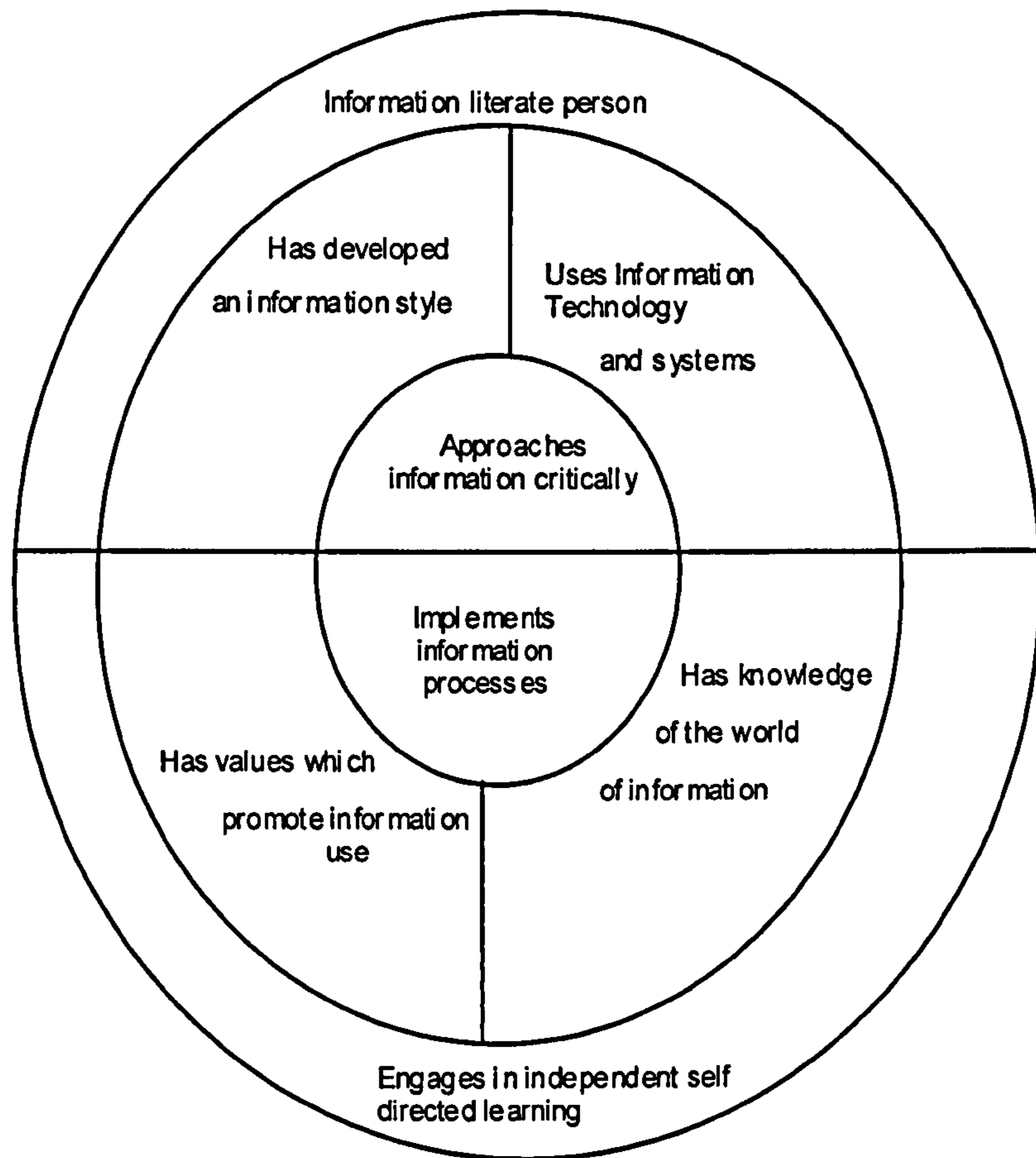
Bruce's model (1995) emphasises the individual's experience of information literacy and how people make sense of the information world (Hepworth, 2000). It indicates that the model employs *constructivist/cognitive* theoretical ideas (which are examined more fully in section 2.4.2). Bruce suggests that the information literate individual will exhibit these key attributes:

1. Recognises the need for information
2. Recognises that accurate and complete information is the basis for intelligent decision making
3. Identifies potential sources of information
4. Develops successful search strategies
5. Accesses sources of information, including computer based and other technologies
6. Evaluates information
7. Organises information for practical application
8. Integrates new information into an existing body of knowledge
9. Uses information in critical thinking and problem-solving

Bruce (1995, p.160)

These attributes can then be distilled into seven key characteristics expressed diagrammatically in Figure 1 below.

Figure 1: Bruce's 'Seven faces of IL' model



Bruce (1995, p.160)

This holistic theory focuses on the idea that information literate individuals have a personal information construct in which: learning is independent and self-directed; information processes are used; a variety of information technologies and systems are exploited; values that promote information use are internalised; knowledge of the information domain is sound; information is evaluated and analysed critically; a personal information style is used to interact with the information domain (Bawden & Robinson, 2002). Furthermore, Bruce envisages that the IL person is skilled in reflecting on their

information experiences (Bruce, 1995). The person centred, where the individual constructing his/her own information literacy world view, and reflective features of this model characterise it as a constructivist approach.

Later work by Bruce, Edwards & Lupton (2007) recommends that tutors should enable this highly reflective approach by adopting a 'relational frame' to IL education. This approach is characterised by assisting learners to become more discerning regarding IL phenomena. This method of discernment, for example, regarding websites is realised through involving learners in discussing issues surrounding when and why web pages should be used in an assignment. Bruce et al (2007) argues that this allows learners to move from using surface notions of evaluating web pages such as authority, relevance and reliability to deeper and more critical notions where 'ideas, opinions and perspective apparent in the source and the quality, style and tone of the writing' are examined (Bruce et al 2007, p53).

Finally, the information literate individual will be able to engage in independent self-directed and life-long learning in which the individual takes responsibility for their own learning and are equipped to learn from the information sources around them (Bruce, 1995).

Bruce (1995) succinctly describes the process of information literacy as one of 'locate, manage, evaluate and use' information appropriately for a wide range of formal and or informal uses (Bruce, 1995, p158). This closely resembles Moseley et al's analysis regarding the commonalities between the process categories of most cognitive theories of thinking that is, analysis, synthesis and evaluation (Moseley et al, 2004).

Bruce (1995) regards IL as an integral part of the curriculum otherwise it is 'unlikely to be seen as relevant, or used by undergraduate students unless their course requires them to learn, locate, manage and use the information independently' (Bruce, 1995, p164) especially if teaching strategies fail to assess. Like the ACRL (2000), Bruce (1995) regards collaboration between faculty, institutional administrators and librarians as an

essential plank in the integration of IL into the curriculum. Bruce's ideas (Bruce, 1995; 1997) heavily influenced the ANZIIL model (Bundy, 2004) discussed below.

### **2.2.5 SCONUL 'Seven pillars' model**

SCONUL (1999) were motivated by a desire to stimulate debate regarding the role of information skills within the context of current activity surrounding 'key skills', 'graduate-ness', and lifelong learning. Their position paper (SCONUL, 1999) recognises the work of the ACRL (2000) in the US, BECTA<sup>13</sup> (in the UK) and specifically Shapiro & Hughes (1998) in contextualising their view of IL as:

'[...] being something which enables individuals not only to use information and information technology effectively and adapt to their constant changes but also to think critically about the entire information enterprise and information society.'

SCONUL (1999, p4)

It is reported by SCONUL (1999) that published work in this area either conflates what they regarded as separate but related sets of skills namely information technology (IT) skills and information handling skills or simply omits any explicit consideration of information skills at all. SCONUL (1999) in their position paper argue that 'IT skills' are a set of lower order skills needed to use a keyboard or mouse, word-processing software and network applications such as web browsers. Whereas, 'information handling skills' are regarded by SCONUL (1999) as higher order skills which include the exploitation of information sources, using evaluation criteria, deploying navigation methods, using manipulation techniques and being able to present material to others.

It is argued that this distinction is an important one because the tendency to equate computers with information leads to the mistaken assumption that computer literacy and

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<sup>13</sup> British Educational Communications and Technology Agency.



information literacy are the same thing (SCONUL, 1999) noting that the assumption that information is storable and usable only via a computer to be a dangerous myth.

These two sets of skills are seen as essential (but separable) and combine to underpin the wider concept of information literacy.

Information skills are further sub divided into two related 'strands':

- a) 'Strand a' relates to study skills which are outlined as the skills students are need to undertake study in higher education namely: the ability to use library resources to further their studies; the ability to perform literature searches appropriate to the subject area and the ability to demonstrate that this has been achieved via citations and references.
- b) 'Strand b' relates to information skills which are: those included in strand 'a' plus students must show: an awareness and understanding regarding how information is produced, the ability to critically appraise the content and validity of the information in question and practical ideas regarding how information is acquired, disseminated and exploited.

It is argued that when students are working at a higher level ('strand b') they have become information literate.

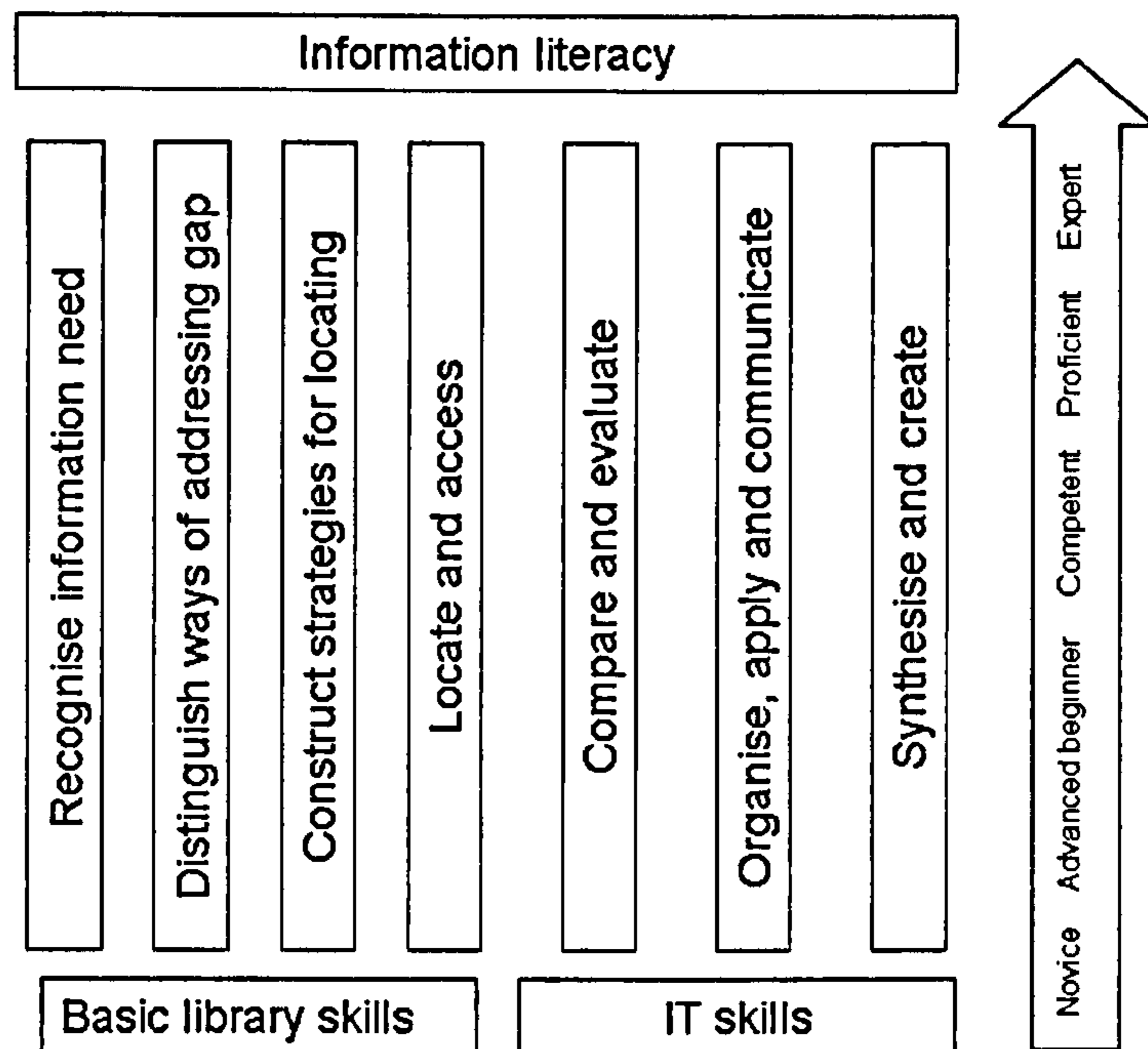
In this model seven 'headline skills' are identified which together form the notion of the information skills ('strand b') which a person should have in order to become information literate. Here, the information literate individual is expected to exhibit the following abilities:

1. The ability to recognise a need for information
2. The ability to distinguish ways in which the information 'gap' may be addressed
  - i. Knowledge of appropriate kinds of resources, both print and non-print
  - ii. Selection of resources with 'best fit' for task at hand

- iii. The ability to understand the issues affecting accessibility of sources
3. The ability to construct strategies for locating information
  - i. To articulate information need to match against resources
  - ii. To develop a systematic method appropriate for the need
  - iii. To understand the principles of construction and generation of databases
4. The ability to locate and access information
  - i. To develop appropriate searching techniques
  - ii. To use communication and information technologies
  - iii. To use appropriate indexing and abstracting services, citation indexes and databases
  - iv. To use current awareness methods to keep up to date
5. The ability to compare and evaluate information obtained from different sources
  - i. Awareness of bias and authority issues
  - ii. Awareness of peer review process of scholarly publishing
  - iii. Appropriate extraction of information matching the information need
6. The ability to organise, apply and communicate information to others in ways appropriate to the situation
  - i. To cite bibliographic references in project reports and theses
  - ii. To construct a personal bibliographic system
  - iii. To apply information to the problem at hand
  - iv. To communicate effectively using appropriate medium
  - v. To understand issues of copyright and plagiarism
7. The ability to synthesise and build upon existing information, contributing to the creation of new knowledge.

SCONUL (1999, p6-7)

**Figure 2: SCONUL's 'Seven pillars of IL model'**



SCONUL (1999, p8)

In this model it is not clear how the seven components (pillars) interact to produce the IL individual. Peters (2003), claims that the SCONUL model bears some similarities to Kolb et al's learning cycle<sup>14</sup> (Kolb et al, 1991), however, it uses (at the higher level) the language of Bloom's taxonomy regarding the six 'cognitive goals' of education but does not define IL as a holistic process. In this instance the reflective process is regarded as an exclusive 'expert' skill rather than part of the learning (and therefore IL) process itself which contradicts notions found within theories of critical thinking. Andretta (2005) argues that SCONUL places a false distinction between technical and IL skills that is difficult to sustain in practice. She notes that even when students use basic systems, such as an online library catalogue, students must be able to think critically (a skill which SCONUL attribute to more complex IL activity). Furthermore, Andretta (2005) regards this model as too linear to reflect fully the learner's experience because it is based on a sequential progression from a foundation in library and IT skills through the development

<sup>14</sup> Kolb et al's learning cycle is fully explained in section 2.4.2.

of competencies culminating in the creation of new knowledge at the highest level of the learning ladder. Indeed, the 'headline skills' of 'compare and evaluate', organise, apply and communicate, synthesise and create are all regarded (by SCONUL) as primarily post-graduate skills: Moseley et al (2004) argue that these skills can, and are, deployed by students post-16. Therefore, the metacognitive, or reflective element, which characterises and is regarded as essential to learning and thinking by Kolb et al (1991) and most other cognitive learning and thinking theorists is absent from this schema as applied to undergraduates.

The 'headline skills' are not as clearly unpacked as the ACRL (2000) model. Indeed, there is no suggestion regarding how this model should be delivered. It is implied that the iterative process from 'novice' to 'expert' is orderly, progressive and successful but how this occurs is not explained.

The language used for some skills is imprecise and uses words (that is, understand to denote the components of the detailed 'abilities' rather than doing words which denote that which is to be actively learned) that (according to Race & Brown, 2001) should be avoided when constructing learning outcomes<sup>15</sup>. In other words, in some instances, there is no clear idea as to how this understanding is to be achieved.

Similar to the ACRL (2000) model and Big Blue Project (2002) the model is a prescriptive tool indicating the abilities students need to become information literate rather than an explanation regarding the ways in which IL is learnt. However, this model has been used in several settings for example, the Open University information skills programme MOSAIC (Making Sense of Information in the Connected Age) has used the 'Seven Pillars' model as a foundation for their information skills module (Dillon, Needham, Hodgkinson, Parker & Baker, 2003).

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<sup>15</sup> Good practice in teaching and learning as suggested by (Race & Brown, 2001; Reece & Walker, 2003) states that learning outcomes which contain the word 'understand' should be unpacked to indicate by what means understanding will be achieved (known as 'intended learning outcomes'). SCONUL concur with this view in a later paper (Peters, 2004).

## **2.2.6 Australian & New Zealand Institute for Information Literacy (ANZIIL) model of IL**

The ANZIIL model was originally developed in 2001 (revised in 2004) by the Council of Australian Librarians (CAUL) as reported by Bundy (2004) and is based on the ACRL (2000) model and contains one extra standard to the original (Andretta, 2005) and reflects much of its rationale in terms of IL and learning. It also echoes the notion put forward by the ACRL (2000) that effective IL delivery is best achieved when librarians, academic staff and administrators collaborate in such a way that collaboration is 'not viewed as unusual but rather is valued and regarded as the norm' Peacock (2004). In brief, the model intends to equip graduate students with the skills to locate, access retrieve, evaluate manage and make use of information from a number of areas (similar language to all other extant models of IL).

Four overarching principles underpin this approach which states that information literate people:

- 'Engage in independent learning through constructing new meaning, understanding and knowledge
- Derive satisfaction and personal fulfilment from using information wisely
- Individually and collectively search for and use information for decision making and problem-solving in order to address personal, professional and societal issues
- Demonstrate social responsibility through a commitment to lifelong learning and community participation.'

Bundy (2004, p11)

The standards are set out below and include learning outcomes which are further unpacked with examples showing how each learning outcome may be realised.

*Standard 1: The information literate person recognises the need for information and determines the nature and extent of the information needed.*

### ***Learning outcomes***

#### **The information literate person:**

- 1.1 defines and articulates the information need;
- 1.2 understands the purpose, scope and appropriateness of a variety of information sources;
- 1.3 re-evaluates the nature and extent of the information need;
- 1.4 uses diverse sources of information to inform decisions.

### ***Examples for Standard One***

#### **1.1 defines and articulates the information need:**

- explores general information sources to increase familiarity with the topic;
- identifies key concepts and terms in order to formulate and focus questions;
- defines or modifies the information need to achieve a manageable focus;
- may confer with others to identify a research topic or other information need.

#### **1.2 understands the purpose, scope and appropriateness of a variety of information sources:**

- understands how information is organised and disseminated, recognising the context of the topic in the discipline;
- differentiates between, and values, the variety of potential sources of information;
- identifies the intended purpose and audience of potential resources eg popular vs scholarly, current vs historical;
- differentiates between primary and secondary sources, recognising how their use and importance vary with each discipline.

**1.3 re-evaluates the nature and extent of the information need:**

- reviews the initial information need to clarify, revise, or refine the question;
- articulates and uses criteria to make information decisions and choices.

**1.4 uses diverse sources of information to inform decisions:**

- understands that different sources will present different perspectives;
- uses a range of sources to understand the issues;
- uses information for decision making and problem-solving.

*Standard 2: The information literate person finds needed information effectively and efficiently*

***Learning outcomes***

**The information literate person:**

- 2.1 selects the most appropriate methods or tools for finding information;
- 2.2 constructs and implements effective search strategies;
- 2.3 obtains information using appropriate methods;
- 2.4 keeps up to date with information sources, information technologies, information access tools and investigative methods.

***Examples for Standard Two***

**2.1 selects the most appropriate methods or tools for finding information:**

- identifies appropriate investigative methods eg laboratory experiment, simulation, fieldwork;
- investigates benefits and applicability of various investigative methods;
- investigates the scope, content, and organisation of information access tools;
- consults with librarians and other information professionals to help identify information access tools.

## **2.2 constructs and implements effective search strategies:**

- develops a search plan appropriate to the investigative method;
- identifies keywords, synonyms and related terms for the information needed;
- selects appropriate controlled vocabulary or a classification specific to the discipline or information access tools;
- constructs and implements a search strategy using appropriate commands;
- implements the search using investigative methodology appropriate to the discipline.

## **2.3 obtains information using appropriate methods:**

- uses various information access tools to retrieve information in a variety of formats;
- uses appropriate services to retrieve information needed eg document delivery, professional associations, institutional research offices, community resources, experts and practitioners;
- uses surveys, letters, interviews, and other forms of inquiry to retrieve primary information.

## **2.4 keeps up to date with information sources, information technologies, information access tools and investigative methods:**

- maintains awareness of changes in information and communications technology;
- uses alert/current awareness services;
- subscribes to listservs and discussion groups;
- habitually browses print and electronic sources.

**Standard 3: The information literate person critically evaluates information and the information seeking process**



## *Learning outcomes*

### **The information literate person:**

- 3.1 assesses the usefulness and relevance of the information obtained;
- 3.2 defines and applies criteria for evaluating information;
- 3.3 reflects on the information seeking process and revises search strategies as necessary.

### *Examples for Standard Three*

#### **3.1 assesses the usefulness and relevance of the information obtained:**

- assesses the quantity, quality, and relevance of the search results to determine whether alternative information access tools or investigative methods should be utilized;
- identifies gaps in the information retrieved and determines if the search strategy should be revised;
- repeats the search using the revised strategy as necessary.

#### **3.2 defines and applies criteria for evaluating information:**

- examines and compares information from various sources to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias;
- analyses the structure and logic of supporting arguments or methods;
- recognises and questions prejudice, deception, or manipulation;
- recognises the cultural, physical, or other context within which the information was created and understands the impact of context on interpreting the information;
- recognises and understands own biases and cultural context.

**3.3 reflects on the information seeking process and revises search strategies as necessary:**

- determines if original information need has been satisfied or if additional information is needed;
- reviews the search strategy;
- reviews information access tools used and expands to include others as needed;
- recognises that the information search process is evolutionary and nonlinear.

**Standard 4: The information literate person manages information collected or generated.**

***Learning outcomes***

**The information literate person:**

4.1 records information and its sources;

4.2 organises (orders/classifies/stores) information.

***Examples for Standard Four***

**4.1 records information and its sources:**

- organises the content in a manner that supports the purposes and format of the product eg outlines, drafts, storyboards;
- differentiates between the types of sources cited and understands the elements and correct citation style for a wide range of resources;
- records all pertinent citation information for future reference and retrieval.

**4.2 organises (orders/classifies/stores) information:**

- compiles references in the required bibliographic format;
- creates a system for organising and managing the information obtained eg EndNote, card files.

Standard 5: The information literate person applies prior and new information to construct new concepts or create new understandings

### *Learning outcomes*

#### **The information literate person:**

5.1 compares and integrates new understandings with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information;

5.2 communicates knowledge and new understandings effectively.

### *Examples for Standard Five*

#### **5.1 compares and integrates new understandings with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information:**

- determines whether information satisfies the research or other information need and whether the information contradicts or verifies information used from other sources;
- recognises interrelationships between concepts and draws conclusions based upon information gathered;
- selects information that provides evidence for the topic and summarises the main ideas extracted from the information gathered;
- understands that information and knowledge in any discipline is in part a social construction and is subject to change as a result of ongoing dialogue and research;
- extends initial synthesis at a higher level of abstraction to construct new hypotheses.

#### **5.2 communicates knowledge and new understandings effectively:**

- chooses a communication medium and format that best supports the purposes of the product and the intended audience;
- uses a range of appropriate information technology applications in creating the product;

- incorporates principles of design and communication appropriate to the environment;
- communicates clearly and in a style to support the purposes of the intended audience

Standard 6: The information literate person uses information with understanding and acknowledges cultural, ethical, economic, legal, and social issues surrounding the use of information.

### *Learning outcomes*

#### **The information literate person:**

6.1 acknowledges cultural, ethical, and socioeconomic issues related to access to, and use of, information;

6.2 recognises that information is underpinned by values and beliefs;

6.3 conforms with conventions and etiquette related to access to, and use of, information;

6.4 legally obtains, stores, and disseminates text, data, images, or sounds.

### *Examples for Standard Six*

#### **6.1 acknowledges cultural, ethical, and socioeconomic issues related to access to, and use of, information:**

- identifies and can articulate issues related to privacy and security in the print and electronic environments;
- identifies and understands issues related to censorship and freedom of speech;
- understands and respects indigenous and multicultural perspectives of using information

#### **6.2 recognises that information is underpinned by values and beliefs:**

- identifies whether there are differing values that underpin new information or whether information has implications for personal values and beliefs;
- applies reasoning to determine whether to incorporate or reject viewpoints encountered;
- maintains an internally coherent set of values informed by knowledge and experience.

**6.3 conforms with conventions and etiquette related to access to, and use of, information:**

- demonstrates an understanding of what constitutes plagiarism and correctly acknowledges the work and ideas of others;
- participates in electronic discussions following accepted practices eg Netiquette.

**6.4 legally obtains, stores, and disseminates text, data, images, or sounds:**

- understands fair dealing in respect of the acquisition and dissemination of educational and research materials;
- respects the access rights of all users and does not damage information resources;
- obtains, stores, and disseminates text, data, images, or sounds in a legal manner;
- demonstrates an understanding of intellectual property, copyright and fair use of copyrighted material.

Adapted from Bundy (2004, pp12 – 23)

What makes the ANZIIL model theoretically robust is that it refers to knowledge-construction, as well as critical thinking, to describe the learning processes that underlie IL education. That the model begins from the general description of standards and then expands these through the articulation of performance indicators and through learning outcomes that are both measurable and easily contextualised within subject areas indicates an ease of application (Andretta, 2005). In addition a pedagogic approach, based on the three elements of learning stated by Bruce (1995), is offered comprising the activities of experience, reflection and practice (Andretta, 2005). These notions echo directly ideas of critical thinking, constructivist and cognitive models of learning discussed in section 2.4.

It is explicitly a non-linear approach to IL and is therefore far more flexible than the SCONUL model and similar to the Big Blue Project Model. The model recognises that different subject areas will have differing IL requirements and that the level proficiency gained and the time spent on learning these will vary from student to student. Like all IL

models the notion of an iterative process is recognised in that students are expected to evaluate the impact of, and to reflect on, the information seeking process in order to deploy a revised and improved process of enquiry. However, unlike many other IL models, with the exception of ACRL (2000), there is an attempt to address the issue of how students should, by using reflective practice, engage with the iterative process<sup>16</sup>.

In addition to the ACRL (2000) model the ANZIIL model (Bundy, 2004) identifies three distinct learning dimensions which make up the IL framework and place it within a wider social context:

- Generic skills described as: problem-solving, collaboration, teamwork, communication and critical thinking;
- Information skills involving competencies in: information seeking, information use and information technology fluency;
- Values and beliefs such as: using information wisely and ethically, social responsibility and community participation.

(Andretta, 2005, p44)

These dovetail neatly with the theories analysed by Bruce (1997) and Moseley et al (2004), and some of the notions of communities of practice espoused by Jonassen, Davidson, Collins, Campbell, & Haag (1995), Hung & Chen (2001), Mayes & de Freitas (2004) and JISC (2004).

The ANZIIL model (Bundy, 2004) follows directly the ACRL (2000) model by making distinctions between higher and lower order thinking to cover the learning needs of students at all levels (Andretta, 2005). In articulating this the ANZIIL model (Bundy, 2004) emphasises the need to deploy a range of assessments (including essays, tests, seminars, portfolios, journals, projects, reports, performances, theses, professional experiences and observations) to develop skills, knowledge and understanding at the

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<sup>16</sup> Iteration is regarded as a characteristic of the information gathering process (Hepworth, 2003).

varying levels of complexity required by HE programmes (Bundy, 2004; Andretta, 2005). Furthermore, the model recommends that assessment should incorporate IL into learning outcomes and assessment tasks and that the assessment should be constructed in such a way that it provides a framework for progression, for example, from undergraduate levels 1 to 2 (Bundy, 2004). These ideas reflect good pedagogical practice put forward by Bligh (1998) quoted in Gibbs (1998d, p8-15), Biggs (1999) and Walton (2005) amongst others.

In addition, the ANZIIL model (Bundy, 2004) offers a framework which describes the different levels of IL provision that may be offered:

- Generic – extracurricular classes and/or self-paced packages;
- Parallel – extracurricular classes and/or self-paced packages that complement the curriculum;
- Integrated – classes and packages that are part of the curriculum;
- Embedded – curriculum design in which students have ongoing interaction and reflection with information.

Examples of the ANZIIL model (Bundy, 2004) in practice can be found at the University of South Australia, University of Tasmania, University of Wollongong amongst many others.

In summary it can be seen that the ANZIIL model (Bundy, 2004) seeks to incorporate many of the ideas associated with the constructivist experiential domain and theoretical area. It is inherently flexible in that the standards to be obtained are not necessarily to be learned in a linear fashion. Students are recognised as individuals with differing needs (personal and/or subject orientated) and that their IL needs may change as they progress through their HE career. The four fold distinction between modes of delivery is a useful schema for delivery although it is perhaps more appropriate that these should be expressed hierarchically with 'embedded' being the primary aim of those seeking to deliver an effective IL programme. It is argued that this especially the case in the light of

learning theory discussed in this thesis where contextualised subject orientation is regarded as essential to successful learning.

However the model has a number of weaknesses. The notion of communicating with others (which is a central feature of situated learning) *vis a vis* information need is regarded as non-essential 'the information literate person [...] may confer with others [...]' (Bundy, 2004, p13) and this is a particular issue within the model. In addition, like all IL models, there is neither a recognition that the information gathering process can fail nor how it might be dealt with. Furthermore, there is no recognition regarding the extent to which motivation, self-efficacy and other related conative factors (seen by Wilson, 1999, Ford, 2004 and Hepworth, 2004, as essential components affecting information behaviour) impinge on the process and how this affects an individual's ability to become information literate. Recommendations on strategies for the delivery of IL do not directly specify which teaching interventions to employ but do suggest that librarians develop their delivery through becoming more familiar with learning theory and strategies, assessment and evaluation strategies and the role of the reflective practitioner (Peacock, 2004). In addition, librarians should create engaging learning environments through developing skills in organising activities, classroom and behaviour management techniques, critical information and technological skills development (Peacock, 2004).

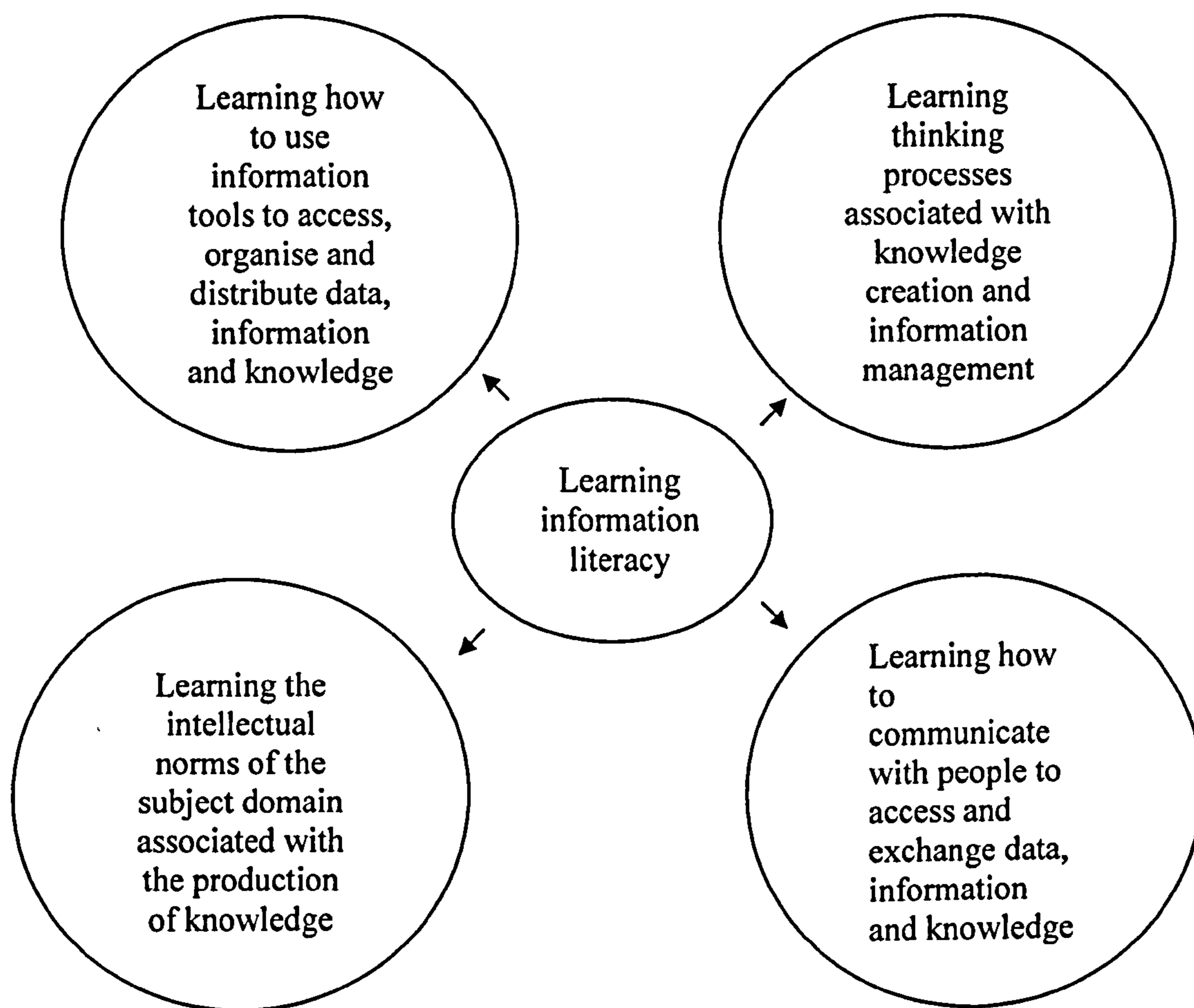
Nevertheless, this model offers a coherent set of standards and detailed learning outcomes and extends beyond the ACRL (2000) model. It reflects many of the notions associate with student centred learning and offers a flexible approach to the concept of IL.



## 2.2.7 Hepworth's 'Learning Information Literacy' model

Hepworth's model is useful in that it draws attention to the social context of IL, the key areas of learning involved and why they are important to an overall understanding of this field (see Figure 3 below):

Figure 3: Learning information literacy



Adapted from Hepworth (2000, p24)

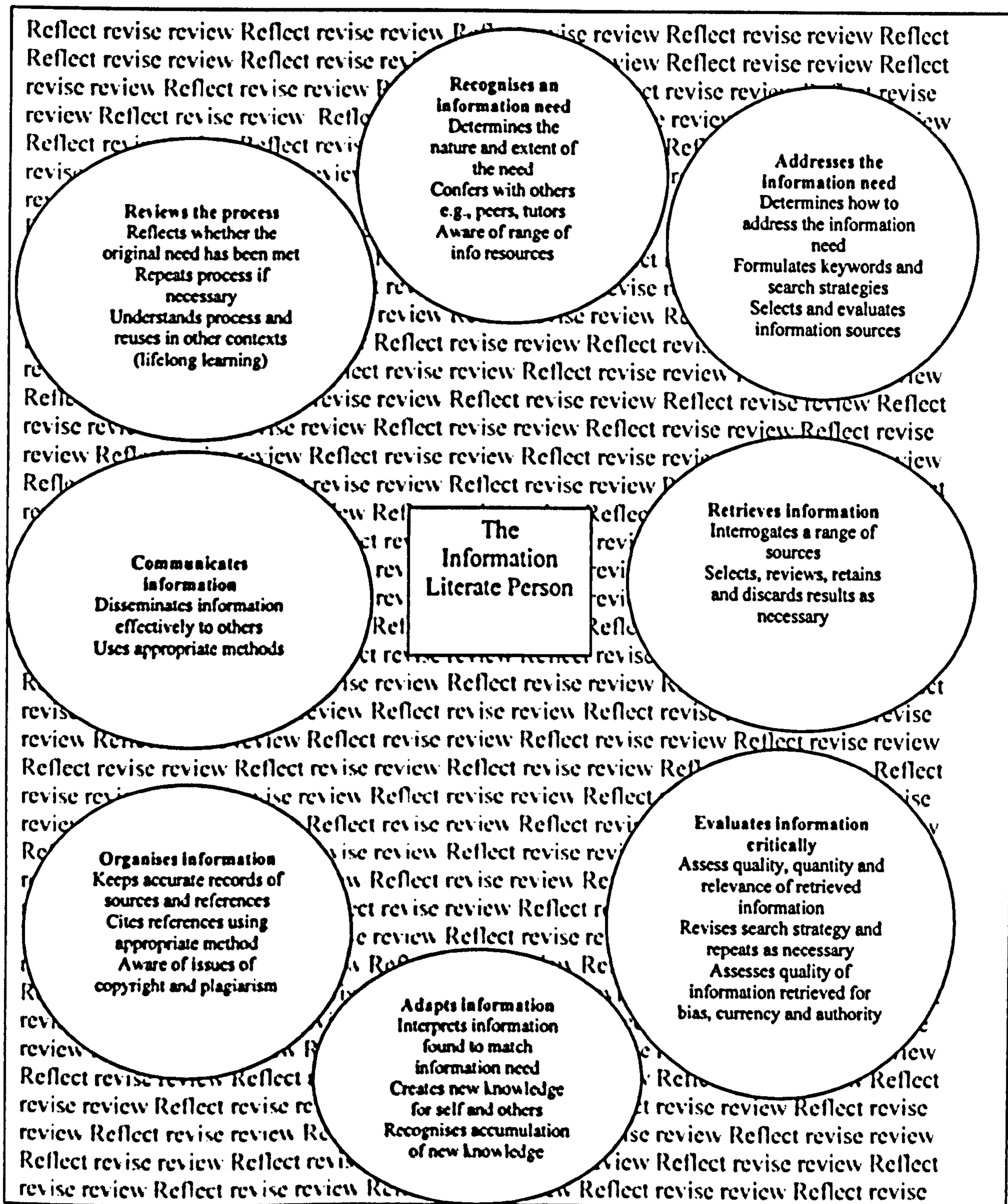
Hepworth draws from current thinking on IL to produce a macro-model of its key components. Primarily a set of recommendations regarding how information professionals should engage with the subject area it is useful in this review for two

reasons: it identifies the issue of communication with others as a key component of IL and it identifies the social context regarding the distribution, communication and exchange of knowledge. These areas are not present in all models of IL and so it is felt that any new strategy should include these components.

### **2.2.8 The Big Blue Project taxonomy**

The Big Blue Project (2002) taxonomy of IL is a synthesis of several IL models currently in use around the world that of Doyle (1992), SCONUL (1999), ACRL (2000) and CAUL (2001). It draws together the main characteristics of these into a new framework which is both iterative and cyclical. For this reason the model bears many similarities to other IL models. It exhibits eight key characteristics shown diagrammatically in Figure 4 below:

**Figure 4: Big Blue Project Information Literate Person**



Big Blue Project (2002, Section 5.2)

**The Big Blue Project model shown above states that an information literate person:**

- **Recognises an information need**

  - Determines the nature and extent of the need**

  - Confers with others for example, peers, tutors**

  - Aware of range of resources**

- **Addresses the information need**

  - Determines how to address the information need**

  - Formulates keywords and search strategies**

  - Selects and evaluates information sources**

- **Retrieves information**

  - Interrogates a range of sources**

  - Selects, reviews, retains and discards results as necessary**

- **Evaluates information critically**

  - Assesses quality, quantity and relevance of retrieved information**

  - Revises search strategy and repeats as necessary**

  - Assesses quality of information retrieved for bias, currency and reliability**

- **Adapts information**

  - Interprets information found to match information need**

  - Creates new knowledge for self and others**

  - Recognises accumulation of new knowledge**

- **Organises information**

  - Keeps accurate records of sources and references**

  - Cites references using appropriate method**

  - Aware of issues of copyright and plagiarism**

- **Communicates information**
  - Disseminates information effectively to others**
  - Uses appropriate methods**
  
- **Reviews the process**
  - Reflects whether the original information need has been met**
  - Repeats as necessary**
  - Understands process and re-uses in other contexts (lifelong learning)**

**Adapted from Big Blue Project (2002, Section 5.2)**

**The *Information Literate Person* as put forward by the Big Blue Project (2002) places the student at the centre of the process and contains similarities to a number of experiential learning models. It not only has some similarities to Kolb's learning cycle (Kolb et al, 1991) but also to the learning spiral model proposed by Northedge & Lane (1997) and Bloom's taxonomy (Bloom et al, 1956). Since Big Blue Project (2002) is a synthesis of other models including the ACRL (2000) model it is unsurprising that some of Bloom's taxonomy (Bloom et al, 1956) is evident.**

**Furthermore, there is a clear expectation that in this process the learning experience will move from a lower form (where students have knowledge or information but have not engaged with it in any particular way other than to remember it or regurgitate it) through to a higher cognitive position (critical evaluation/ analysis etc.) via some form of metacognitive process<sup>17</sup> (reflection and/or re-evaluation, re-examination or iteration). The underlying continuous reflective processes, 'weave their way across all the information seeking skill activities' (Big Blue Project, 2002, section 5.2) mirroring experiential learning models.**

**This model has been used within an information skills module at Staffordshire University as a structure for delivery and as means for assessment. This model includes many of the**

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<sup>17</sup> This term is defined in section 2.4.5.

key ideas which pervade cognitive theory (not just Bloom's taxonomy but ideas about reflection<sup>18</sup> (the related notion of metacognition) and problem-solving. However, although recommendations are made regarding collaboration between faculty and librarians it makes no specific recommendation regarding the delivering of teaching and learning. It is (as with other models of IL) a prescriptive tool describing what an IL person should be rather than an explanation as to how the behaviour which constitutes IL takes place.

## **2.2.9 International Federation of Library Associations (IFLA) model of IL**

The IFLA standards (Lau, 2006) are grouped under the three basic IL components.

**A. ACCESS.** The user access information effectively and efficiently

### **1. Definition and articulation of the information need**

Defines or recognizes the need for information  
Decides to do something to find the information  
Express and defines the information need  
Initiates the search process

### **2. Location of information**

Identifies, and evaluates potential sources of information  
Develops search strategies  
Accesses the selected information sources  
Selects and retrieves the located information

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<sup>18</sup> This term is discussed in more detail in section 2.4 .

**B. EVALUATION.** The user evaluates information critically and competently

**3. Assessment of information**

Analyzes, and examines, extracting information

Generalizes and interprets information

Selects and synthesizes information

Evaluates accuracy and relevance of the retrieved information

**4. Organization of information**

Arranges, and categorizes information

Groups and organizes the retrieved information

Determines which is the best and most useful information

**C. USE.** The user applies/uses information accurately and creatively

**5. Use of information**

Finds new ways to communicate, present and use information

Applies the retrieved information

Learns, or internalizes information as a personal knowledge

Presents the information product

**6. Communication and ethical use of information**

Understands ethical use of information

Respects the legal use of information

Communicates the learning product with acknowledgement of intellectual property

Uses the relevant acknowledgement style standards

Lau (2006, p16)

The IFLA model (Lau, 2006) is to be welcomed because it attempts to address the issue of delivery of IL and its assessment rather than simply offering yet another model.

However, its brevity causes it to overlook the complexity of some of the issues it attempts to cover, not just in teaching and learning but also in the nature of information and information seeking itself.

The guidelines are very general regarding the ways in which 'information competencies' are vital and make no reference to the nature of the individual or the information domain in question, for example, is it designed to be applicable to a student who needs to find specific information to complete an assessment or a carer who needs general information about health services for someone in their care.

The document states that libraries are the most important repositories of information, however the point should be made that information professionals (rather than the libraries *per se*) are the real facilitators of 'information competencies'. In addition, libraries do not have an exclusive role to play, any organisation which acts solely or partly as an information provider could potentially fulfil this role.

This model does not focus sufficiently on information need and how different individuals and groups of individuals have very different competencies at the outset and probably more importantly differing motivations regarding fulfilling needs and extending competencies. The assumption here is that individuals (particularly students) are a homogeneous group with similar needs, skills and motivations. Views regarding learning styles, thinking skills, other information literacy models and information behaviour contradict this view of students or populations as homogenised and undifferentiated (see section 2.4.4 for Biggs & Moore's (1993) views on 'presage' factors).

The model focuses narrowly on information as artefacts and doesn't mention people (family, friends, tutors, fellow students) or institutions (for example, NHS professionals or help desk facilities) as other valid sources of information; see Case (2002) for a broader definition of information.



The model seeks to ground its delivery in constructivist approaches and in so doing demonstrably recognises that students can become more motivated when they are given the opportunity to take ownership of their learning. However, by reporting that this approach puts information at the centre of the process over states the case and is erroneous. The aim of constructivist approaches is to focus on students engaging with information in order to solve a problem and thereby creating new understanding.

This model does include a number of different approaches to delivering IL. However, the fundamental issue is to attempt to become 'pedagogically sophisticated' where a number of appropriate approaches should be used which enable the intended learning outcomes to be realised, enable students to do the assessment and recognise as many learning styles and approaches as is realistically possible. This 'triangulated' approach is mentioned by Biggs (1999).

The model assumes that information need translates into a motivation to want to find information. Many researchers (Wilson, 1999; Case, 2002; Ford, 2004; Hepworth, 2004) indicate that this isn't necessarily the case.

As with many models a further assumption made is that we are dealing with rational human beings who are going to make the best choice – research also indicates that this is not true (Case, 2002). Furthermore, with particular reference to students the power that the module reading list has over their choices should be recognised (Powis, 2004).

In addition, the informal routes to information that students use such as, that between students themselves, where they share what they have found or already know, is not taken into account. In fact *constructivist* approaches, particularly in the form of group work, whether face-to-face or virtual encourage these types of exchanges and, it seems, should be recognised in this and other models.

Assessment does feature as part of the delivery of this model and an excellent overview is given. This is similar to ACRL (2000) and ANZIIL (Bundy, 2004) in that it seriously

attempts to bring together recommendations for teaching and learning interventions, learning styles and assessment in an IL model.

### **2.2.10 Chartered Institute of Library & Information Professionals (CILIP) IL definition**

This is the most recent IL construct to be put forward in the UK. The CILIP model was motivated by a belief that IL as a concept was not widely understood or consistently used in the UK and a desire to create an intelligible, understandable definition of IL hitherto missing from all information/library sectors in the UK (Armstrong, Abell, Boden, Town, Webber, & Woolley (2005). This definition recognises that there are other models and definitions extant such as, SCONUL (1999), ACRL (2000) and ANZIIL (Bundy, 2004). Armstrong et al (2005) point out that some of the concepts, facets and skills found in previous definitions and models are re-used in this case. In outlining their view on the understandings that information literate people would be able to achieve Armstrong et al (2005) state that:

**'[they]...understand more than how to find information; they understand its limitations and the need to examine how they use the information, and how to manage and communicate [it]. IL is an essential and discrete dexterity – everyone relies on information every day.'**

**Armstrong et al (2005, p23)**

The model echoes much of what has gone before in wording and structure. It concurs with both SCONUL (1999) and ACRL (2000) in stating that IT skills and IL are not synonymous though strongly related. In addition, it has flexibility in that it recognises that information is not just hard copy or electronic resources but can be people and other non-standard sources such as TV and radio and that it (IL) will mean slightly different

things to different communities. This notion dovetails with the ACRL (2000) definition and the IL model put forward by Hepworth (2000).

Where the CILIP definition begins to diverge is in the recognition that IL is broader than a set of skills but also should include positive attitudes and a motivation for learning. Unfortunately, Armstrong et al (2005) argue that this is self-evident and give no guidance on how attitudes and motivation can affect the degree to which an individual may become information literate. However, they echo some of the ideas expounded in thinking skills frameworks mentioned by Moseley et al (2004) in that it is believed that the information literate person, 'cares about the quality of the answer to whatever he or she is investigating and is prepared to work to guarantee that quality' (Armstrong et al, 2005).

The model identifies eight skills (or competencies) that an individual is required to have to become information literate and are unpacked as shown below:

#### **(1) Understanding a need**

This skill is couched in terms of recognising that information is needed and understanding why this is the case. An understanding of the nature and constraints surrounding the availability of information: that it can be available in any format but not necessarily accessible at a specific time and that this may temper the use of the information found.

#### **(2) Understanding availability**

Expressed in terms of being able to identify what and where resources are available (e-journals, databases on the web or books in a library etc) for exploitation. Furthermore, an awareness that information sources are biased to a greater or lesser degree depending on the source for example, newspaper articles or web pages written by pressure groups.

### **(3) Understanding how to find information**

**Couched in terms of the ability to search appropriate sources effectively and identify relevant information. This skill focuses particularly on the search strategy (and the ability to limit search results appropriately) but also identifies the ability to browse or scan as important.**

### **(4) Understanding the need to evaluate results**

**This skill focuses on the ability to evaluate information for its authenticity, accuracy, currency, value and bias. In addition, it also includes the ability to evaluate the search strategy itself to ensure that the approach taken did not produce misleading or incomplete results. This also includes the ability to use the skill to find information to problem solve.**

### **(5) Understanding how to work with or exploit results**

**This skill identifies the need to analyse and work with information to provide accurate, presentable research results or to develop new knowledge and understanding which echoes the higher order skills mentioned by other IL models.**

### **(6) Understanding ethics and responsibility of use**

**This skill identifies the importance of using information responsibly and professionally with an awareness of cultural sensitivities with a need to respect confidentiality and give credit to ideas as appropriate. Furthermore, use the information to provide an unbiased a view as possible.**

### **(7) Understanding how to communicate or share findings**

**This centres on the ability to synthesise the information into a new form and communicate or share information in whatever manner is required (face-to-face or email**

etc) and in whatever mode (one-to-one or one-to-many). This skill also mentions the need to be able to understand communication formats.

#### **(8) Understanding how to manage findings**

Finally this skill identifies the need to manage information as effectively as possible that is, referencing and filing systems. In addition, it focuses on the need to be able to reflect critically on the process in order to learn from the experience of finding and using information. This last skill dovetails neatly with thinking skills frameworks generally and some of the ideas expounded in the e-learning arena<sup>19</sup>.

As with many of the other IL models, with perhaps the exception of the ACRL (2000) and ANZIIL models (Bundy, 2004), no explanation or guidance is given on how these skills may be taught or learned. The terminology is less precise than either the Big Blue Project (2002) or ACRL (2000) models and gives no guidance on how these skills may be unpacked into smaller more practical components. However, it should be noted that CILIP intend to work towards further articulation of this model for delivery across a number of sectors beyond HE.

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<sup>19</sup> E-learning is examined in more detail in section 2.4.7.

## 2.2.11 Summary to section 2.2

**Table 1: Summary of key components of IL models**

The information literate individual...

ACRL (ALA)	Big6	Brace	SCONUL	IFLA	Hepworth	Big Blue Project	ANZIIL	CILIP
Determines information need	Defines task	Recognises information need	Recognises information need	Accesses information	Learns to use information tools to access, organise & distribute data	Recognises information need	Recognises information need	Understands information need
Accesses information efficiently & effectively	Determines information seeking strategies to be used	Recognises accurate & complete information needed for decision making	Distinguishes ways in which information gap is to be addressed	Evaluates information	Learns the intellectual norms of the subject domain in question	Retrieves information	Finds information effectively & efficiently	Understands availability of information
Evaluates information critically	Locates & accesses information	Identifies information sources	Constructs search strategies	Organises information	Learns thinking processes associated with knowledge creation & information management	Critically evaluates information	Critically evaluates information & information seeking process	Understands how to find information
Uses information effectively, individually or in a group	Uses information	Develops successful search strategies	Locates and accesses information	Uses information	Learns to communicate with people to exchange information	Adapts information	Manages information collected or generated	Understands how to evaluate information
Understands legal, economic & ethical issues when using information	Synthesises information	Accesses sources of information	Compares & evaluates information			Organises information	Applies information to new concepts & creates a new understanding	Understands how to work with & exploit results
	Evaluates information & problem solving process	Evaluates information	Organises, applies & communicates information			Communicates information	Uses information ethically & acknowledges social & economic issues when using information	Understands ethics & responsibilities in using information
		Organises information	Synthesises & builds on existing knowledge to create new knowledge			Reviews the information gathering process		Understands how to communicate findings
		Interprets information						Understands how to manage findings
		Uses information in critical thinking & problem solving						

From the discussion and the summary of IL models offered in Table 1 above it can be seen that the IL models have many similarities and few differences, a view shared by Owusu-Ansah (2003) and Andretta (2005). This is to some extent unsurprising as many are drawn from the ACRL (2000) model such as the ANZIIL model Bundy (2004) or as in the case of Big Blue Project (2002) are a synthesis of a number of existing models. Critical evaluation, critical thinking, the need to reflect on the results of a search as well as the need to reflect on the information gathering process itself are all common features. SCONUL (1999), however, is the only model which maintains that the critical skills are exclusively a postgraduate skill. These ideas dovetail neatly with constructivist and situated learning theories and with recommended structures for e-learning discussed below.

By contrast Hepworth's IL model (Hepworth, 2000) is the only model to mention the specific need to learn the intellectual norms of a subject domain and recognises the importance of understanding the process of knowledge creation. The ACRL (2000), ANZIIL (Bundy, 2004) and CILIP (Armstrong et al, 2005) specify the need for ethical use of information. ANZIIL (Bundy, 2004) is the only model which identifies the importance of recognising social issues in the use of information.

The most detailed models (those which contain examples of specific learning outcomes for each IL component) are the ACRL (2000) and ANZIIL (Bundy, 2004) models.

Whilst some of the IL models are clearly hierarchical in structure (SCONUL, 1999) others are cyclical (Big Blue Project, 2002) or holistic such as, ACRL (2000) and ANZIIL (Bundy, 2004). It may be more useful to envisage IL models as non-hierarchical cyclical learning processes or as a set of overlapping facets as noted by Armstrong et al (2005) and Lowe & Eisenberg (2005) rather than as a set of skills or attributes that may or may not be learned in a linear way. By doing this it may enable a more flexible set of learning interventions to be developed, recognise that students bring prior knowledge to the IL process (that is, they may be able to use databases to find information very well

but be unable to evaluate or reference sources effectively) and so recognise some of the factors involved in information behaviour and learning discussed below.

This section has examined all the major IL models and discussed their similarities and differences. All of these models put forward a process which outlines how the information literate person should go about their information seeking, however, none explain or use empirical research to explain how individuals actually go about finding, using and evaluating information. To address this issue, this thesis now turns to information behaviour theory and research in order to ascertain an understanding of how individuals engage in these processes.

## **2.3 Information Behaviour**

### **2.3.1 Models of Information Behaviour**

Fisher, Erdelez & McKeachie (2005) include seventy two theories of IB in their wide ranging overview of the field. Case (2007) identifies that there are seven theories which are of the greatest importance because they are the most fully developed. These models as Case (2007) notes attempt, through flow-chart depictions, to explain a sequence of behaviour. This thesis examines the development of one of the models mentioned by Case (2007) in more detail. Wilson's model (Wilson, 1999) is selected for examination here as it has a broad scope, emphasises people as well as systems and because its development has been informed by a great deal of fieldwork (Case, 2007). In tandem with this it was thought useful to examine Ford's IB model (2004), not included in Case's summary (2007), because this explores IB in an educational context with a particular focus on the role of learning styles and their effects. Finally, Hepworth's IB model (2004) is also examined because it is a synthesis of many of the seven models cited by Case (2007) plus many other important IB models mentioned by Fisher et al (2007) and some not included in the summary made by Case (2007) such as, Kulthau (1991) and Heinström (2003) amongst others. These models are examined in more detail below.



### **2.3.1.1 Wilson's information behaviour model**

Wilson (1999) aims to review the status of models<sup>20</sup> of information behaviour defined as:

‘[...] activities a person may engage in when identifying his or her own needs for information, searching for such information in any way and using or transferring that information.’

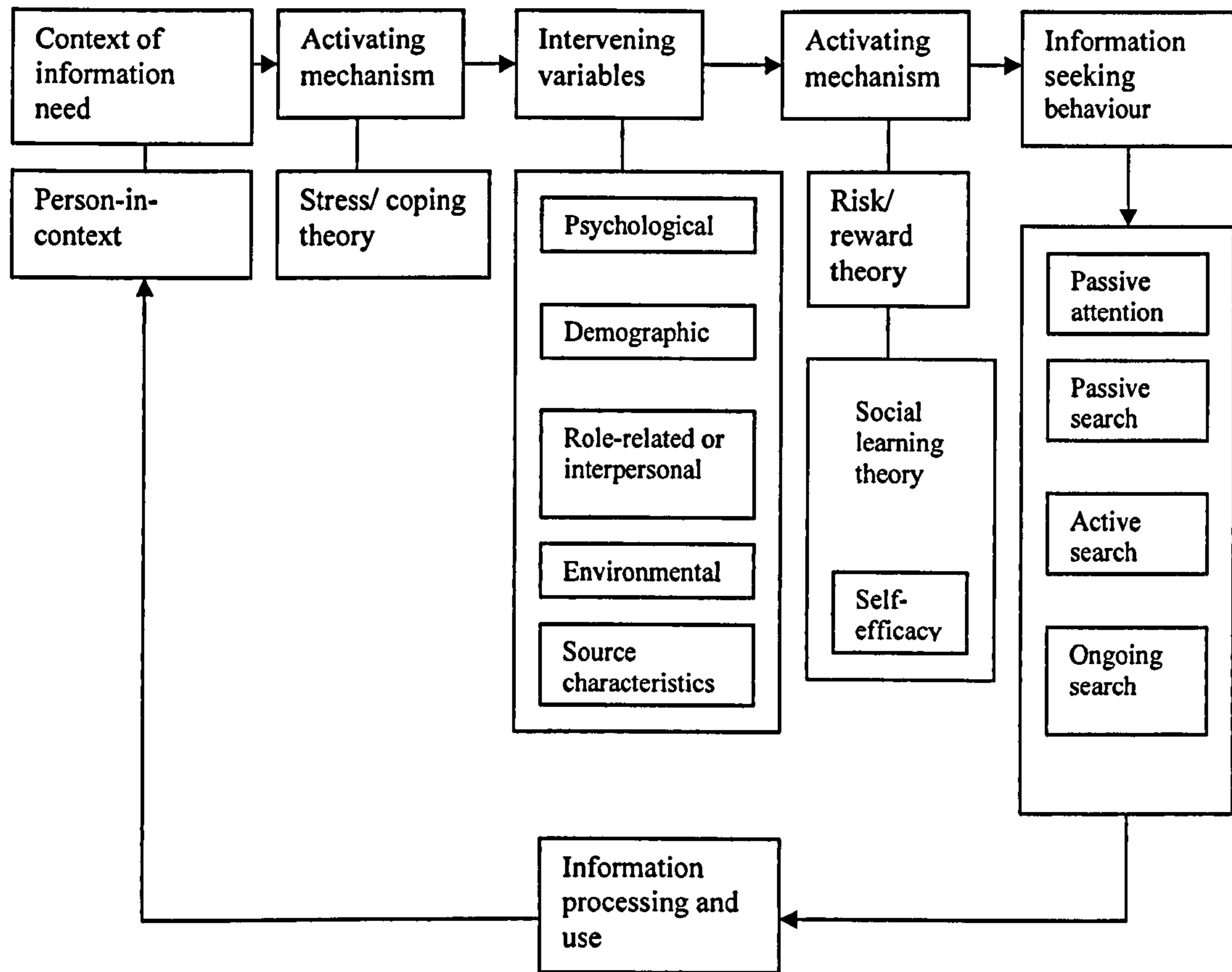
Wilson (1999, p249)

He stresses that models are useful in mapping an area for research and drawing attention to the gaps but that they don't necessarily suggest causative factors or hypotheses to be tested. The model that Wilson (1999) devised is shown in Figure 5 below.

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<sup>20</sup> Wilson defines a model as ‘[...] a framework for thinking about a problem and may evolve into a statement of the relationship among theoretical propositions.’ (Wilson 1999, p250)

Figure 5: Wilson's Information Behaviour Model



Wilson (1999, p257)

Wilson (1999) advocates employing the theories and qualitative methods used in the wider tradition of social sciences which he argues put forward more robust theories of human behaviour. Therefore, Wilson's model draws on research from a variety of fields such as decision-making, psychology, innovation, health communication and consumer research.

Wilson (1999) argues<sup>21</sup> that information needs are secondary to, and often emerge from, needs of a more basic kind such as, physiological, cognitive or affective. In this respect his paper ultimately draws on the ideas regarding personal construct theory put forward by Kelly (1955). In meeting this need the enquirer may experience 'barriers' of some kind (which can be personal, role-related or environmental). Importantly, Wilson (1999)

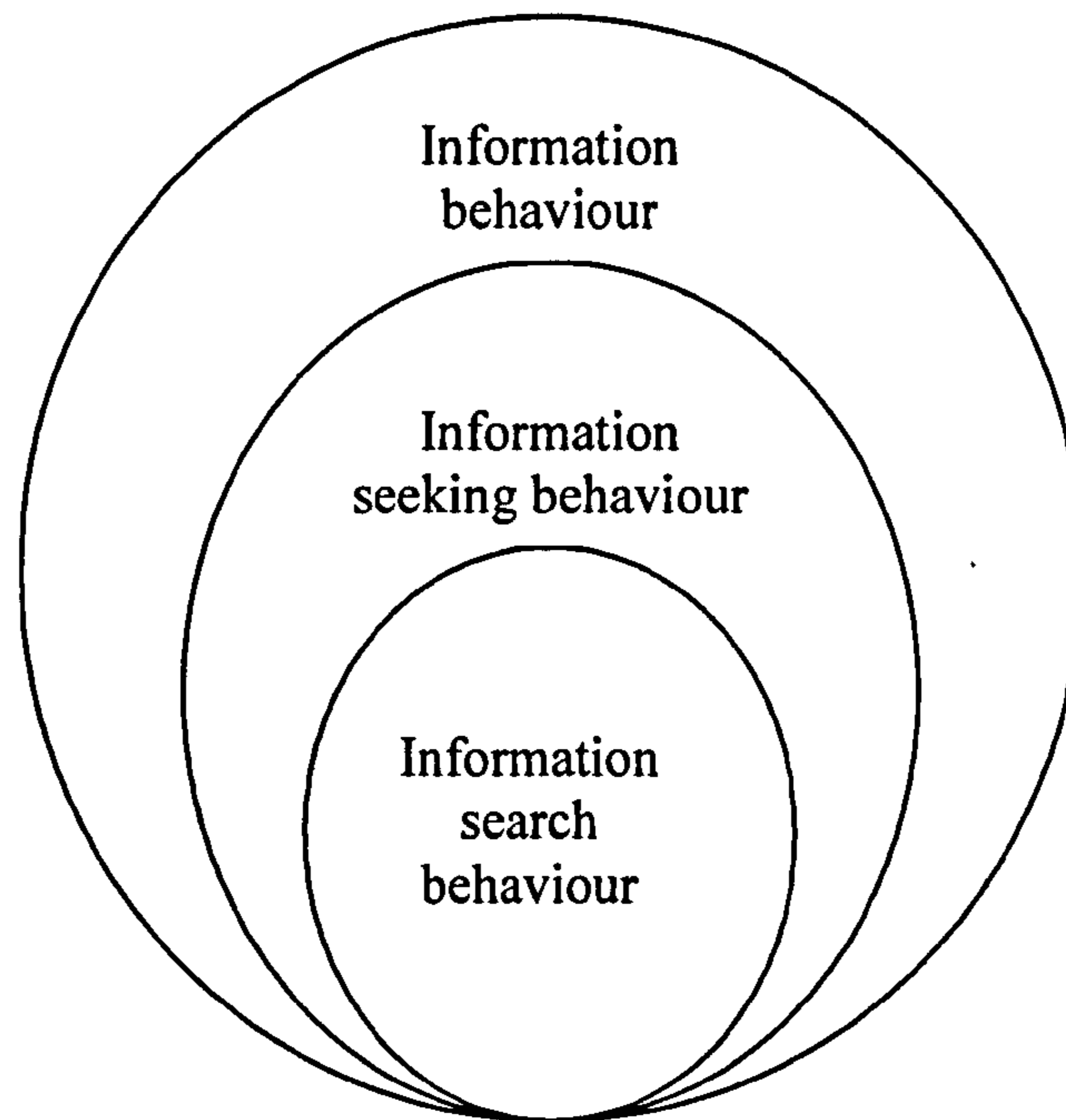
<sup>21</sup> Case (2002) concurs with this view.

highlights the issue that information needs may be satisfied by the person putting demand upon formal sources for example, books and journals or informal sources such as colleagues and friends but the results are not guaranteed. It should be noted that the issue of failure in an information searching task is not explicitly addressed in models of IL.

Three relevant theoretical ideas are presented: the notion of stress/coping which offers an explanation regarding why some needs don't actually invoke information behaviour; the idea of risk/reward which may explain why some information sources are used above others for example, tutor approval has been shown to be an important feature in students' decisions to use an information source especially books (Powis, 2004); the concept of social learning theory which includes the notion of self-efficacy in that one can produce the desired outcomes by adopting appropriate behaviour.

A central feature of Wilson's model is the idea of 'nesting' in that each box within the model can be seen as open to further theoretical articulation depending on how 'fine-grained' the theory is and is shown diagrammatically in Figure 6 below:

**Figure 6: Wilson's 'nested' model of Information Behaviour**



Wilson (1999, p263)

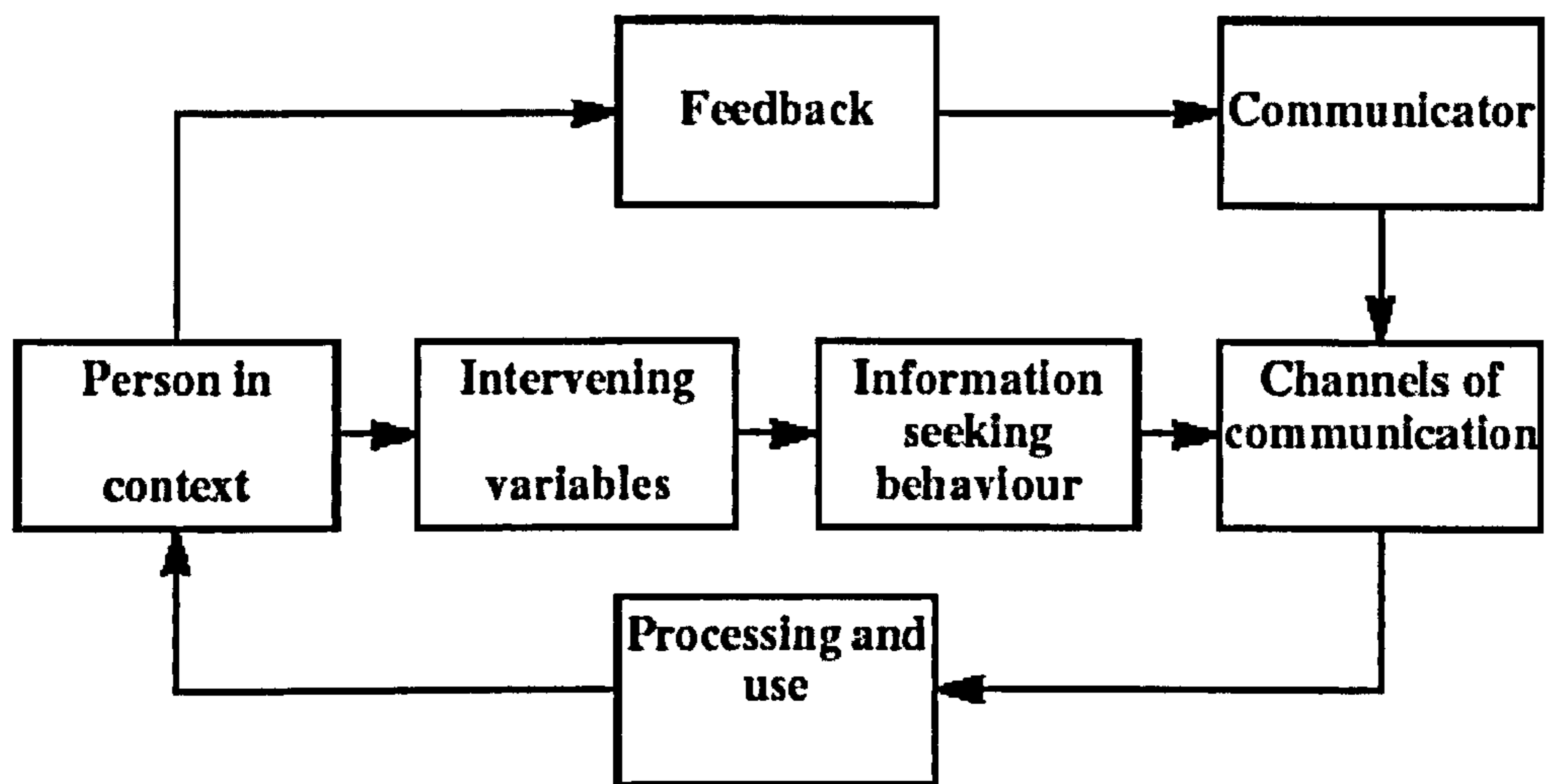
Wilson regards feedback as an essential component of information behaviour and is also explicitly introduced into the model because:

'[...] the process can be seen to require a model of the process that views behaviour as iterative, rather than one-off and the idea of successive search activities introduces new research questions.'

Wilson (1999, p268)

He suggests a further model to incorporate these ideas (Figure 7 below).

**Figure 7: Wilson's modified Information Seeking model**



Wilson (1999, p264)

He argues that these models are useful in themselves because they often lack certain elements and stimulate thinking regarding which elements a complete model would include. The ultimate purpose of Wilson's model (1999) is to provide a framework for hypothesis testing regarding information retrieval systems so that it can produce design suggestions for example, by designing clearer navigation routes to reduce the risk of failure to increase the user's feelings of self-efficacy. Furthermore, the idea of personal networks should be enabled which provide easier routes for users to contact others with similar research interests. In so doing the system could become a genuine tool for encouraging collaborative research.

The notion that information behaviour involves communication with others through information exchange, in that information perceived as useful may be passed to others, also features in Wilson (1999). This issue is reported as under researched by Wilson (1999) though it is measured and discussed by Hepworth (2004).

The idea that information behaviour is not a fixed set of stages but a set of interacting and overlapping 'features' (though he does argue that the features may ultimately be sequential) where the interaction is dependent upon a unique set of circumstances (that the individual brings to the information seeking activity at the time) is also introduced into the model (Wilson, 1999). Hence the person-in-context becomes the primary focus.

Notwithstanding the fact that Wilson's ideas (Wilson, 1999) underpin Ford's later model (Ford, 2004) of information behaviour and though Wilson's model (Wilson, 1999) does not pertain to education specifically it does, however, offer some useful additional theoretical components that could be used in a new model. In particular, the inclusion of easy paths to communication between peers and an explicit feedback mechanism (within the information behaviour process itself) are regarded as essential mechanisms for enabling successful information seeking.

### **2.3.1.2 Ford's model of learning related information behaviour**

This model is highly complex with a great deal of theoretical flexibility built in. Based on research across a number of fields Ford (2004) regards it as essential that information seeking can only be understood if the context (in this case the learning domain) in which it takes place (and shapes this behaviour) is also mapped and understood (Ford, 2004). This evidence based model situates information seeking within Wilson's broader definition of information behaviour (Wilson, 1999) stated above.

The model is also highly relevant (but not exclusive) to digital technologies which Ford calls 'educational informatics' and defines it as the:

'Study of the development and application of digital technologies in relation to the analysis, storage, manipulation and use of information selected from multiple independent sources, in relation to learning.'

Ford (2004, p184)

In this definition 'independent sources' means information sources that exist independently outside the system under consideration for example, an online abstracting database such as *Web of Knowledge*.

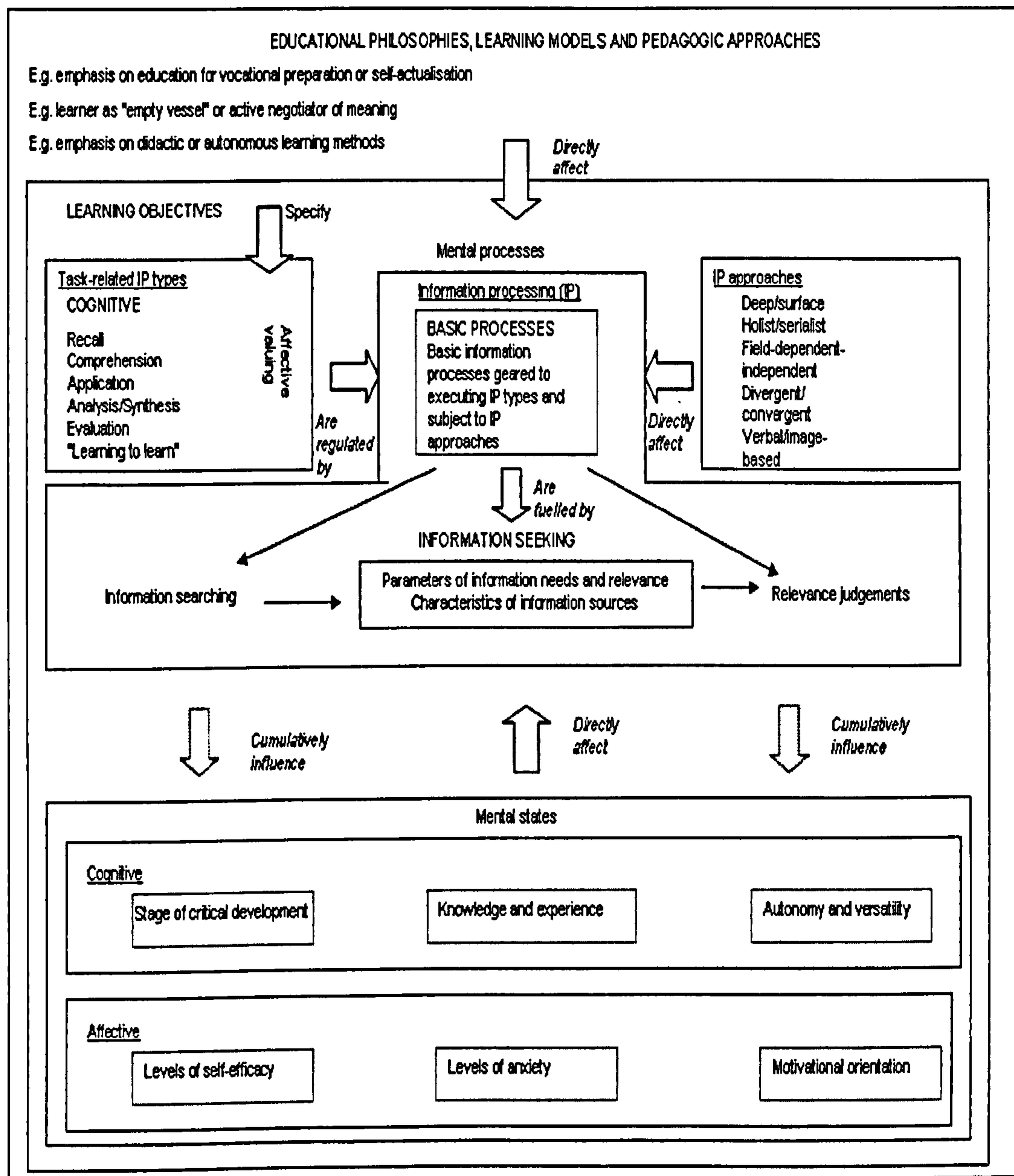
Ford (2004) then synthesises these two definitions give rise to a new definition of information behaviour which he states as:

'Those activities a person may engage in when, for the purposes of learning, *identifying his or her own needs for information searching for and selecting* such information from multiple independent information sources and *using or transferring* that information'

Ford, (2004, p184 – author's italics)

It should be noted that this definition of information behaviour resonates with and uses similar language to models of IL. The definition is formulated with particular reference to the individual's responses to tasks designed to achieve particular learning objectives which in turn are dependent upon educational philosophies, models of learning and pedagogic approaches such as, cognitive or behaviourist philosophies which are outlined in section 2.4. Furthermore, the individual's responses to these tasks may depend upon a range of psychological factors – all of which are incorporated into the model (such as cognition, metacognition, 'deep' and 'surface' approaches to learning and the many learning styles examined in section 2.4.4 in more detail).

Figure 8: Ford's model of learning-related information behaviour



Ford (2004, p203)

Unlike the IL models examined here with the exception of the ACRL (2000) and ANZIIL (Bundy, 2004) IL standards Ford (2004) underpins his theory with a detailed examination



of the context in which information behaviour occurs and divides this into two broad areas that of educational and psychological.

Ford (2004) identifies and describes the broad spectrum of educational philosophies in use today from didactic behaviourist approaches (which envisage little learner autonomy) to constructivist approaches which envisage negotiation of shared meaning by autonomous learners. Ford (2004) recognises that each of these philosophies and their concomitant pedagogic approaches will have a profound influence on information behaviour and also the extent to which this behaviour will be autonomous. This set of factors is equivalent to Hepworth's notion of 'norms' (Hepworth, 2004).

Ford (2004) situates information behaviour within a specific context – in this case teaching and learning dimension within HE. Furthermore, similar to Wilson (1999), Ford (2004) articulates his model by drawing upon theories of human behaviour, particularly cognitive theory favoured by educationalists.

What Ford (2004) presents is a complex interrelated model which gives an indication regarding how the above factors influence information behaviour. It is a flexible model where each dimension he identifies could be populated by constructs other than those named for example, Blooms taxonomy (used in the 'Task-related IP types' area) could be replaced by Squires (1994) 'conditions of learning' model (discussed in more detail in section 2.4.6) without unbalancing it. Hepworth (2004) refers to these as 'cognitive states'.

Unlike IL models it is not a prescriptive tool but one that attempts to provide a framework for explaining the interrelations between several processes which affect information behaviour. Therefore, it is a template for future research rather than a pedagogic intervention. Ford readily admits it is a pre-theoretical model (though it is strongly evidence based) and that interrelations between processes are yet to be empirically proven – though suggestions are given to what further research may take place to achieve this.

Although his definition of information behaviour alludes to the notion of 'information transfer' it is not an explicit dimension in his model. This is an important omission particularly within the educational context because most, if not all, information behaviour is geared towards an output of some description either regarding assessment usually in the form of a written assignment, exam or oral presentation or communication with peers.

Information output regarding assessment using Biggs' SOLO (Structured of the Observed Learning Outcome' model (Biggs, 1999) outlined in section 2.4.5 below (for measuring levels of understanding demonstrated in an assignment) would readily provide the finer theoretical 'grain' for this extra dimension. In tandem with this a feedback mechanism of some description would be necessary which would 'complete the loop' for the whole process and is regarded as both good practice with respect to marking assignments (Gibbs, 1998b) and essential in process terms because any information seeking is rarely unproblematic, Wilson (1999).

Information output regarding information exchange is more problematic since very little research (apart from Hepworth, 2004) has been done regarding how individuals, particularly students, communicate information to each other (Wilson, 1999).

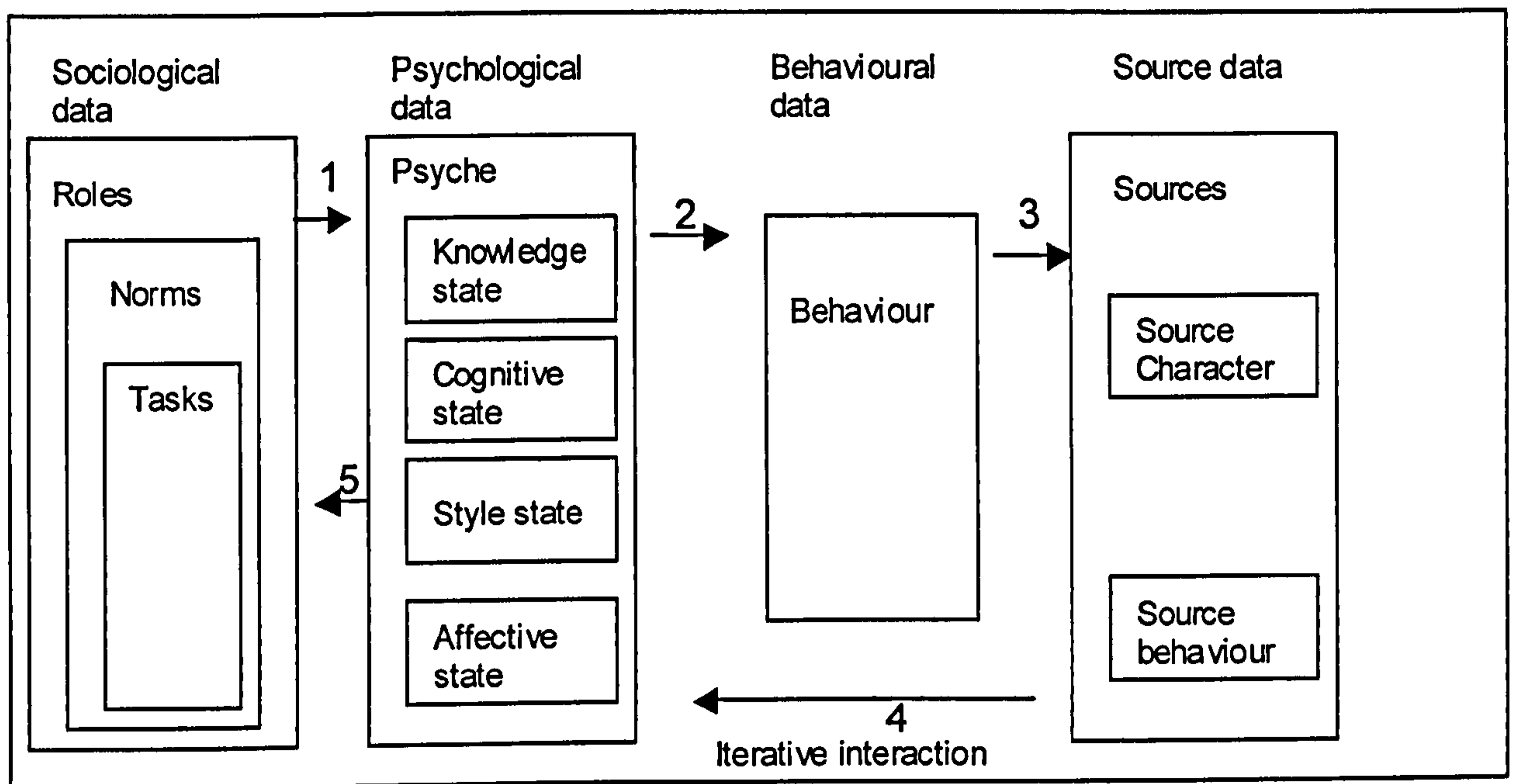
The model demonstrates that, whilst models of information behaviour are theoretically and empirically rigorous, information literacy models lack an evidence based foundation in that they are often not based on empirical evidence or fail to recognise important theoretical or empirical findings in this area. Furthermore, there is no evidence to suggest how these models work in practice or how they should be delivered in terms of a teaching and learning philosophy, subsequent teaching intervention and assessment mechanism.

Ford comes at this problem from the reverse perspective and looks at what affects information behaviour and seeks to explain it within a context. This model offers a way of measuring all external and internal inputs to ascertain their relative importance and to what extent they affect each other within the process itself.

### 2.3.1.3 Hepworth's Information Behaviour Model

The model put forward by Hepworth (2004) is based on empirical findings and theoretical models from within in the field of information behaviour. It has many similarities to these and draws from psychological and behavioural theory. This recent study is based on the experiences of a particular community, that of informal carers, and is represented below.

Figure 9: Hepworth's Final Conceptual Framework



Key:

1= associated with

2= associated with

3= interaction with

4= has impact on

5= may resolve situation and help complete task(s)

Hepworth (2004, p705)

#### **2.3.1.3.1 Sociological data**

'Roles', 'norms' and 'tasks' which are grouped as 'sociological data' are seen as creating the information need. These define the 'person-in-context' and the boundaries of that context in which an individual finds him/herself (Hepworth, 2004). Using the example of higher education as an illustration, the 'role' dimension is embodied in the person as a student, the 'norms' are represented by the requirement to pass an award and the 'tasks' are defined by the requirement to complete assessments via a limited set of pedagogical interventions such as, lectures, seminars, group work or individual work etc. In addition, the learning context in which students experience learning, whether it be student centred or didactic, fall into this category.

#### **2.3.1.3.2 Psychological data**

The internal characteristics of the individual are also regarded as important in information behaviour are disaggregated into four areas that of, 'knowledge state', 'cognitive state', 'style state' and 'affective state' and are grouped as 'psychological data'. Hepworth uses the word 'state' to emphasise that these are conditions associated with a situation (and its response) rather than a permanent condition of mind. Furthermore, specific processes may or may not be present depending on the role, task, knowledge and source characteristics of a particular situation.

'Knowledge state' pertains to the level of prior knowledge a person has of a subject area which is similar to the notion of 'presage factors' put forward by Biggs and Moore (1993). It also refers to the knowledge they have of an information system and – in the light of this – indicates the importance of distinguishing between expert and novice users of systems.

'Cognitive state' which reflects the thinking processes associated with situations for example, the level of critical thinking in which an individual is engaged (Ford, 2004) and

affected by learning styles<sup>22</sup> detailed by Pask (1976), Honey & Mumford (1982), and Ford (2004) are regarded as important in information behaviour and may include such activities as choosing, doubting, revising or 'plan-do-review' as summarised by Moseley et al (2004) and relate directly to the level of uncertainty (Kulthau, 1991) felt by the individual.

'Style state' refers to the disposition or level of self-efficacy or motivation individuals have towards a certain situation and may affect their information behaviour accordingly. It is important to include this dimension because some individuals may regard their situation in a positive way that is, as a challenge and be proactive and persistent in their endeavours (referred to as 'monitors') which echoes the notion of the 'deep learner' (Marton & Saljo, 1997). Whereas others may regard their situation in a negative fashion (referred to as 'blunters') and has some resonance with the notion of the 'surface learner' (Marton & Saljo, 1997). In an educational setting it is important that these are recognised because as noted by (Ramsden, 1992) learning may only take place when the student is predisposed to deep learning that is, has a positive style state.

'Affective state' refers to the emotional disposition of an individual and will have a bearing on influencing information behaviour in certain settings. Included within this is the feeling of 'uncertainty' (Kulthau, 1991) especially at the beginning of the process which has similarities to the notion of an 'anomalous state of knowledge' (ASK) put forward by Belkin (2005). Again, the presence or absence of positive affective states such as, high motivation, feeling good about doing a particular task or the degree of self-efficacy an individual feels will all affect the information behaviour undertaken. This echoes notions of 'self-regulation' identified by Moseley et al (2004) and the idea of 'positive self-concept' identified by Squires (1994).

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<sup>22</sup> Discussed in detail in section 2.4.4.

### **2.3.1.3.3 Behavioural data**

This is primarily concerned with the physical activities in which individuals engage such as reading, using databases and communicating with others. Hence, it can be seen that it is not just to do with using electronic tools but wider activities such as sharing information with others and consulting with 'experts'.

### **2.3.1.3.4 Source data**

Where Hepworth (2004) moves beyond Ford (2004) and Wilson (1999) is in two important ways: in disaggregating sources of information or 'source data' into a new set of categories and in defining the locus of information behaviour. Hepworth (2004) in his study of informal carers separates source data into seven areas:

- Organisations for example, government departments
- People for example, health service professionals
- Information objects for example, books, newspapers
- Equipment for example, medical aids
- Services (in the home) for example, home help
- Services (external) for example, hospital
- Financial for example, allowances

Hepworth (2004, pp701-702)

These could be used in an information behaviour model for students (in a learning situation) where the source data is mapped to different categories for example, the 'people' category could become tutors and 'hospital' could become information service etc. These define the notion of 'source character'. 'Source behaviour' pertains to how the 'information source' responds to a user and can be characterised as enabling contact with artifacts for example how an e-journals service links to full-text articles.

The locus of information behaviour could map across to a new model in an unchanged fashion so that the levels used would be as follows:

- **Group level:** where data is aggregated for the whole community for example, a particular cohort of students;
- **Individual level:** which has a specific focus on the information behaviour of an individual within the group
- **Moment of interaction:** the specific point when an individual interacts with an information source such as a database or person.

Adapted from Hepworth (2004)

These specific dimensions add extra granularity to the notion of information behaviour and would greatly enhance the understanding of this behaviour within the educational context.

#### **2.3.1.4 Summary to models of information behaviour**

It can be seen that information seeking behaviour, and by implication IL, is affected by many factors not readily recognised or identified by IL models but present in learning theory and pedagogy and include issues such as motivation, self-efficacy, emotions, persistence and failure. All information behaviour models are expressed in some form of cycle and in tandem with learning theories mention notions of iteration, reflection, and feedback. These notions are echoed in learning theory and pedagogy which are also discussed in detail in section 2.4. Though the language of information behaviour and IL models is similar their purpose is very different in that information behaviour models explain the processes involved, whereas IL models offer a structure for going about information seeking.

The models put forward by Wilson (1999) form the bases of many of the components identified and further articulated by both Ford (2004) and Hepworth (2004). The model

researched by Hepworth (2004) is firmly based on empirical search and is straightforward in nature. The model designed by Ford (2004) is based on meta-analysis and though thorough is complex and may be less straightforward to apply. However, it does focus on the educational factors such as, learning theories, learning approaches and styles and pedagogy and how these might shape information behaviour in that context.

From this section it can be seen that these information behaviour models may provide a way of analysing IL models. This analysis may assist in the identification of the assumptions, omissions and discontinuities that IL models contain and by doing this reveal the most suitable model(s) which best enable individuals to become information literate via their information seeking behaviour. In addition, systematic consideration can be given to which additional features should be 'wrapped around' IL models to enable their effective delivery in the teaching and learning context.

### **2.3.2 Analysing information literacy models using Hepworth's 'final conceptual framework' of information behaviour (Hepworth's model) as a diagnostic tool.**

#### **2.3.2.1 Introduction**

This analysis deliberately uses the model devised by Hepworth (2004), as discussed above, to scrutinize current information literacy models because:

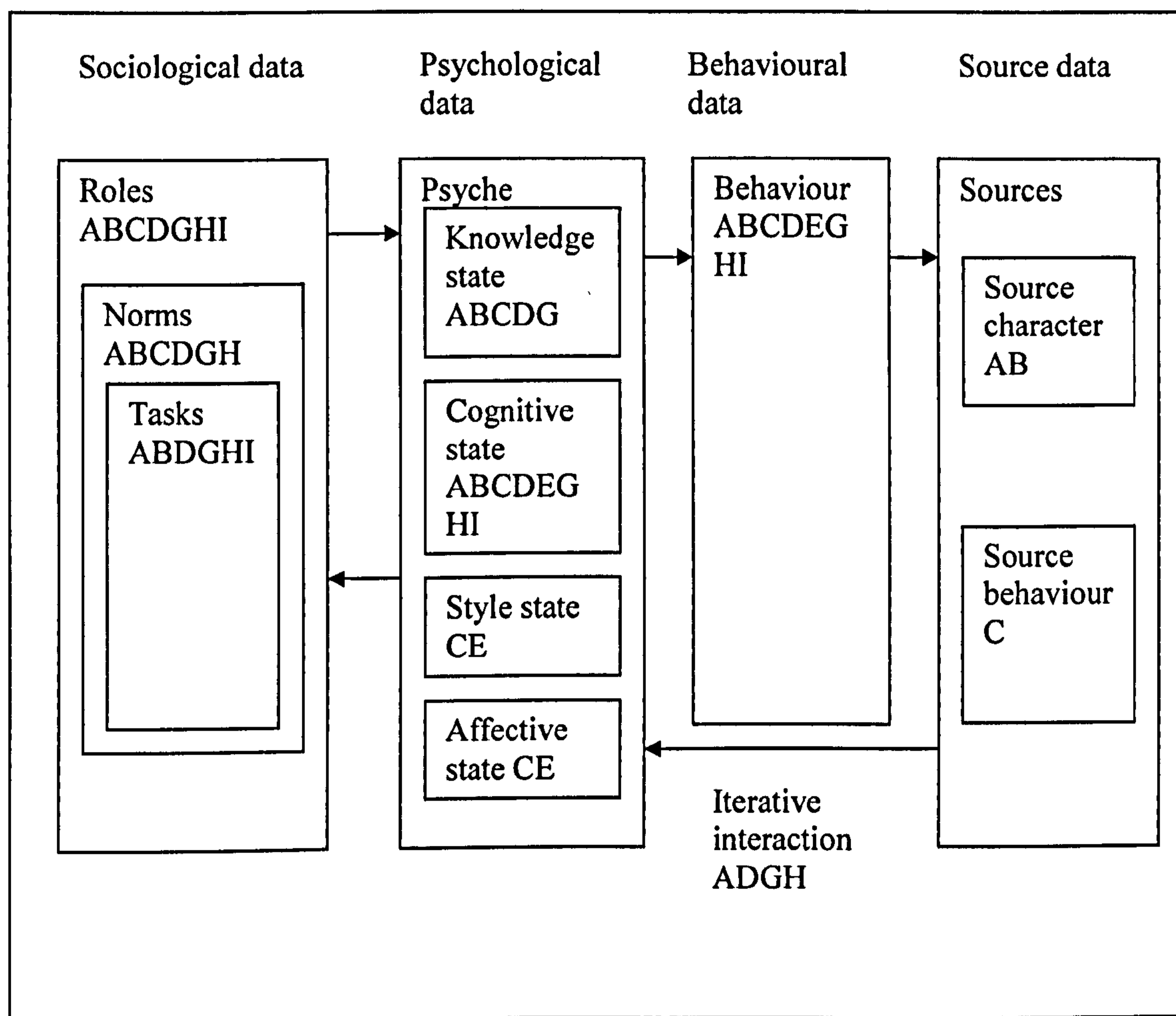
- It is concerned with and explains many of the factors underpinning activities that IL models set out as important to the process of becoming information literate and therefore finding information;
- It is based on rigorous research focussing on how particular individuals engage with information and highlights which factors affect this engagement;



- It builds on previous robust empirical studies and meta-analyses regarding information behaviour.

Following Hepworth's model (see section 2.3.2.3 for a detailed description of these headings) the main headings and sub-headings have been used as a template to structure the analysis of IL models as shown in Figure 10 below:

Figure 10: Analysing IL model components using Hepworth's information behaviour model



Key: A=ACRL (ALA)    B=Big6    C=Bruce    D=SCONUL    E=IFLA  
 G=Big Blue Project    H=ANZIIL    I=CILIP

## **2.3.2.2 Sociological data**

### *2.3.2.2.1 Roles*

It can be seen from the descriptions in section 2.2 that the SCONUL (1999), ACRL (2000), Big Blue Project (2002) and ANZIIL (Bundy, 2004) IL models are primarily targeted at students in higher education and Big 6 (Lowe & Eisenberg, 2005) primarily at students in secondary education. Therefore, the role the target group is expected to undertake is assumed or implied. In addition, the context in which students find themselves, and which is the creator of their needs, requires them to find information to a stipulated quality in order to complete assignments and gain an award. SCONUL (1999) make a further separation in this area expecting only post-graduate students to undertake the higher 'headline tasks' of synthesis and evaluation which gives a finer grain regarding the implied need of students. However, this is highly problematic for two reasons: one, it conflicts with the widely accepted notions of thinking skills frameworks analysed by Moseley et al (2004) in that the aim of teaching and learning, from primary school onwards, is for all students to work towards synthesis and evaluation of knowledge or information; two, experience in teaching postgraduate students IL does not bear this out (Andretta, 2005).

The Bruce (1995) and IFLA (Lau, 2006) models appear to be more diffuse in identifying the roles for which these models are intended and are linked more overtly to the notion of lifelong learning post (or parallel to) higher education. Bruce (1995) goes further in stating that the individual is at the centre of the process and defines the nature of their own IL and continually reflects upon it and in this sense Bruce's model (because of its constructivist nature) is more flexible, pragmatic and situational in that allows the individual to define their own IL role for a particular context. By contrast, IFLA (Lau, 2006) appears to offer an all embracing model, with a bias towards higher education, but in so doing appears to regard students, and the wider public also, as one homogeneous group. Given the diverse needs of people in general and students in particular it seems to

be a false premise and weakens the structure of the IFLA (Lau, 2006) model because it appears to place the individual outside the process rather than at the centre of it.

#### *2.3.2.2.2 Norms*

For the IL models which are strongly associated with higher education (SCONUL, 1999; ACRL, 2000; Big Blue Project, 2002; Lau, 2006) or secondary education such as the Big6 (Lowe & Eisenberg, 2005) norms are centred upon the academic process, in this sense how learning is delivered (constructivist, behaviourist or situated learning) and its outputs primarily completing assignments in a particular fashion dictated by the institution to which they attend and are assumed. These models are also highly specific in placing a value on certain sources of information above others that is, refereed journals and academic text books at the expense of other non-artefact information sources for example fellow students or their tutors. Furthermore, students are then (in a hitherto mysterious and unexplained way) expected to transfer these skills to the world of work without the recognition that different sets of norms are likely to prevail in that setting – which in turn can affect the nature of identifying information need (Lloyd, 2003). As mentioned above in section 2.2.4 Bruce (1995) tends to view the person as being able to identify and adapt to whichever context the individual finds themselves by gaining knowledge of the information domain and by being able to reflect on information experiences independently. The ACRL (2000) model identifies the subject context as crucial in determining how students use the information they find. All tend to reflect the notion of ‘good thinking’ set out in Moseley et al (2004).

#### *2.3.2.2.3 Tasks*

All the models described clearly define the tasks that individuals are expected to undertake in that they focus on what the student (or individual) will have to do in order to achieve their goal for example, find information to complete an assignment which is assessed and may contribute to a module or award or solve a problem at work. However, none focus specifically on the tasks themselves and to what extent their simplicity or

complexity should reflect existing knowledge or level of attainment. Some work has been done in linking IL tasks to specific subject areas (Andretta, 2005).

### **2.3.2.3 Psychological data**

There are a number of overarching assumptions made by all models that: individuals all have the same needs, motivations and approaches who will, once they have all the information before them, make informed decisions and use the information correctly. These ideas are further underpinned by the assumption that there is a right decision to make. Research indicates that all these assumptions are open to dispute (Case, 2002).

#### *2.3.2.3.1 Knowledge state*

This is a complex area which can be affected by the personal knowledge of the subject domain held by an individual as well as knowledge of the information sources being used. Here the issue regarding the individual's perceived and actual (and/or prior) level of knowledge is not taken into account. SCONUL (1999), ACRL (2000) and Big Blue Project (2002) tend to express the knowledge state in terms of a 'gap' or a 'need' to be addressed. The gap notion has parallels in information behaviour theory (Case, 2007) however, no IL model makes the distinction between 'need' and 'want' leaving the issue of individual motivation un-addressed. This issue of motivation also impinges on the affective state and is discussed more fully below. Case (2002) points out that the distinction is critical in that no one can really argue with an individual's wants, by contrast a need is open to interpretation, negotiation and discussion and is very different.

In teaching and learning terms this needs/wants duality is important from another dimension. Race<sup>23</sup> (2001a) sees this as a distinction between an internal motivation (want) and an external one (need) where it is regarded as far more important to engender, enable and harness individuals' intrinsic motivations in order to achieve learning rather

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<sup>23</sup> Discussed more fully in section 2.4.2.

than simply focus on a need, which is a primary focus of constructivist or student centred approaches to learning. Therefore, in this respect IL models seem insensitive to these distinctions and indeed tend not to set out how differing levels of knowledge or the nature of knowledge held are to be catered for. IL models tend to assume that the information need or gap will lead to an individual being motivated to fulfil the need or fill the gap. Many writers (Wilson, 1999; Case, 2002; Ford, 2004; Hepworth, 2004) state that this is an erroneous assumption to make. Some individuals may not wish to address their need at all (or address it in a superficial way) for one reason or another for example, a cancer patient needing to know about side affects of a particular treatment but not wanting to find out or a surface learner needing to complete an assignment but not wanting to understand concepts relating to his/her subject area. Furthermore, it is argued by Wilson (1999) and Case (2002) that an information need is at the very best likely to be of only secondary importance to an individual after more primary concerns such as food and shelter have been realised. Wilson (1999) and Hepworth (2004) argue that it may be more helpful to express information need in terms of increasing certainty or reducing uncertainty in a given situation.

It can be seen that none of the IL models focus sufficiently on information need and the ways in which individuals and groups of individuals bring very different competencies to the information gathering situation from the outset and by-the-same-token differing motivations regarding the fulfilment of needs and extending competencies. As noted below in section 2.4.4 issues such as 'presage factors' (Biggs & Moore, 1993) which affect how individuals come to a learning situation (using their prior experiences, characteristics and conceptions of learning which, in turn, are affected by developmental factors and social factors, learning styles and approaches to learning) should be taken into account in any programme (or part of a programme) of study (which IL models purport to be).

#### *2.3.2.3.2 Cognitive state*

IL models tend to address the cognitive state by focussing on the ways in which the information is to be found that is, via constructing a search strategy to interrogate a database rather than by focussing on the thinking processes the individual is required to use in order to reach this state. Section 2.4.5 below demonstrates that there are many theories and models of thinking skills that could be used to understand these processes. Often described mechanically IL models don't reflect the complexities associated with thinking skills, especially levels of critical thinking (Ford, 2004) or levels of understanding (Biggs, 1999), and how these may be addressed. The generic nature of some models, particularly SCONUL (1999), seem to militate against the centrality of constructivist or student centred learning notions and Squires (1994) 'conditions of learning model' in that learning is about creating new structures and contextualising information. By contrast, Bruce (1995), ACRL (2000) and ANZIIL (Bundy, 2004) address this by insisting that IL models should be embedded within the curriculum.

#### *2.3.2.3.3 Style state*

The IFLA model (2006) mentions that the concept of 'deep' and 'surface' learners has to be taken into account and Bruce (1995) alludes to the importance of engendering a positive learning experience again by recommending that IL programmes should be embedded and therefore highly contextualised within the curriculum. This factor is implied in the ACRL (2000) model in that they mention that student's should learn at their own pace. No IL model takes into account learning styles such as 'visualiser'/'verbaliser', 'holists' and 'serialists' etc., which are identified by Ford (2004) and Hepworth (2004) as important factors to be recognised when analysing an individual's information behaviour.

#### *2.3.2.3.4 Affective state*

Bruce (1995) and the IFLA model (2004) address this issue by stating that by making IL learning experiences more student centred via critical thinking or problem-solving it will cause individuals to be more motivated to learn. No model directly addresses the issues of motivation, feelings or emotions and how these may affect the IL process for the individual in that some individuals may see the IL enterprise as a challenge and will be more persistent ('monitors') whilst others will not ('blunters'). The anxieties associated with feeling of uncertainty and how these may influence IL are completely absent from all IL models. Research does indicate that this is an important factor in student learning in that students who are more relaxed tend to learn more (Graham-Rowe, 2004) and a critical factor in information behaviour particularly the notion of self-efficacy (Wilson, 1999; Ford, 2004) which relate to metacognitive, self-regulatory and thinking skills processes noted by Moseley et al (2004).

#### **2.3.2.4 Behavioural data**

The behaviour that IL models expect individuals to undertake is generally similar in concept and alludes to: identifying, selecting and refining keywords; selecting e-resources such as databases; constructing search strategies using Boolean logic or browsing to find relevant information within a certain context. Iterative action is expected by or recommended to the individual. However, how this iteration is to occur is only well articulated in the ACRL (2000) and ANZIIL (Bundy, 2004) models. Only the ACRL (2000) model mentions the requirement to gain further knowledge (as per Bloom et al, 1956) as the starting point to the process of gaining more information before synthesising and evaluating it. Bruce (1995), ANZIIL (Bruce, 2004) and IFLA (Lau, 2006) indicate how this process is to be taught to or instilled into individuals.

All recommend evaluating information and synthesising it into a new format for appropriate communication. This tends to be alluded to in terms of outputs and tends not

to include the ways in which people may work together to find and share information and how this may affect the IL process itself. Only the ANZIIL model (Bundy, 2004) alludes to this, however, the importance of collaborative working is only weakly stated. This may be an important omission since information behaviour models (especially Wilson, 1999) regard communication and the feedback it may generate, within the information seeking process itself and not the output as mentioned by many if not all IL models, as an essential part of the overall process – and greatly under researched. Emerging notions of e-learning which are discussed in section 2.4.7 below also include this as an important part of the learning process itself.

All models could be said to be ‘success’ models in that they all assume that once student have all the skills and attributes of a model they will be successful every time. Clearly this may not be the case as mentioned by Wilson (1999) results aren’t guaranteed and this notion of failure is not addressed in IL models in any way. In tandem with this the potential barriers to information seeking aren’t mentioned or identified. However, it could be said that all models attempt to alleviate this to some extent by attempting to engender greater degrees of self-efficacy through providing a structure.

### **2.3.2.5 Source data**

#### *2.3.2.5.1 Source character*

Artefacts such as, IT, databases, books and peer reviewed journal articles feature strongly in IL models, how to understand their character via evaluation criteria and how to use them is well articulated. A great deal of guidance is given on how to use these evaluation criteria to analyse information sources. However, other ‘informal sources’ such as organisations, tutors, equipment other than IT or services are not addressed as thoroughly. How the nature of sources affect the IL enterprise are not addressed in IL models. Where artefacts are concerned this may be expressed in terms of their positive or negative attributes such as accessibility and extent of knowledge contained; for



individuals this may be expressed in personal terms such as a good listener, proactive, provides lost of information or is responsive. IL models tend not to examine how using intermediaries for example, librarians may inform the IL process itself and how this may impinge on its success or failure. IL models assume that the difficulties associated with dealing with negative attributes such as counter intuitive interfaces or information overload provided by a service is easily addressed by recourse the structure that IL models provide.

#### *2.3.2.5.2 Source behaviour*

Bruce (1995) does mention 'formal' and 'informal' information sources. However, notions of non-artefact sources of information for example, tutors or fellow students and the enabling role these can play are largely missing from IL language. Big Blue Project (2002) mentions this in terms of discussing the information need and addressing it but not in the information seeking process itself. Furthermore, how the positive or negative attributes of these could affect IL behaviour is not addressed. In positive terms for example, how the intuitive nature of a search interface is inherently more enabling or how a librarian might give a straight forward explanation regarding an information source or the degree of pedagogic sophistication a librarian might use when teaching how to search a database and how this can enhance the learning experience.

#### **2.3.2.6 Summary to section 2.3.2**

IL models are highly abstract ideas (Hepworth, 2003; Owusu-Ansah, 2003) and do not necessarily provide the tools for delivering the relevant skills and neither do they provide an adequate explanation of either the process of becoming information literate nor information behaviour.

In general IL models appear to be prescriptive tools or manifestos for action containing common sense statements regarding how individuals should engage with the information

world and structure their information seeking behaviour. What they are not are explanations of how information literacy or information behaviour takes place. IL models recommend certain skills, attributes, standards that individuals must conform to or processes to be followed in order to become information literate. However, these common sense statements are often grounded in the language of the librarian and only sporadically use the language of learning theory, pedagogy or information behaviour and are not recognised outside the information profession (Virkus, 2003). Inherent within these models is a level of abstraction which causes IL models to build in many assumptions. These assumptions include:

- notions regarding the nature of information;
- the context in which individuals are seeking information;
- the existing knowledge that individuals bring to the information seeking process;
- individuals' approaches to finding information;
- individuals' own psychological make-up and how this affects their motivation towards engaging with information;
- how individuals go about the process of engaging with information;
- how individuals' think about, analyse, evaluate and communicate information.

## ***2.4 The Learning Context***

Sections 2.2 and 2.3 have outlined IL and IB respectively. This section seeks to complete this overview by examining two aspects of the learning context: theories of learning (sections 2.4.1 – 2.4.6) and notions of e-learning (section 2.4.7). These broad areas which encompass learning (as overviewed in Chapter 1) are unpacked and discussed in detail below.

### **2.4.1 Behaviourist theories**

The theory of 'behaviourism' was originally put forward by Skinner (1935) and was based on its antecedent 'associationism' (Gross, 2005). Thorndike devised a theory of learning based on experimental work which identified the relationship or association between stimulus and response and became known as Thorndike's 'law of effect' (1911 quoted in Gross, 2005, p175). This theory became known as 'associationism' and it is from this that behaviourism devised by Skinner (1935) emerged (Gross, 2005). Skinner (1935 and for example 1973) emphasises the idea that learning takes place when associations between stimulus and response are made (Fry et al, 1999). Knowledge is regarded as an organised accumulation of associations and skill components (Mayes & de Freitas, 2004). Behaviourist instruction is organised in such a way that tasks are pre-arranged into sequences based on their relative complexity with simpler tasks a pre-requisite to more complex tasks. This structure enables students to succeed by learning in small logically ordered steps. It is often useful to organise the teaching of electronic resources in this fashion. Race (2001a) maintains that behaviourism emphasises the importance of repeated practice and the use of rewards to aid retention of appropriate responses. Mayes & de Freitas (2004) note that behaviourism is centrally concerned to emphasise active learning by doing with immediate feedback on success, the careful analysis of learning outcomes and above all the alignment of learning outcomes, instructional strategies and methods used to assess these.

Many of the methods labelled 'constructivist', constituting the commonly accepted consensus on pedagogy in HE, are indistinguishable from those derived from the behaviourist tradition (Mayes & de Freitas, 2004). However, behaviourists concede that higher order thinking skills for example, synthesis and evaluation could not be taught in this fashion (Mayes & de Freitas, 2004). Finally, from this perspective, consciousness is regarded as a market place full of competing interests and demands and unless learning stimulates, both in content and in learning activities, it will either fail to engage the learner or fail to hold the learner's attention (Squires, 1994). A notion that links directly to the issue of motivation.

## 2.4.2 Constructivist theories

The constructivist approach which is based on personal construct theory (Kelly, 1955) describes learning as the continuous building and amending of previous structures as new experiences such that effective learning involves individual ‘transformation’ (Squires 1994; Fry et al, 1999; Race, 2001a). MacKeracher (2004) in her ‘dialectical’ learning model argues that this transformation occurs firstly when individuals gain a greater degree of detail to their existing knowledge (‘differentiation’) and then secondly by combining this new knowledge (‘integration’) into their personal understanding of reality. In this approach it is believed that people actively construct their own knowledge (Biggs & Moore, 1993; Kolb et al, 1991; MacKeracher, 2004). Some recent studies in the field of visual perception suggest that there may be physiological evidence to support this theory of an individualised reality (Hollingham, 2004). Experiential learning and the use of reflection are based on this constructivist theory where higher order learning involving understanding can only take place when the learner’s underlying schemata are changed to incorporate new understanding.

Constructivist learning theories (experiential learning in particular) currently underpin most learning theory and practice within HE (Fry et al, 1999; Race, 2001; Race & Brown, 2001; Gibbs & Coffey, 2004) because they are regarded as inherently student centred in approach as opposed to didactic models such as behaviourism<sup>24</sup>. In addition, these theories have much in common with theories of ‘critical thinking’ (Moseley et al, 2004) examined in this thesis. Therefore, it seems pertinent that this particular theoretical framework should be investigated more fully.

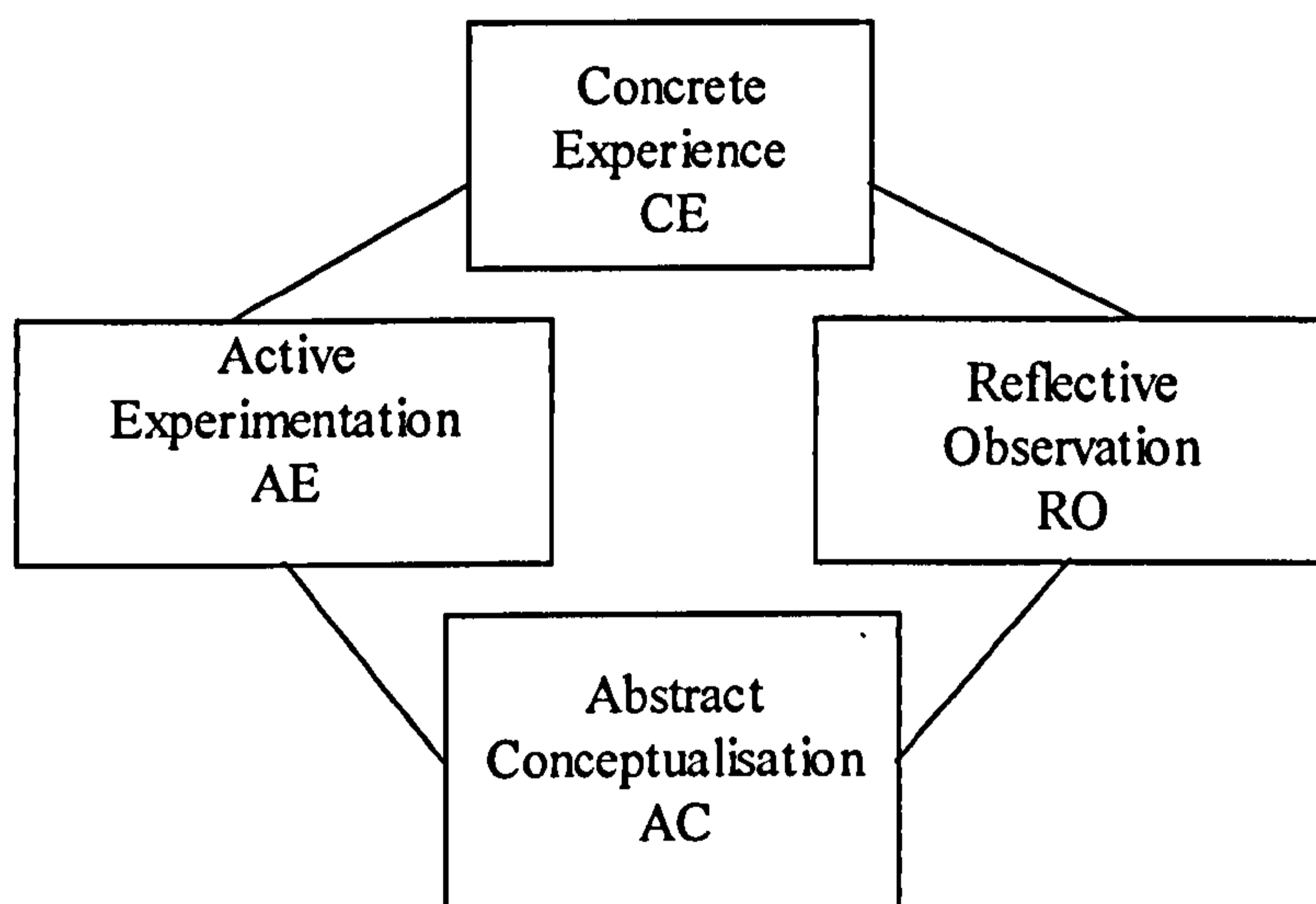
It can be said that it is self-evident that the experiences we have whether in life, at work or in education play a central role in the process of learning. Kolb et al (1991) expound the notion that ideas are formed and reformed continuously through experience and that we bring our own ideas and preconceptions to differing levels of elaboration to the

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<sup>24</sup> It should be noted that Mayes & de Freitas (2004) disagree with this received wisdom and regard behaviourism as consistently misunderstood and misrepresented, stating that behaviourist programmes also involve active student centred endeavour.

process which is, in essence, an iterative process. Kolb's learning cycle (Kolb et al, 1991) is conceived as a four stage process and it is viewed as most applicable to work based learning, teaching laboratory and practical work, action learning, role play and small group teaching (See Figure 11 below). Snowball (1997) has successfully used this model to structure information skills workshops for medical postgraduates. In addition, this is regarded by Webb & Powis (2005) as a useful model for the structuring of IL teaching.

**Figure 11: 'Kolb's Learning cycle'**



Adapted from Kolb et al, 1991 (quoted in Gibbs, Morgan & Northedge, 1998 p20)

In this model learners employ these four processes in this order:

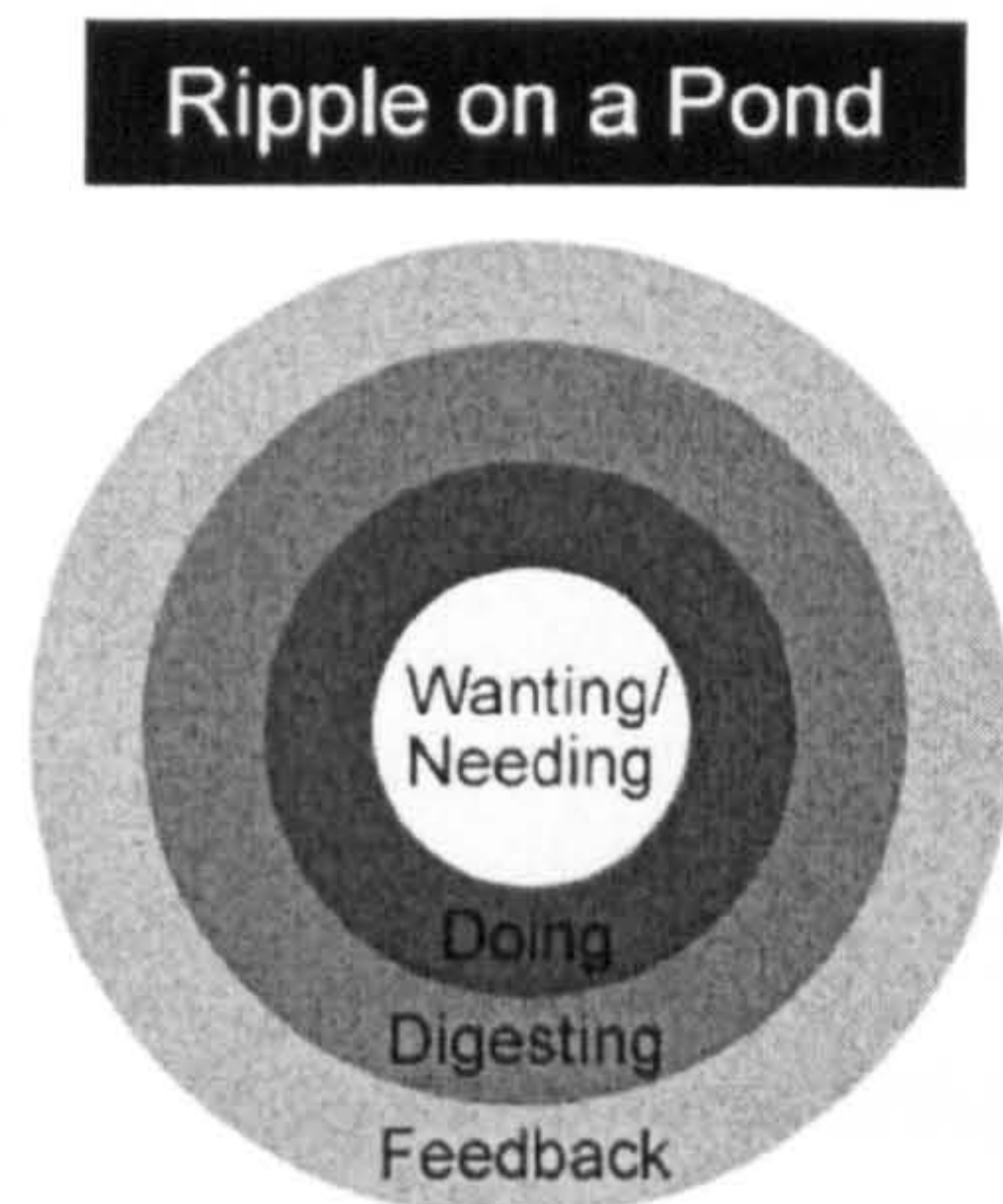
- CE: Concrete experience, where learners should be fully and freely involved in the new learning experience.
- RO: Reflective observation, where learner needs time to reflect on new learning experiences from different perspectives and is closely linked to the notion of feedback.
- AC: Abstract conceptualisation, where learners are able to form and reform, process, take ownership and integrate their ideas into sound logical theories.

- AE: Active experimentation, where the learner uses theories to make problem-solving decisions and tests implications in new situations

In summary this cycle involves: doing, reflecting, processing, thinking and understanding, which are governed by the learner's needs and goals, and all elements are necessary for learning to be achieved. As the learner continues round the cycle they not only become more skilful but also notice more, make better connections, understand more and make more informed decisions regarding what to do next (Gibbs et al, 1998). The cycle concerns learning concepts as well as skills, in effect it is about learning by doing, not just learning to do (Gibbs et al, 1998). In addition, where students are expected to learn practical skills such as information skills, several cycles may be involved, each of progressively longer duration and greater complexity. Envisaged by some writers as a learning spiral, each loop more advanced than the previous one (Northedge & Lane, 1997: Gibbs et al, 1998). MacKeracher (2004) identifies this advancing or articulation of learning as 'differentiation'. This model offers us a view of learning as a highly personalised iterative activity. It is noteworthy that this view has parallels with Hepworth's (2004) findings regarding the iterative nature of information behaviour. In contrast, some (Bloom et al, 1956) regard learning as an hierarchical activity moving from lower to higher order learning (see section 2.4.5 for more detail).

Race (2001b) argues that this sequential cyclical model does not sufficiently explain the nature of learning. Other writers (Gibbs et al, 1998) agree with Race (2001b) that learning is 'messy' and he suggests a new model which he calls the 'Ripple on a pond' (see Figure 12 below).

Figure 12: Race's 'Ripple in a pond'



(Race 2001b, p1)

This model focuses more directly on the motivation of the learner to learn and the notion of continuous feedback. This idea suggests that learning is dynamic (learning achieved by doing, gaining feedback, making sense of what is learned and using reflection), iterative and driven by internal (intrinsic) and external (extrinsic) motivations. Within this model reflection, the metacognitive element of the model, becomes the dominant component. Metacognition or reflection is important to learning because it aids the learner to monitor, evaluate and change (see section 2.4.5 below for a more precise definition) as they progress and gives rise to further learning and understanding (Biggs & Moore, 1993; Metcalfe, 1994).

Indeed, reflection appears to be an essential component and may even characterise deep or strategic learning (Biggs & Moore, 1993). This emphasis on affective issues has much in common with ideas of critical thinking (for example Moseley et al, 2004) and information behaviour (for example, Ford, 2004 and Hepworth, 2004). Furthermore, the notion of reflection is not only a pedagogical method recommended by Squires (1994), Kolb et al (1991), and Race (2001b), in the traditional learning setting, it is included in MacKeracher's 'dialectical learning model' (MacKeracher, 2004), Mayes dialogical model (JISC, 2004) for e-learning contexts but it is also a learning outcome in its own right in that students are expected to learn to become reflective learners as they progress through an award (Mayes & de Freitas, 2004; Quality Assurance Agency [QAA], 2006). Reflective practice as a professional issue from which some of these ideas are derived,

especially those involved in teaching and learning, can be found in Schon (1987), Trigwell (2001) and Bell (2001).

Race (2002) gives a useful definition of reflection:

‘The act of reflecting is one which causes us to make sense of what we’ve learned, why we learned it, and how that particular increment of learning took place. Moreover, reflection is about linking one increment of learning to the wider perspective of learning – heading towards seeing the bigger picture’

(Race, 2002 quoted in Hinett, 2002a, p2)

This idea of using reflection to build on previous understanding is also used by Jonassen et al (1995). Furthermore, the idea of reflection can be found as a component closely linked to metacognitive processes in many thinking skills frameworks (Moseley et al, 2004) and as central to the iterative process mentioned specifically by SCONUL (1999) and Big Blue Project (2002) and also implied in the ACRL (2000) and ANZIIL models (Bundy, 2004). In addition it is implied in information seeking behaviour models (Wilson, 1999; Ford, 2004; Hepworth, 2004) as well as learning theory as mentioned above. Vygotski in particular posits this relationship (Hung & Chen, 2001) and argues that these processes provide a form of self-regulation which causes the learner to internalise learning from the social to the individual dimension.

Cowan (2002) argues that it is only when learning outcomes provide opportunity for reflection that they engage the learner. Teles (1993) reports that reflection is critical to the notion of ‘online apprenticeships’ and Walker (2003) states that asynchronous delivery enables reflection because the learner is given more time (than in a face-to-face situation) to do some reflecting on a topic and contribute a considered response. The process of reflection can be further assisted by the provision of formative feedback from tutor to student for example, where a tutor critically evaluates, gives feedback via comments and suggestions and support for each version of an English student’s poem



with a view to fostering reflection in the learner so that the skill of writing poetry can be mastered (Teles, 1993). Littlejohn & Higgison (2003) regard continuous feedback as an essential component within the e-learning context.

Cowan (2002) states that it isn't simply enough to ask learners to reflect. What tutors need to do is structure learner's reflections in such a way that learners are provided with questions they may find useful to answer such as, 'How did I construct that last search strategy and how might I improve on it next time'. In this way the outcome should be an effective process analysis of the approach they have followed (Cowan, 2002).

Furthermore, the purpose of the reflective activity will dictate the questions to be posed.

Kolb (1991), Teles (1993), Race (2001b) and Cowan (2002) believe that those who become more aware of how they do something on the whole become more effective learners. However, this awareness can come some time after the event (Cowan, 2002).

### **2.4.3 Situated learning**

From a theoretical standpoint this notion is characterised by focussing on the ways in which knowledge is distributed socially (Mayes & de Freitas, 2004). In this sense knowledge is regarded as situated when learning outcomes enable individuals to participate in the practice of a certain community in a successful manner. This focus moves away from analysis of sub-tasks towards patterns of successful practice. In essence this notion is regarded as a necessary attempt to reconnect behavioural or cognitive levels of analysis that have become disconnected from the social dimension. Within this analysis the assumption is that learning is shaped by social forces and that successful learning must be personally meaningful where a learner's activity, motivation and learning are related to a need for a positive sense of identity (or positive self-esteem).

There appear to be two strands to situated learning, also known as ‘flavours’ which will be referred to as ‘socio-psychological situativity’ and ‘community of practice situativity’ (Mayes & de Freitas, 2004).

- *Socio-psychological*

This is centred on the importance of context-dependent learning in informal settings where the learning activity, in which the skills or knowledge are normally embedded, is given as authentic a social context as possible. For example, problem-based learning, anchored instruction and cognitive apprenticeships embody this approach. In this instance the design focus is on the relationship between the nature of the learning task in an educational setting and its characteristics when used in a real situation.

- *Community of practice*

The emphasis here is on the individual learner’s relationship with a group of people rather than the relationship of an activity to wider practice. In this learning model the learning of a particular practice is characterised by a process where beginners are initially peripheral in the activities of the community but as their learning increases their participation becomes more central. As with constructivist theories meaning is constructed by individuals. However, the main difference here is that meaning is generated through negotiation, participation and reification through mutual engagement with others in this community (Wenger, 1999). Negotiation of meaning is defined as interaction and gradual achievement within a given context. Participation is defined as the process of taking part and is therefore active. Reification is the process of treating abstractions as real entities for example in the legal system the abstract notion of justice is represented as a blindfolded person holding a set of scales. Hence, it is a shortcut to communication where we project our meanings onto the world and then perceive them as existing and having a reality of their own (Wenger, 1999).

## **2.4.4 Influences on student learning**

It is essential that the context within which students experience their learning is understood. This context can be usefully divided into three stages presage, process and products (Biggs & Moore, 1993).

### **2.4.4.1 Presage**

This comprises the factors that exist prior to the student experiencing a learning event and these can be subdivided into two broad areas:

- (1) Student characteristics such as, conceptions of learning, developmental factors, social factors, abilities, expectations of success and failure and preferred approach to learning and learning style.
- (2) Teaching contexts that exist prior to the learning event such as teacher conceptions of learning and teaching expertise and the institutional dimension (curriculum, method, resources, assessment, rules and procedures)<sup>25</sup>.

These factors are becoming more central within HE as issues such as ‘widening participation’, non-traditional entry routes and the widening base of international student enrolment are addressed.

### **2.4.4.2 Process**

This tends to be affected more by students’ own preconceived ideas and motivations for example, regarding notions of the university environment or the need to have a degree for a particular profession. The learning process addresses the issue of the relationship

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<sup>25</sup> These presage factors have strong parallels with Hepworth’s factors which affect information behaviour such as roles, norms, tasks, environment and sources discussed in section 2.3.1.

between student and teacher for example, how they interact in tutorials or seminars. In addition, what is central to this is the students' predisposition for surface, deep or strategic learning (Biggs & Moore, 1993) and how they clarify their intentions to learn for example, that they attempt to understand a complex psychological theory and all its applications or simply learn by rote for an examination. This is mediated by the students' own process of realising that they know about something (metacognition) for example, a political theory or knowing how to do something for example, use a keyboard. In information behaviour terms Hepworth (2004) regards these as psychological and behavioural states. Psychological states include, knowledge, affective, style and cognitive aspects. The strong parallels between these two theoretical areas are again noteworthy.

#### **2.4.4.3 Products**

In this sense the product is the 'learning outcomes'. Ausubel (1967 quoted in Moseley et al, 2004, p12) originally called these 'advance organisers', designed by the teacher and directly affected by learning styles (process) and presage. It is important that the learning outcomes maximise the most positive learning styles. Learning outcomes may be described in two ways either quantitatively (how much is learned) or qualitatively (how well it is learned). At the institutional level these two ways are drawn upon to derive marks and grades awarded for learning achievement (Biggs & Moore, 1993).

#### **2.4.4.4 Approaches to learning**

Unpacking the various approaches to learning mentioned above: 'surface', 'deep' and 'strategic' learning is a useful next step.

Marton and Saljo (1997) investigated the interaction between students and set learning tasks where students' written answers to a question were scrutinised using the technique

of content analysis to measure their levels of understanding of a particular topic. They concluded that a student's approach to a task (intention) determined the extent to which she or he engaged with the subject and thus affected the quality of their learning. From this they identified two approaches to learning; 'deep' and 'surface'.

'Deep' learning involves an intention to understand and seek meaning leading to an attempt to relate concepts to existing experiences. In addition, deep learners distinguish between new ideas and existing knowledge and critically evaluate and determine key theories and concepts. This approach results from the student's intent to gain maximum meaning from their studies. This is achieved through high levels of cognitive (and metacognitive) processing throughout the activity. In essence, facts are learnt within the context of meaning and in the ownership of the process. Students tend to be motivated to learn and interested in their subject. Ramsden (1992) argues that deep learning is the only way that students will effectively understand learning materials, Moseley et al (2004) argue that critical thinking facilitates this approach and Ford (2004) regards these (approach to learning and thinking level) as essential factors affecting information behaviour.

'Surface' learning involves the intention to complete the task at hand and memorise its components, there is no distinction made between new ideas and existing knowledge. Students treat the task as extrinsic (that is externally imposed) for example in the case of learning by rote. Students may offer the impression that maximum learning has taken place which is achieved through superficial cognitive processing. Here facts may be learned, however, this learning takes place outside a meaningful framework. Furthermore, this may belie a student misconception that a subject consists of a large number of facts to be learned which one needs to absorb for example, students may feel that they can 'get by' by learning a large number of historical dates rather than understanding why the events occurred. Ramsden (1992) maintains that this student view must be challenged directly by designing curriculum and assessment that maximises the opportunity for deep learning.

Biggs & Moore (1993) have added 'achieving learning' to the list. This parallels the notion of 'strategic learning' espoused by Race (2001a). Strategic learning, underpinned by a motivation to achieve, is characterised by being focused on the product, akin to surface learning, where the student maximises the chances of obtaining high marks whilst maintaining optimal engagement with the task. Such engagement for strategic learners is the means not the end unlike deep learning.

It is argued that these approaches should not be seen as fixed but modifiable within the teaching and learning context and are themselves learned (Biggs & Moore 1993). Some writers have argued that learning approaches change over time and that adult learners learn differently and have differing motivations. This theoretical perspective is known as 'androgogy' (Fry et al, 1999). However, some have noted that these approaches may be habituated and are not easy to change (Fry et al, 1999). Ramsden (1992) warns that at times, particularly during examinations, students can imitate a deep approach when in fact they have adopted a surface approach. He has named this phenomenon 'imitation learning' (Ramsden, 1992). It could also be argued that this is in fact a student operating in strategic learning mode in that the student is focussed on the product rather than new knowledge (Newstead & Hoskins, 1999).

#### **2.4.4.5 Learning styles**

Although students' approach to learning may be changed, their learning styles are regarded as relatively fixed (Fry et al, 1999). There are many theories surrounding learning styles, some of which are summarised here. Kolb et al (1991) have suggested a number of learning styles based on their learning cycle. Pask (1976 quoted in Fry et al, 1999, p31) identified two types, that of serialists (who prefer a step-by-step narrow focus) and holists (who prefer the 'big picture' and work with illustrations and analogies). Studies have found that holists tend to use broader searching strategies engage in a larger number of searches, greater awareness of broader and narrower terms and are more likely to use serendipity than serialists when using information sources (Ford, 2004).

Honey and Mumford (1982 quoted in Fry et al, 1999, p25) put forward a four-fold classification of learning styles:

- ‘Activists’ respond best to new experiences and problems;
- ‘Reflectors’ best engage when learning activities are well structured and where they have time to observe, reflect and think;
- ‘Theorists’ respond well to logical structure where they have time to explore methodically and question;
- ‘Pragmatists’ work best with practically based immediately relevant learning activities.

Ford (2004) draws attention to the ‘field-dependent’/ ‘field-independent’ cognitive styles continuum (of which Honey & Mumford’s categories may be a part) in that:

- ‘Field-independent individuals’ tend to experience the components of a structured field analytically, as discrete from their background and to impose structure on unstructured fields. They tend to work best where they are required to mediate their own learning.
- ‘Field-dependent individuals’ tend to be less good at such structuring and analytical activity and to perceive a complex stimulus as a whole. They tend to favour a ‘spectator’ approach where learning is structured for them.

Regarding information behaviour Ford (2004) reports that field independent individuals make more use of truncation, use more keyword terms, are less confused when using the Web, are more focussed in their thinking and tend to be quicker than field-dependent individuals

**‘Kinaesthetic’ (also ‘kinesthetic’), ‘auditory’ and ‘visual’ learning styles are derived from the theory of ‘multiple intelligences’ or ways of thinking developed by Gardner (1993).**

**‘Kinaesthetic’ (more correctly ‘bodily-kinesthetic’) learners learn by manipulating and doing tasks rather than reading about them, use their sense of touch more than other senses, respond to physical rewards, are physically orientated and move a great deal, memorise by walking and seeing, use action words, can’t sit still for long periods, like to act things out and like being involved in games (Gardner, 1993).**

**‘Aural’ (more correctly ‘auditory-musical-rhythmic’) learners use sound, rhyme, music and use aural content in visualisation, for example sound effects (Gardner, 1993). These learners according to Gardner (1993) enjoy reading out loud, find writing difficult but are better at telling, speak in rhythmic patterns, learn by listening, enjoy discussion, remember discussions better than written text and aren’t good at doing projects that involve a large amount of visualisation.**

**‘Visual’ (more correctly ‘visual-spatial’) learners prefer using images, maps and pictures to organise and communicate information and enjoy drawing (Gardner, 1993). These learners memorise by visual association, have trouble remembering verbal instructions and are good readers.**

**Interestingly these last two categories have strong parallels with the verbaliser/imager cognitive style continuum mentioned by Ford (2004). On this continuum individuals are regarded as being located towards one or other of these poles and will tend to perform better in tasks that require the associated form of information representation in memory that is, visual or verbal. Unsurprisingly, imagers tend to prefer visually orientated information sources, interestingly whilst their retrieval effectiveness in Web-searching is low they tend to feel less disorientated when using it than verbalisers (Ford, 2004). Finally, the last dimension to include is that of ‘divergent’ and ‘convergent’ thinkers. Divergent thinking is used almost synonymously with creative thinking where individuals who engage in this tend to generate links between wide-ranging disparate items of**



information and can use 'free associate' readily. In contrast convergent thinkers tend to have a narrow logical approach (Ford, 2004).

All of these differing theories put forward the idea that any learner will deploy one or more of these styles in a particular learning situation. The implication of this is that, with particular respect to practitioners, an awareness of these learning approaches and styles is required so that activities are structured to include all learning styles for example, an information skills workshop may include some theory as well as allow time for hands-on at a PC or solve a problem. Therefore, activities should be contextualised and take place within a motivational context which engages learners as much as possible to encourage deep learning. In addition, Ford (2004) argues that these notions must be embraced in order to understand the information behaviour exhibited by students as they progress through HE.

#### **2.4.5 Moseley et al's evaluation of thinking skills theories**

It is essential that 'thinking skills' theories, which includes the concepts of critical thinking and problem-solving, are considered here because they can interact and enhance the quality of information gathering, building understanding and productive thinking (Moseley et al, 2004). Furthermore, problem-solving and critical thinking skills form an essential part of information literacy models for example Bruce (1995) and ACRL (2000) in particular, and information behaviour models, especially Ford (2004). Moseley et al (2004) identifies over fifty one thinking skills frameworks and evaluates in detail thirty five of them.

They offer precise definitions for both the concept of thinking and the notion of skills:

- Thinking

‘A consciously goal directed process, such as remembering, forming concepts, planning what to do and say, imagining situations, reasoning, solving problems, considering opinions, making decisions and judgements and generating new perspectives.’<sup>26</sup>

- Skill

‘[...] expertness, practical ability facility in doing something [...] Skill overlaps with ability but more often refer to specific areas of performance – it implies performances are of a high standard and adapted to particular requirements.’

Moseley et al (2004, p7)

Moseley et al (2004) identify three common factors which are central to the notion of thinking skills which are ‘metacognition’, ‘self-regulation’ and ‘critical thinking’.

Metacognition is characterised as the knowledge one has regarding one’s own cognitive processes and products and anything relate to them. For example, when a person engages in metacognitive activity a realisation emerges that s/he is having more trouble learning fact X than fact Y; a person may double check fact X before accepting it as a fact or the person may feel they have to make a note of fact Y because they may forget it. In essence, it is an active monitoring and consequent regulation and orchestration of these

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<sup>26</sup> The language used here is similar in many respects to the descriptions which outline models of information literacy see section 2.2.

processes – usually to achieve a goal. It is not just an awareness of one's own processes but also the ability to plan, monitor and evaluate that thinking. This appears to detail the iterative process mentioned in many learning theories, information literacy and information behaviour models.

'Self-regulation' is strongly linked to metacognition and pre-supposes it (Moseley et al, 2004). Regarded as a systematic process it involves, cognitive, motivational, affective and behavioural components (echoing the style and affective states in information behaviour as identified by Hepworth, 2004) enabling a person to adjust actions to achieve desired results in changing circumstances. It is strongly context-specific and comprises:

- Setting goals for learning;
- Attending to and concentrating on instruction;
- Using effective strategies to organise, code and rehearse information
- Establishing a productive working environment
- Using resources effectively
- Monitoring performance
- Time management
- Seeking assistance when needed
- Holding positive beliefs about one's capabilities, the value of learning, factors influencing learning and anticipated outcomes of actions
- Experiencing pride and satisfaction with one's efforts

Moseley et al (2004, p9)

This resonates strongly with the concept of 'self-efficacy' as put forward by Wilson (1999) and Ford (2004) (see section 2.3) in that a learner deploying the characteristics set out above will feel more in control and more confident in a learning situation, and therefore, may do better in say finding information to support an argument. Clearly self-regulation, like self-efficacy, is underpinned by affective that is, emotional factors.

In the US, critical thinking and thinking skills are synonymous (Moseley et al, 2004). This equates with Bloom's higher order thinking skills (Bloom et al, 1956) implying that good critical thinkers are proficient in analysing, inferring and evaluating. These ideas also found in 'higher-order' IL skills in Bruce (1995), SCONUL (1999), ACRL (2000), Big Blue Project (2002). Philosophical definitions include a normative component, also found in information behaviour models<sup>27</sup>, which is inextricably linked to values where 'good thinking' depends on two dispositions that of caring about making the right decision and caring to present the decision honestly and clearly. These ideas are specifically mentioned in the ANZIIL (Bundy, 2004) and CILIP (Armstrong et al, 2005) IL models. The elements of critical thinking (related to these dispositions) are: interpretation, analysis, evaluation, inference, explanation and self-regulation.

Moseley et al (2004) helpfully divide the thinking skills frameworks they have evaluated into 4 'families':

'All embracing' frameworks which cover personality, thought and learning and deal with emotional and motivational influences as well as the structure of cognition.

'Designer' frameworks which deal specifically with instructional design and have cognitive rather than a more comprehensive theoretical base. These are more relevant to, and are used within, the educational field.

'Higher' order frameworks which are more philosophical in nature. They include critical and productive thinking and are concerned with higher-order processes leading to a judgement or decision (educational or political) where an individual strives to make the right decision or present a position honestly and clearly.

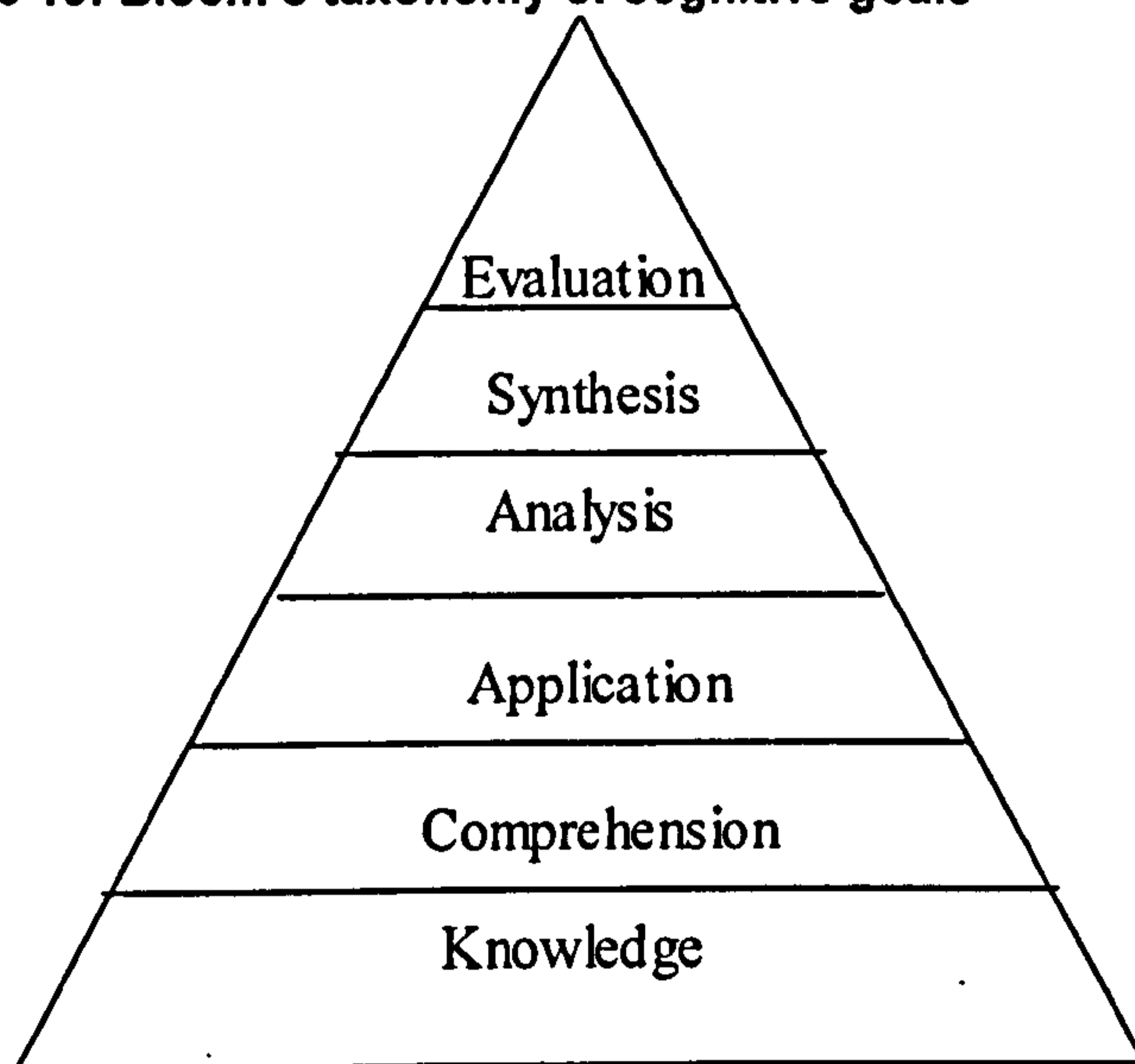
'Explanatory' frameworks, which are strongly grounded in psychological theory, are concerned with cognitive structure and or development either in intellectual aptitudes or stages of progression towards more complex or mature ways of thinking.

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<sup>27</sup> This is most striking in the information behaviour model put forward by Hepworth (2004)

What is clear from his evaluation is that Bloom's taxonomy<sup>28</sup> (see Figure 13 below) still underpin many of the theories analysed and indeed pervade education generally (Moseley et al, 2004). Interestingly, some of the main information literacy models use Bloom et al (1956) explicitly ACRL (2000) or resemble them implicitly (SCONUL, 1999 and Big Blue Project, 2002).

**Figure 13: Bloom's taxonomy of cognitive goals**



Bloom et al (1956 adapted from Moseley et al, 2004, p23)

To what these goals relate is described below:

'Knowledge' relates to remembering and retaining information and can be cued into the thinking process by asking students to say what they know or remember by describing, repeating and defining the information. This goal can be divided into three sub-sets, knowledge of 'specifics' for example, knowing what a Boolean operator is, 'factual'

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<sup>28</sup> Bloom's taxonomy (Bloom et al (1956) has recently been revised by Anderson & Krathwohl (2001, quoted in Moseley et al, 2004, p23-24). However, it still appears within the educational context in its unrevised form (Moseley et al, 2004).

knowledge for example, that *ScienceDirect* is an e-journals resources and knowledge of 'processes' for example, a method for finding a journal article in an e-journal service.

'Comprehension' relates to interpreting and understanding and can be cued into the thinking process by asking students to describe information in their own words, tell how they feel about it, say and/ or explain what it means, compare information and relate it to other information for example, noting similarities between a search engine and a library catalogue.

'Application' relates to making use of information and can be cued into the thinking process by asking students to state where it leads to, use the information to solve a problem or demonstrate its use in some way for example, by using their new knowledge of a title search on a library catalogue to find books from a reading list.

'Analysis' relates to taking the information apart and can be cued into the thinking process by asking the students to identify the constituent parts of the information, its order, its causes, the problems and/ or solutions it generates and its consequences for example, evaluating a web page by using a set of criteria.

'Synthesis' relates to putting the information together and can be cued into the thinking process by asking students to identify how the information may be different, what is missing, how it can be improved or developed or how the information can be re-created by the students in their own way. For example, students can demonstrate this by bringing together suitably evaluated material found using the search skills they have learnt about.

'Evaluation' relates to judging and assessing and can be cued into the thinking process by asking students to state how they will judge the information and pose the question, does it succeed in its purpose? It is also enabled by having students state why the information will or will not work and justifying their reasons for their judgements. For example, students decide which evaluated books, article and web pages to use or not use, and state why they have used it, to solve a problem or include in their assignment.

Importantly Moseley et al (2004) identify the practical applications of the theory families. Hence, Bloom's model is recognised as important in designing thinking skills programmes.

Biggs & Collis' (1982 quoted in Moseley et al, 2004, p21) SOLO (Structure of Observed Learning Outcomes) model (see Table 2) is identified as being useful for assessment of critical thinking. It is essential that we consider this model in more detail as it is vital in understanding the outputs within the educational context in general and may offer a potential way of measuring information behaviour and information literacy in particular.

It is argued that this model provides a systematic way of describing how a learner's performance may grow in complexity when mastering new tasks particularly those undertaken in education (Biggs, 1999). It is useful for defining curriculum objectives that describe performance targets or goals as well as for evaluating learning outcomes so that the levels at which individual students are performing can be identified.

**Table 2: Biggs & Collis' SOLO model (1982)**

<b>SOLO description</b>	<b>Capacity</b>	<b>Relating operation</b>	<b>Consistency and closure</b>
<b>Pre-structural</b>	Minimal: cue and response confused	Denial, tautology, transduction. Bound to specifics	No need felt for consistency: closure without seeing the problem
<b>Uni-structural</b>	Low: cue and one relevant datum	Can generalise only in terms of one aspect	No need felt for consistency: closed too quickly, jumps to conclusions, so can be very inconsistent
<b>Multi-structural</b>	Medium: cue and isolated relevant data	Can generalise only in terms of a few limited and independent aspects	Feeling for consistency: closure too soon on basis of isolated fixations so can reach different conclusions with same data
<b>Relational</b>	High: cue and relevant data and interrelations	Induction: can generalise within given or experienced context using related aspects	No consistency in given system, but closure is unique to given system
<b>Extended abstract</b>	Maximal: cue and relevant data and interrelations and hypotheses	Deduction and induction: can generalise to situations not experienced	Inconsistencies resolved: no need for closed decisions; conclusions held open or qualified to allow logically possible alternatives

Biggs & Collis (1982) quoted in Moseley et al, 2004, p21

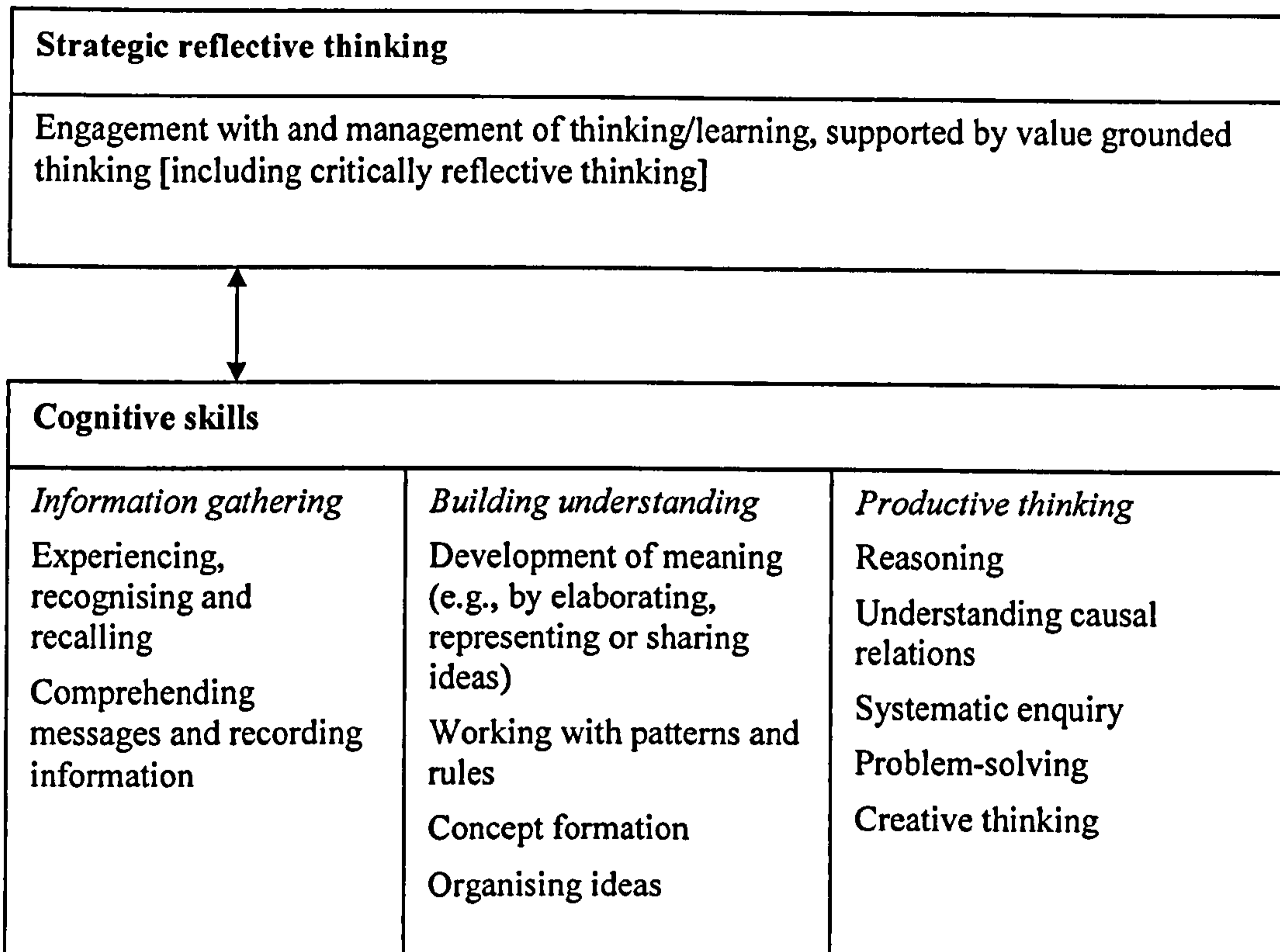
It must be noted that if this is used it has some limitations: the taxonomy does not take into account the social nature of interactions or the influence of affective and conative<sup>29</sup> dimensions of thinking because its focus is on student performance. This thesis takes the view that these dimensions are vital to an understanding of information behaviour and IL. However, because the overall context is an educational one this model is worthy of consideration.

<sup>29</sup> Expression of effort and the will to achieve (Moseley et al, 2004).



Moseley et al (2004) offer a new model of critical thinking which synthesises many of the ideas stated above and is represented below:

Figure 14: Moseley et al's Thinking skills framework



(adapted from Moseley et al, 2004, p45)

This model may be useful because it includes the higher order cognitive components of analysis, synthesis and evaluation identified by Bloom et al (1956) which also feature heavily in information behaviour models and IL models. It also includes conative and affective aspects of thinking which are featured specifically in information behaviour models. Information gathering is included as a specific component. The structure allows strategic and reflective thinking to be used in conjunction with information gathering, building understanding or productive thinking. However, the relationship between strategic and reflective or metacognitive thinking and cognitive skills is regarded as hierarchical in that information gathering comes before the higher level, strategic and

reflective thinking, rather than as part of higher order thinking itself. It should be noted that this view is at odds with and tends to contradict models of information behaviour put forward by Wilson (1999), Ford (2004) and Hepworth (2004). Nevertheless, this model is worthy of consideration because it synthesises a large and well researched field and its features are recognised as important within HE teaching and learning (Moseley et al, 2004).

Thinking skills programmes based on these ideas typically (as argued by Moseley et al, 2004) require students to plan, describe and evaluate their thinking and learning, or more succinctly 'plan-do-review', and implies that these activities can induce processes which produce desired mental products. Furthermore, the outputs from these activities can be assessed in a structured and meaningful way. In summary, thinking skills can be seen as a way of managing attention and working memory to enable conscious and unconscious activity to work together productively. This core idea has much resonance with IL models and explicitly form a part of Ford's information behaviour model (Ford, 2004) particularly regarding levels of critical thinking that students deploy in their information behaviour. Finally, for the purposes of this discussion, these thinking skills frameworks are regarded as residing within the 'constructivist' classification.

#### **2.4.6 Squires' conditions of learning model**

Squires' 'conditions of learning' (Squires, 19994) is included in this review because this meta-theory was used to underpin the *EduLib* training programme of 1997 and 1998 which was delivered to librarians involved in teaching information skills in HE (McNamara & Core, 1998). It is possible, therefore, that this approach underpins the teaching philosophy and pedagogic interventions of librarian teaching information skills and information literacy in some HE institutions. Consequently, his ideas may have influenced the delivery and construction of some IL models. Furthermore, it is also of interest because his model synthesises a number of seemingly opposing teaching and

learning philosophies. Squires (1994) appears to concur with Mayes & de Freitas (2004) who argue that learning theories have a greater degree of similarity than difference. Squires (1994) maintains that though the process of learning is a difficult concept to define and as we have seen above there are many theories. However, the conditions of learning of which the learning process is a part can be more readily identified (Squires, 1994). He maintains that there are a relatively small number of conditions which influence learning and offers us a model which details these. Squires (1994) argues that these should be analysed in order to understand how these factors affect learning. Squires summarises these conditions under four main headings and are set out below using the format as used in Squires (1994, p17):

A person who has a

**POSITIVE SELF-CONCEPT**

**OPEN MIND and the necessary**

**ABILITY who**

**PRIORITISES the**

Person

**ACTIVE and**

**REFLECTIVE**

**PROCESSING of**

**INFORMATION which is**

Process

**PATTERNED**

**MEANINGFUL**

**EMBEDDED and**

**EMBODIED**

Information

**In an environment which offers**

**STIMULUS**

**SUPPORT**

**FEEDBACK and**

Environment

## REWARD

(Squires, 1994 p17)

Each condition will be explained below with an indication of its theoretical origin.

### *Person*

Squires (1994) argues that people need to believe that they are capable of learning in order to do so and argues that this idea features strongly in humanistic and social models of learning. In addition, people need to believe that there is something to be learned and are open to new ideas, beliefs, habits, practices, relationships and approaches. This idea features strongly in cognitive theories (Gibbs, 1998c; Moseley et al, 2004). Furthermore, ability and how it is affected by ethnicity, environment and social situation is a factor and this is identified in some cognitive theories (Biggs and Moore's 'presage' factors, – see section 2.4.4 for more detail). Finally, for learning to take place the person must see it as a priority to do so in that the student is motivated in some way either internally or externally. Again, many cognitive theories reflect this idea (Race, 2001a; Race & Brown, 2001; Moseley et al, 2004) and this notion can also be found in some theories of information behaviour (Wilson, 1999; Ford, 2004; Hepworth, 2004).

- *Process*

This implies that learning is active from the most basic procedural skill such as, using a mouse to point and click through to more complex activities such as relating, questioning, re-constructing, interpreting and evaluating information for a project or dissertation. Squires (1994) calls this an 'attitude towards an approach' rather than an observable activity similar to surface and deep approaches to learning as put forward by Marton & Saljo (1997) and detailed above.

This active engagement requires a need to reflect during and after the learning event in that a learner thinks about the thinking itself and becomes more aware of oneself and the task at hand and the learning context (in essence a metacognitive activity).

Furthermore, Squires (1994) argues that only in the simplest learning situation does input equal output, more complex learning involves some degree of processing or transformation where the learner develops schemas, strategies, approaches and new ways of thinking. This notion features strongly in cognitive models of learning (Gibbs, 1998c; Race, 2001a & b; Hinett, 2002a & b; Moseley et al, 2004) and in current thinking regarding e-learning (Teles, 1993; Jonassen et al; 1995; JISC, 2004; Mayes & de Freitas, 2004). In short, learning can only occur when there is something to be learned not just facts but procedures, concepts, skills, ideas, emotions and perceptions.

- *Information*

When information is structured with advance organisers (Ausubel, 1967 quoted in Moseley et al, 2004, p12) such as instructions, signposts, learning outcomes, overviews, resumes and summaries it is more readily learnt and most learning is driven by the need to give form to content (Squires, 1994). Squires (1994) argues that when information is given meaning it can begin to be related to the learners own mental processes. In addition, meaning can have emotional and existential overtones not just in relation to how the learner thinks but in relation to his/her own identity (Squires, 1994). This argument is similar to the idea of self-efficacy expounded by Wilson (1999), Ford (2004) and Hepworth (2004). Squires (1994) notes that much formal learning can lie outside the learner's own situation and, therefore, cause the embedding of information to be problematic. Situated learning gives us sensible ideas on how to overcome this (Mayes & de Freitas, 2004). By contrast, Squires (1994) argues that most informal learning such as procedural knowledge and skills tend to be deeply embedded. Therefore, he maintains that learning can be reinforced in a very positive manner when people or teachers provide living examples or meaningful demonstrations of what can otherwise be a highly abstract activity or concept (Squires, 1994) in other words when it is highly contextualised and situated (in tandem with Jonassen et al, 1995). He calls this 'embodied information' and this echoes some of the ideas regarding the nature of an 'information provider' put forward by Hepworth (2004) and appears to be a critical consideration when examining the notion of information literacy.

- *Environment*

Borrowing from behaviourist theories Squires (1994) regards consciousness as a market place of competing interests and demands and unless the learning situation stimulates the learner in some way it will fail to engage initially and hold attention subsequently (Squires, 1994). In addition, he argues that learning also requires a measure of security, trust, support and the right mix of stimuli.

Squires (1994) also states that learning cannot be complete without gaining feedback on what has been done. It can be immediate feedback from a tutor or come after a time in the form of grades and comments on an assignment. It need not be immediate but should be timely, informed, informative and explanatory. This notion is a central feature for Kolb et al (1991) and Race (2001a); as well as in theories of critical thinking (Moseley et al, 2004); situated learning (Jonassen et al, 1995) and features in theories of information behaviour (Wilson, 1999; Ford, 2004; Hepworth, 2004).

Finally, Squires' model highlights the necessity for some kind of reward or punishment to be fed into the whole process to ensure that behavioural changes, defined by Squires (1994) as learning, don't 'fade'. These can come in the form of extrinsic rewards such as, a degree award and intrinsic awards for example, the fulfilment gained in handing in a considered piece of work (Squires, 1994).

Squires (1994) accepts that it is unlikely that all of these conditions could be produced at their optimum within every learning situation, but argues that strengths in one could compensate for weaknesses in others. He gives some relevant examples:

- A positive self-concept can outweigh a lack of support;
- Reflection can open a closed mind;
- Stimulating teaching can lead to a prioritisation of learning;
- Embodied and embedded information can transcend a lack of pattern and structure;

- Carefully constructed teaching can overcome disembodied or the irrelevant nature of some material.

Squires (1994, p26)

Squires (1994) argues that for any learning situation tutors should analyse these conditions for our learners and for ourselves to optimise as many of these conditions as we can to maximise learning. However, Squires (1994) suggests that it should be realised that some of these conditions will remain beyond the tutor's control. It would appear that the interactions these identified components produce may suggest possible hypotheses for testing.

## **2.4.7 E-learning**

### **2.4.7.1 Introduction**

The use of e-learning within the HE curriculum in the UK is now well established as part of the suite of pedagogical tools available to tutors particularly through the medium of VLEs (Jenkins, Browne & Walker, 2005). This e-learning landscape continues to change as social networking software tools become more easily available (Beetham & Sharpe, 2007). E-learning is now used across all subject areas (Jenkins, Browne & Walker, 2005) and (Beetham & Sharpe, 2007) note that developments in dentistry, English, History, law, social sciences and veterinary medicine are of particular interest. Jenkins, Browne & Walker (2005) observed that the majority of VLE usage activity was in terms of supplementing traditional delivery rather than exploiting the full range of features available such as quizzes and discussion boards. The use of e-learning is growing in FE in the UK (BECTA, 2006; 2007), however, recent analysis of provision show that whilst some excellent practice exists take up is uneven (Finlayson, Maxwell, Caillou, & Tomalin, 2006). Finlayson et al (2006) note that the use of e-learning in the curriculum

such as, searching for materials, e-mailing and using discussion boards, appears to have a positive impact on students in that it contributes to the autonomy of learners, that is it enables high interactivity and student control. Research carried out on masters distance learning students by McConnell (2006) corroborates this view. Finally, the private sector has also begun to harness e-learning as a training tool and a particularly good example can be found in the oil industry Collis & Moon (2005) which uses notions of communities of practice (discussed in section 2.4.3 above) as its pedagogical foundation enabling participative learning, that is high levels of discourse and creation of shared meanings.

This section outlines the e-learning context and indicates that when developing e-learning interventions it is necessary to take into account two important considerations: firstly, how to carefully plan what students actually do during their online learning endeavours which contains two sub strands of mapping theory to e-learning practice and how the role of online tutor differs from traditional delivery and secondly how to prepare the learner for this relatively new approach.

## **2.4.7.2 Planning for e-learning**

### *2.4.7.2.1 Mapping theory to practice*

Jonassen et al (1995) note that e-learning programmes fail because tutors bring assumptions about teaching and learning which are not theory based and do not translate well to e-learning delivery. Therefore it essential that, before embarking on the construction of an e-learning course, the ways in which existing theory can be mapped to e-learning must be understood (JISC, 2004; Mayes & de Freitas, 2004 and 2007). In mapping existing learning theory to an e-learning environment Mayes & de Freitas (2004) demonstrate how the three main learning theories, that of constructivist, behaviourist and situated, can be mapped onto the e-learning context. In doing so Mayes & de Freitas (2004) observe that these theories have more similarities than differences.



Interestingly, Mayes & de Freitas (2004) put forward the useful notion that these three perspectives may offer differing levels of analysis of the same thing, in a sense a 'nested' view, in that behaviourism analyses overt activities and their outcomes for individual learners. Whereas constructivist perspectives (including experiential learning and cognitive approaches) describe the detailed structures and processes that underlie individual learning as it is constructed and reconstructed. Finally the situative perspective (which is also known as social constructivism) describes activity at the groups of learners level where individuals participate and learn as members of a learning community.

Mayes and de Freitas (2004) argue that implementing e-learning will involve a mix of these approaches which involves learning as behaviour, learning as construction of knowledge and meaning and learning as social practice. Hence, it is unlikely that one single theory would map to a set of teaching and learning activities that were designed to achieve a particular set of learning outcomes. However, in the endeavour to create an e-learning environment it is essential that the tutor is aware of which theory and its associated pedagogy is suitable for a particular set of learning activities (JISC, 2004; Mayes & de Freitas, 2004).

This nested viewpoint (Mayes & de Freitas, 2004) fits very well with IL in that there is a great deal of procedural knowledge to be learnt as well as higher order learning of meanings and ideas to be recognised, shared with others, discussed and recorded as part of the process of becoming information literate. For example, when students come to do their research for an assignment they are confronted with a need to become information literate. One of their initial tasks is often to find out the procedural information that they need to know for example, click here, tick box there before they begin to deal with an information source at the cognitive level for example, constructing a search strategy and often do this as part of a wider community of students within a subject area and at a given level for example, undergraduate psychologists.

Mayes & de Freitas (2004) mention situated learning as (possibly) the most suitable for e-learning - though they (and JISC, 2004) do map all three theories onto e-learning structures/environments. Others (Teles, 1993; Jonassen et al 1995; Fowler & Mayes, 2000; Goodyear, 2001; Martin, 2003a; Garrison et al, 2003) move beyond this viewpoint and provide an emerging consensus that situated learning delivers the tools for the creation of a learning experience which is significantly different from traditional delivery – especially the notion of situated learning involving communities of practice in some form of collaborative goal centred problem-solving endeavour.

Mason (2004) sounds a cautionary note in that tutors should be aware that there is frequent incongruence between a tutor's articulated rationale for particular actions which he calls 'theory-in-action' and their underpinning theories. This difference between explicit and implicit approaches to teaching and the possibility that tutors can hold multiple and contrasting viewpoints at the same time is regarded as 'a significant contributory factor in the responses adopted or achieved by the learners' (Mason, 2004, p3). Therefore, this must at least be taken into account when planning e-learning.

JISC (2004) overview a number of learning and teaching theories challenging tutors to examine which assumptions and approaches underpin their teaching. JISC (2004) focus on Vygotskian principles of learning and how these have been translated into the situated e-learning environment. The idea of the 'scaffolding' of learning opportunities in particular has been examined.

'Scaffolding' is regarded as the structure used to design learning and teaching activities where the tutor provides the guidance to the individual learner and also promotes a role for the wider group, or community of practice, in the process (Mayes & de Freitas, 2004; McConnell, 2006). Mayes & de Freitas (2004) note that scaffolding draws on and exploits the Vygotskian notion of the 'zone of proximal development' (ZPD). ZPD is envisaged as a process by which skills, rules and knowledge involved in learning something are internalised by the learner which in turn create the cognitive tools to enable self-directed learning. This structure is recommended in the design of web-based

learning environments (Mayes & de Freitas, 2004) and should contain the following elements:

1. Provide learning activities that are part of real or simulated activity systems, with close attention to the tools and interactions which characterise real life situations. This context specific approach embodies the constructivist view of learning;
2. Structured interaction amongst participants. It should be noted that Mayes & de Freitas (2004) reports that there is relatively little research regarding group dynamics amongst students in an educational context either face-to-face or virtual;
3. Guidance by an expert. Mayes (1995) and Laurillard (1993) offer guidance regarding how this conversation or discussion should take place and be structured in an e-learning context;
4. The locus of control passes from the tutor to increasingly competent learners (McConnell, 2006). This is similar to the notion of 'fading' mentioned by Teles (1993) in the context of 'online apprenticeships' where the learner becomes able to do alone what formerly s/he could only do in collaboration with the tutor. As we have seen above as reported by Hepworth (2004) this locus of control notion is also an important feature in information seeking activity.

To make this structure a reality requires tutors to be effective 'scaffolders' through being sufficiently expert in their subject domain, to be able to judge individual learning needs, sufficiently skilled as teachers to adjust dynamically and continuously switch between the novice and expert perspectives the learner becomes increasingly competent. Teles (1993) gives us a specific example (in analysing and writing poetry) demonstrating how this can be achieved. Within the context of face-to-face tutorials Northedge (1998) regards scaffolding as way of enabling students to contribute and 'put themselves on the map' by employing strategies in which everyone has the chance to talk; to scale down the task and focus on the process rather than the content; to enable tutors to keep a clear vision of what is to be achieved and communicate it to students and to deter tutors from expecting students to be mind readers. In short the scaffold provides a structure for students'

thoughts and should provide a clear summary that brings closure to the task. Bordinaro & Richardson (2004) have successfully used scaffolding techniques to teach IL to students in face-to-face delivery. The absence of non-verbal cues and the text based nature of online communication necessitate detailed structures of this kind to be deployed in the e-learning medium in particular (Alpay, 2005).

The detailed interactions of tutor and learner can be made richer by exploiting some of the ideas regarding conversation theory such as Mayes (1995) and Laurillard (1993) which give us a detailed set of principles and structures to follow. However, scaffolding is not sufficient in itself and Teles (1993) identifies reflection, sequencing of instructions (similar to 'procedural facilitation' Jonassen et al, 1995, p18, and notions of behaviourist/associative learning) and peer collaboration as additional components to realise the goal of effective online learning.

Peer collaboration can be characterised as moving the learner from the individual learning mode implied above to the one-to-many described as necessary by Teles (1993), Jonassen et al (1995), Goodyear (2001) and McConnell (2006) as the most appropriate way forward for e-learning and, again, developed from notions of communities of practice (Hung & Chen, 2001). Understanding how people from communities come together, usually because they identify with something such as a need, a common shared goal and identity and translating this to the e-learning context, is a central consideration in constructing an e-learning environment (Hung & Chen, 2001). Goodyear (2001) gives practical guidance on how to achieve this in the e-learning context using Mayes' (1995) threefold classification of courseware.

Mayes (1995), reiterated by Goodyear (2001), draws a distinction between three levels of courseware used in e-learning contexts, that of primary, secondary and tertiary.

- 'Primary courseware' is used principally to convey information to students in the form of online lecture notes and reading lists, in other words subject matter (Littlejohn & Higgison, 2003; JISC, 2004). Mayes (1995) and Goodyear (2001)

regard this courseware as only useful in the conceptualisation stage of learning where students are exposed to other people's ideas and concepts (JISC, 2004).

- 'Secondary courseware' is used largely to question and encourage reflection in students via online tests and quizzes (Littlejohn & Higgison, 2003). These are regarded as tools for carrying out learning tasks (Mayes & de Freitas, 2004) one example would be computer aided assessment (JISC, 2004). Mayes regards this courseware as vital to the construction stage of learning where learners apply new concepts in meaningful tasks (JISC, 2004).
- 'Tertiary courseware' enables the production of materials by previous and current learners in the course of discussing and assessing their learning such as, dialogue between learner and tutor or peer discussion or assessment outputs to be captured and made available for all learners. This could be material compiled from: questions and answers and discussion typically generated in networked learning (Mayes & de Freitas, 2004); videoconferencing (JISC, 2004) or simulations such as the *Virtual Microscope* at the Open University (JISC, 2004). This capturing of online material, especially online discourse, allows students to read and re-read previous contributions before posting a reply. In effect, 'tertiary courseware' creates a 'cognitive space' (Garrison et al, 2003) where students can give a far more considered reply online than in the immediacy of a face-to-face conversation. Mayes (1995) and Goodyear (2001) regard this tertiary level as the only point at which learning, via this two way dialogue, can take place. Furthermore, McConnell (2006) regards this social dimension, embodied in online discussion and dialogue, as an essential pre-requisite in fostering effective learning in the online environment.

Therefore it seems reasonable to regard the use all three levels of courseware in designing e-learning in order to provide a variety of learning opportunities as the best way to maximise motivation and higher order learning in learners (JISC, 2004).

Jonassen et al (1995) map the change from objectivist or behaviourist philosophical learning and teaching to a constructivist epistemology and describe instructional systems that can support constructivist learning at a distance. Jonassen et al (1995) emphasise the

need for 'good learning experiences' in which the most valuable activity is the opportunity for students to work and interact together and to build and become part of a community of scholars and practitioners. It is maintained that this can be achieved when learners 'master new knowledge and skills, critically examine assumptions and beliefs, and engage in an invigorating, collaborative quest for wisdom and personal, holistic development' (Jonassen et al, 1995, p7). Technology should enable this in an 'extended classroom model'. In this instance the mediated instruction moves teacher from podium to the sideline to one of a facilitator of personal meaning making. They mention the significance of situated learning in that learning is context dependent where learning is increased when the learner attempts to solve real world problems. Learning in this sense becomes a social dialogical process in which communities of practitioners socially negotiate the meaning of phenomena via conversation (Jonassen et al, 1995).

Jonassen et al (1995) put forward the notion that learners should examine their thinking and learning processes; collect record and analyse data; formulate and test hypotheses; reflect on previous understanding and construct their own meaning. This separates this constructivist view from behaviourism in that the learner is seen as the central agent of learning rather than receiver of and mirror to reality. Furthermore, knowledge is seen as usable in new and different situations rather than inert.

Jonassen et al (1995) emphasise four central themes to learning:

Firstly, they identify need for 'context' in the learning situation. By this they mean a real world setting where the features replicated in the educational setting include physical, organisational, cultural, social, political and power issues in relation to the application of the knowledge being learned.

Secondly, they discuss the need for 'construction', in the learning context. They regard this feature as the active process of articulation and reflection within the context where learners are allowed to make their own meaning of what they experience rather than requiring them to learn the tutor's interpretation of that experience or content. The notion

of reflection in teaching IL has been adopted and use by Bordinaro & Richardson (2003) and Andretta (2005).

Thirdly, they identify the notion of 'collaboration' between learners as vital. In this instance, learners work with their peers throughout the learning process enabling them to develop, test and evaluate different beliefs and hypotheses within the learning context. This articulation enables learners to build new knowledge and modify existing knowledge. Garrison et al (2003) regard this as essential in building evaluative skills in order to enhance the 'social presence' that learners need to deploy in an e-learning context such as in online discussion.

Fourthly, Jonassen et al (1995) identify the need to promote 'conversation'. Laurillard (1993); Mayes (1995) and Goodyear (2001) also regard this as an essential part of the learning process. The collaborative process where learners negotiate plans for solving situated problems which involves reflecting on what is known, what needs to be known and the viability of various plans. Collaboration is essential because knowledge is language mediated and additionally problems are better solved when they are 'voiced' (Davies, 2000).

It is recommended by Jonassen et al (1995) that within the VLE context a resource-based approach will best deliver this educational model. They envisage a further dimension to this delivery embodied in computer-supported collaborative work experienced by learners either in synchronous fashion, meaning real time such as a 'chat room' online facility, or asynchronously, meaning delayed time between correspondence for example, e-mail or online 'discussion boards'.

Jonassen et al (1995) mentions reciprocal teaching which they define as, systematically alternating control between teacher and students which allows students to generate questions, summarise content, clarify points and predict forthcoming events and echoes some of the ideas put forward by Teles (1993), Salmon (2004) and Alpay (2005).

#### **2.4.7.2.2 *The changing tutor's role***

JISC (2004) note that in using the e-learning medium, especially VLEs, tutors may find that they are required to focus more on how students learn rather than how to teach and the tutor becomes more of a guide especially as the student becomes more independent. The focus ultimately moves away from subject content to activities which enable learning to take place. Goodyear (2001) summarises the changes as follows:

- From oracle and lecturer to consultant, guide and resource provider;
- Teachers become expert questioners, rather than providers of answers;
- Teachers become designers of student learning experiences rather than just providers of content;
- Teachers provide only the initial structure to student work, encouraging increasing self-direction;
- Teacher presents multiple perspectives on topics, emphasising the salient points;
- From a solitary teacher to a member of a learning team which can help reduce isolation sometimes experienced by teachers;
- From teacher having total autonomy to activities that can be broadly assessed;
- From total control of the teaching environment to sharing with the student as fellow learners;
- More emphasis on sensitivity to student learning styles;
- Teacher-learner power structures eroded.

Goodyear (2001, p91)

Goodyear (2001) emphasises the need to pay particular attention to what the learner will be doing – especially in terms of the mental activity in which students may be engaged and is termed ‘cognitive walkthrough’ (Goodyear, 2004, p98). Cognitive walkthrough is a method for working through learning resources attempting at each stage to determine what it is the tutor intends the learner to do and can be broken down into smaller



'learning functions' (Goodyear, 2001, p98) which may include, prior knowledge activation, motivation, hypothesis generation as well as other factors.

### **2.4.7.3 Preparing students**

Despite the fact that students expect technology to have a significant effect on their learning (JISC, 2004), drop out rates for e-learning courses will be very high unless students receive some sort of induction (Walker, 2003). Long (2003), Salmon (2004) and Alpay (2005) put it more strongly and agree that students should be given a set of principles which clarify in students' own minds what is expected of them and, in turn, what they should expect from the e-learning environment itself. From this it is clear that students need to be prepared for this new learning. Indeed, Goodyear (2001) states that e-learning in the form of VLEs in particular has a significant and radical impact on students' roles in that:

- Students move from passive receptacles for hand-me-down knowledge to constructors of their own knowledge;
- Students move from memorising facts to solving problems;
- Students view topics from multiple perspectives;
- Students devise their own questions and search for their own answers;
- Students work as group members on more collaborative assignments where group interaction increases;
- Students become more multi-culturally aware;
- Students work towards fluency with the same tools as professionals in their field;
- Students experience increased emphasis on learning as autonomous, independent, self-motivated and self-managed;
- Students experience greater discussion of their own work;
- There is a change in emphasis from receiving information from the teacher and learning to 'pass the test' towards using knowledge;

- Students have greater access to resources.

(Goodyear, 2001, p91)

Students need to know what to expect, why e-learning is being used and how it will benefit them as well as an explanation regarding how e-learning differs from face-to-face tuition. JISC (2004) recommends preparation via an induction which involves online discussion and quizzes to actively engage participants.

Salmon (2004) offers a five stage model (which is summarised below). The model is based on practical experience of delivering online courses in HE and is constructivist in nature. It structures the online experience for the learner in order to acclimatise and socialise them as follows:

**Stage 1: Access and motivation:**

Here the student should understand the need to put time and effort into online activity. It is also critical that appropriate and reliable IT is available with necessary technical support;

**Stage 2: Online socialisation:**

Now learners need to become comfortable with the online environment and socialise with other learners. To overcome embarrassment in making mistakes in front of others, the lack of non-verbal cues and the novel environment it is essential that learners feel respected and show respect to others;

**Stage 3: Information exchange:**

At this stage exchange of ideas and information becomes 'fast and furious' and learners interact with each other and web resources. Information overload and lack of structure can be experienced at this stage. Here the

role of the tutor is to intervene and give structure and organisation to exchanges;

**Stage 4: Knowledge construction:**

At this point the focus shifts to building an online community that is focussed on learning. Here the tutor relates back to theories encouraging learners to respond and providing summaries with a view to moving on to different topics;

**Stage 5: Development:**

At this juncture online learners begin to take responsibility for their own learning and become more confident critical thinkers where the focus is on high-level learning with the tutor encouraging discussion at a deeper level.

From experiences in the business sector Long (2003) recommends a blended approach to learning with a mixture of face-to-face, VLE and on-the-job training interventions rather than purely online delivery. Long (2003) puts forward seven principles which have some similarity to Salmon (2004):

1. Learners need to recognise that they are being asked to abandon familiar approaches to adopt a unknown threatening process;
2. Learners need to change their perspective to grasp the value of this new learning;
3. Learners need to recognise that they can engage in this successfully;
4. Learners need to be aware that the learning may not take a direct path;
5. Learners will need to adopt a positive attitude towards information processing, goal development and decision making;
6. Learners need a great deal of support, in the form of reinforcement and feedback, in the early stages when they may begin to doubt themselves;
7. Learners will not progress from highly dependent to independent learners after one activity.

Adapted from Long (2003, p8-9)

Alpay (2005) used e-mail as a collaborative tool for delivery of a particular course and found participation in online discussion inactive, disjointed and without focus. To remedy these issues Alpay (2005) suggests a set of four guidelines for online discussion:

1. Group goals must be explicitly identified and individual responsibilities and accountabilities established. A protocol for group discussion should be deployed which promotes discussion via effective mechanisms for clarification, evaluation and question-response actions as well as encouraging group members to interact over matters which may be causing personal tension.
2. Similar to Salmon (2004), Alpay (2005) regards the online facilitator role as essential for monitoring and supporting group discussions, maintaining communication protocols and encouraging reflection.
3. The use of a real-time 'chat-room' style interaction is encouraged in order to promote free casual discussion to garner immediate feedback and progression.
4. The need for some form of face-to-face interaction to supplement online discussion is regarded as beneficial to further promote group activity, clarify objectives and role differentiation. As well as, or alternatively, a pre-online discussion face-to-face meeting may establish group identity in a similar fashion.

Adapted from Alpay (2005, p14).

#### **2.4.8 Summary to Section 2.4**

In summary there appears to be some agreement between theorists concerning learning theory and Squires (1994) summarises them as:

- Learning involves change;
- This change is fairly permanent;
- Learning may involve a change in consciousness that is, how we think, or behaviour that is, what we do, but usually both;

- Learning comes about through interaction with elements in our environment such as, information, events, people (*especially peers*) and experiences which include but are not confined to teaching or training.

Squires (1994, p13 – 14) author's addition in *italics*

It appears to be a process which involves several concurrent and dynamic stages: wanting to learn (intrinsic motivation), needing to learn (extrinsic motivation), learning by doing (interaction with the environment and with others), learning from feedback (reflecting) and making sense of (re-conceptualisation and experimentation) and digesting (realising) what has been learned (a change in consciousness or behaviour or both).

From the discussion above it can be seen that all theorists agree that learning should be active with opportunities for students to work together in a personally meaningful way to solve highly authentic, contextualised and goal centred problems to create new understanding. In addition, learning outcomes, teaching interventions and assessment should be aligned to maximise learning. Using the nested view of learning theory to group activities appears to be useful and practical guidance. In addition, it can be seen that the teaching of critical thinking skills engenders goal directed behaviour and fosters self-regulation as well as higher order skills such as analysis and evaluation. These are also regarded as essential components within IL models – see section 2.2.

Furthermore, as shown above, an individual's motivation to learn is shaped by: internal factors characterised by presage factors such as personality, social background which affect learning styles and approaches to learning and external factors such as the learning environment itself. All of which require recognition within any learning delivery.

Recognising the components of effective learning in this way gives us the opportunity to create a motivational learning context which is stimulating and engaging.

It can be seen that reflection is regarded by all theorists as a critical feature of learning and is seen as essential in fostering deep learning. It appears to be an important part in

the metacognitive and self-regulatory aspects of learning. Hinett (2002a & b) regards reflection as an important way of enabling students to become more motivated by examining their affective (emotional) states and how this contributes to the effectiveness of their learning. It underpins the notion of learning as a highly iterative and personal activity. Timely feedback in a learning situation is seen as an important corollary, and additional motivating factor, in this aspect of learning.

Highly authentic, contextualised, goal-centred problems and reflective learning can be realised in the e-learning context by the scaffolding of learning opportunities. This structure is seen as particularly useful in the e-learning environment as it offers additional guidance on how structure and support learning at a distance in particular the notion of situated learning or community of practice which describes how students should be encouraged to work together online. Goodyear (2001) in his separation of courseware into primary, secondary and tertiary function provides a useful practical structure for effective exploitation of the e-learning medium and in turn maximising learning.

The theories outlined above (particularly constructivist and situated) appear to offer the most appropriate way forward in terms of envisaging learning and thinking (particularly in the e-learning context) because they put the student at the centre of the process stressing the highly context specific nature of this behaviour. For this reason there would appear that there is some resonance with these theories and the models of information literacy and information behaviour examined in this review.

## **2.5 Conclusion to Chapter 2**

### **2.5.1 A provisional model synthesising learning theory, e-learning recommendations, models of information behaviour and information literacy**

The theories and models examined in the previous sections above give us an indication as to which features should be included in an IL programme in HE whether it be delivered in traditional, online or blended fashion. Some tentative conclusions, based on the discussions above, regarding the features an IL programme should exhibit are offered below.

Despite the large number of IL models in existence it can be seen that these display a greater number of similarities than differences. Where they do tend to differ is in their level of articulation. It is further posited that models which contain a greater degree of articulation are more likely to be useful, in that, the standards or facets or pillars that make up these models can be readily disaggregated into components which can be expressed as intended learning outcomes.

For example here is part of the ANZIIL Standard Two Learning Outcome 3 example 2.3 Bundy, 2004):

‘The information literate person finds needed information effectively and efficiently.

#### *Learning outcomes*

##### *2.3 Obtains information using appropriate methods*

Example from 2.3: uses various information access tools to retrieve information in a variety of formats [...]

Bundy (2004, p15)

This can be made far more detailed for the proposed teaching intervention by adding to the learning outcomes and expressing these as 'intended learning outcomes' in the following manner for example,

At the end of the session students will be able to:

- Recognise their information need by identifying appropriate keywords;
- Use common Boolean terms 'and' 'or', 'not' to construct a simple search strategy;
- Identify appropriate electronic resources such as the Library Catalogue, e-journals and e-books and use them appropriately by:
  - Exploiting the Library Catalogue through:
    - Locating it on the web;
    - Using the Alphabetical facility to find book, e-book and journal resources;
    - Using the Advanced search facility to find resources on a particular topic,
    - Locating books and journals on the shelves.
  - Exploiting E-journal resources through:
    - Locating it on the web;
    - Using the search facility to find appropriate journal articles including:
      - Simple keyword searches;
      - Phrase searching;
      - Using truncation and wildcards;
      - A combination of the above search tools to create a search strategy;
    - Using navigation tools to read and/ or print journal articles;



This is regarded as a highly important consideration because it assists in the creation of a deliverable programme because intended learning outcomes orientate students to the subject area and guide teaching, learning and assessment strategies. Intended learning outcomes are recommended as the best way of planning for student learning by Race & Brown (2001), Reece & Walker (2003), Walton (2005) and the QAA (2006) regard them as an ideal way of focussing learning.

Another essential consideration is whether the IL models evaluated have featured in HE teaching & learning programmes because in so doing they demonstrate that they have been used and re-used in real settings with real students. The ANZIIL model (Bundy, 2004), because it contains greater detail, is a development of a well established, widely used model and is utilised in many HE institutions in Australia, is regarded as potentially the most appropriate model to choose as a basis for an IL programme. In addition, the model is accompanied with a set of recommendations which highlight how information professionals should carry out liaison with faculty and curriculum administrators to maximise the possibility of a subject based programme which is sustainable at every level.

However, as the analysis in section 2.3.2 demonstrates IL models are insufficient in themselves in addressing the issues that contribute to effective information behaviour and therefore enable information literate individuals. Cheuk (1998) and Hepworth (2003) note that carrying out a search in order to retrieve information is a highly complex iterative activity in that it can: involve progress and abandonment; be by turns ordered, disordered and regular. Neither do they, as noted in previous sections above, take sufficient account of issues that teaching and learning theory identify. All of the IL models describe the process as going forward in an orderly fashion. However, it must be borne in mind that these models are abstractions and writers such as, Gibbs et al (1998), and Race (2001a) state that learning in general is probably not like this.

In recognition of these issues it is recommended that the new IL strategy is regarded as a metacognitive tool which provides a self-regulatory framework within a subject based

programme. It must be recognised that the abstraction, in this case an IL model, does not provide the goal but is the thinking skills framework which enables the goal to be realised. Only through goal centred activity, such as problem-based learning and particularly focussed on professional issues, will this really occur (Mason, 2004). For example, Jonassen et al (1995) argue that retrieved information can be used to support a position in a computer conferencing discussion. In that knowledge construction is fostered through the intentional searching process and through linking information to the learner's own schema. This intentional goal-orientated behaviour carried out by the learner whilst for example, doing a database search facilitates and strengthens connections between retrieving information and using it in an appropriate context which results in higher-order thinking and meaningful learning (Jonassen et al, 1995). Hence, an IL framework should be regarded as a component within the scaffolding process rather than the goal of the learning activity itself.

Therefore, what must be avoided is to over emphasise the IL case and make it an end in itself: information needs are only likely to be secondary at best (Wilson, 1999; Case, 2002). For this reason IL models require other features to be 'wrapped around' the delivery structure and contextualised within a subject area to create an effective programme. It is to some of the notions found in theories of information behaviour and teaching and learning that we must turn in order to complete the framework:

1: There appear to be a number of common factors within information behaviour and teaching and learning theory which impinge on the IL process. Both sets of theories identify the role of context as a central factor in information behaviour and in learning. Therefore, to address this, it is suggested that an IL programme should be embedded within subjects, that is, highly situated and not taught as a generic set of skills.

2: IL models mention the iterative or recursive nature of the process but it is information behaviour and teaching and learning theory that identify the structures required to realise this central component in practice. It is argued that this can be done through the use of structured reflection and feedback as recommended by Teles, (1993), Jonassen et al

(1995), Hinett (2002a & b), Cowan (2002), Walker (2003), Littlejohn & Higgison (2003) and specifically for online contexts see Mayes & de Freitas (2004) and JISC (2004) using reflective questions drawn from the numerous examples given by Race (2001b) ensuring that feedback, and in effect increasing the role of formative assessment<sup>30</sup>, is relevant and timely. Salmon's five stage collaborative model (Salmon, 2004) can draw upon which is a scaffolded approach to online collaboration and reflection, as discussed in section 2.4.7, to structure this in an online setting and realise the goal of peer to peer and peer to tutor conversation. This conversation is regarded as necessary in enabling students to learn how to negotiate and reflect on what is known and needs to be known (Jonassen et al, 1995). This not only gives structure to, and completes, the process but also enables students to become more aware of how they do something and in turn become better learners. From the tutor's perspective it enables outputs and engagement by students for example, via e-mail exchanges or 'chat-room' facilities in a virtual learning environment to be monitored. Hence, offering a highly contextualised, discursive and collaborative mode of learning.

3: Motivational issues (needs and wants) are more likely to be addressed by this highly structured, contextualised and scaffolded format by engaging with students' subject interests and building confidence where risks are taken later on in the process, in essence the locus of control gradually moves from the tutor to the student. The reflective dimension can be used to directly to address affective issues because, 'encouraging students to articulate their feelings about learning helps them to come to terms with strengths and weaknesses' (Hinett, 2002a, p8) and have a beneficial affect on conative aspects like self-efficacy which may, in turn, lead to a more positive attitude to learning. However, it is recognised that assessment remains the greatest external motivator (Fry et al, 1999).

4: It is argued that this structured approach, which gives form to the iterative process, may obviate the barriers to successful information behaviour and by the same token,

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<sup>30</sup> This is designed to provide learners with feedback on progress (via self, peer or tutor led assessment) and informs development, but does not contribute to the overall assessment.

avoid either a failure to find relevant information or indeed avoid retrieving too much information. This experience may be alleviated by giving students a recursive structure to 'fall back on' which in turn gives them more confidence to try again. This, it is contended, will minimise feelings of stress by engendering feelings of being able to cope with risk leading to greater rewards via more fruitful information gathering and ultimately a greater degree of positive feedback from the tutor in an assessment.

5: It is argued that all of these structures used together are more likely, though there are no guarantees, to foster a deep learning approach in students. What is less readily addressed is the issue of learning styles. Section 2.4.4 above outlined many of the learning styles, many of which overlap, which must be addressed in the learning situation. Students are individuals who come to the learning situation with their own presage factors of which learning styles are a part. Saroyan & Snell (1997); Race & Brown (2001) and Webb & Powis (2005) argue that the most effective and realistic way to deal with this is via pedagogical sophistication known in the vernacular as an 'eclectic' approach to teaching. This requires tutors to design learning opportunities which contain as many teaching formats as possible, for example a lecture should contain opportunities for discussion, answering questions, 'filling in the blanks' in a printed resource and so forth. A workshop should contain some form of mini-lecture exposition with a demonstration, some form of activity, individual and some form of group work, either via PC or using printed resources, solving a problems etc and where PCs are used tutors should employ 'touring' (Gibbs, 1998a, p15) in order to ensure that students are engaged and on task. MacKeracher (2004) argues that for learning to be truly transformative and empowering tutors should ensure that group work provides students with opportunities to interact as equals with each other and the tutor, in order to promote the negotiation of shared meanings. It is also recommended that some form of diagnostic assessment<sup>31</sup> is used to clarify the skills students bring to the learning situation. By adopting this approach tutors are more likely to engage the learning styles that students draw upon to

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<sup>31</sup> Diagnostic assessments recommended by the QAA (2006) and used in electronic fashion by Andretta (2005) offer way of auditing student skill levels on entry to an award or module. This can either be used either by the tutor to tailor teaching and learning or as a benchmark from which students can reflect on their progress.

learn. In the online environment courseware would be used: in primary mode to provide subject based information for example, via a web page: in secondary mode to provide interaction with the information provided for example, via a quiz: in tertiary mode to provide a problem to be solved via the collaborative, reflective scaffolded structures outlined above.

6: It is argued by Squires (1994) that activities which involve IT skills such as, learning how to find, access and use a database like *PsycINFO* should be constructed using behaviourist methods where logical step-by-step instructions are used to build student skills and confidence in using these tools. A different approach is recommended when higher order skills are needed for example, to create a search strategy from an assignment title, a scenario or to evaluate information for its suitability. This may be addressed by some form of constructivist or situated approach using a subject based problem to promote critical thinking again realised using the structures outlined above. For all these activities Goodyear (2001) recommends that tutors engage in cognitive walkthrough to achieve this that is, it is essential that tutors know what students will be doing for each element of an activity.

7: It is essential that protocols for interaction between students are devised where group work is concerned to foster collaboration and negate the feelings of isolation associated with e-learning (Walker 2003; Salmon, 2004; Alpay, 2005). Alpay (2005) recommends that these are devised by the tutor, whereas Thorley & Gregory (1994), Goleman (1995) and Hayes (1997) recommend that these are devised by students under the guidance of the tutor. The relevance of this is particularly acute in the online environment where student rarely or in some cases never meet as a group and the normal group interaction cues for example, non-verbal cues are missing (Salmon, 2004). It is suggested that this would form part of an overall induction to the online learning environment.

With particular reference to the online environment JISC (2004) states that Virtual Learning Environments (VLEs) are designed to support and enhance student learning and defines a VLE as the components in which learners and tutors participate in online

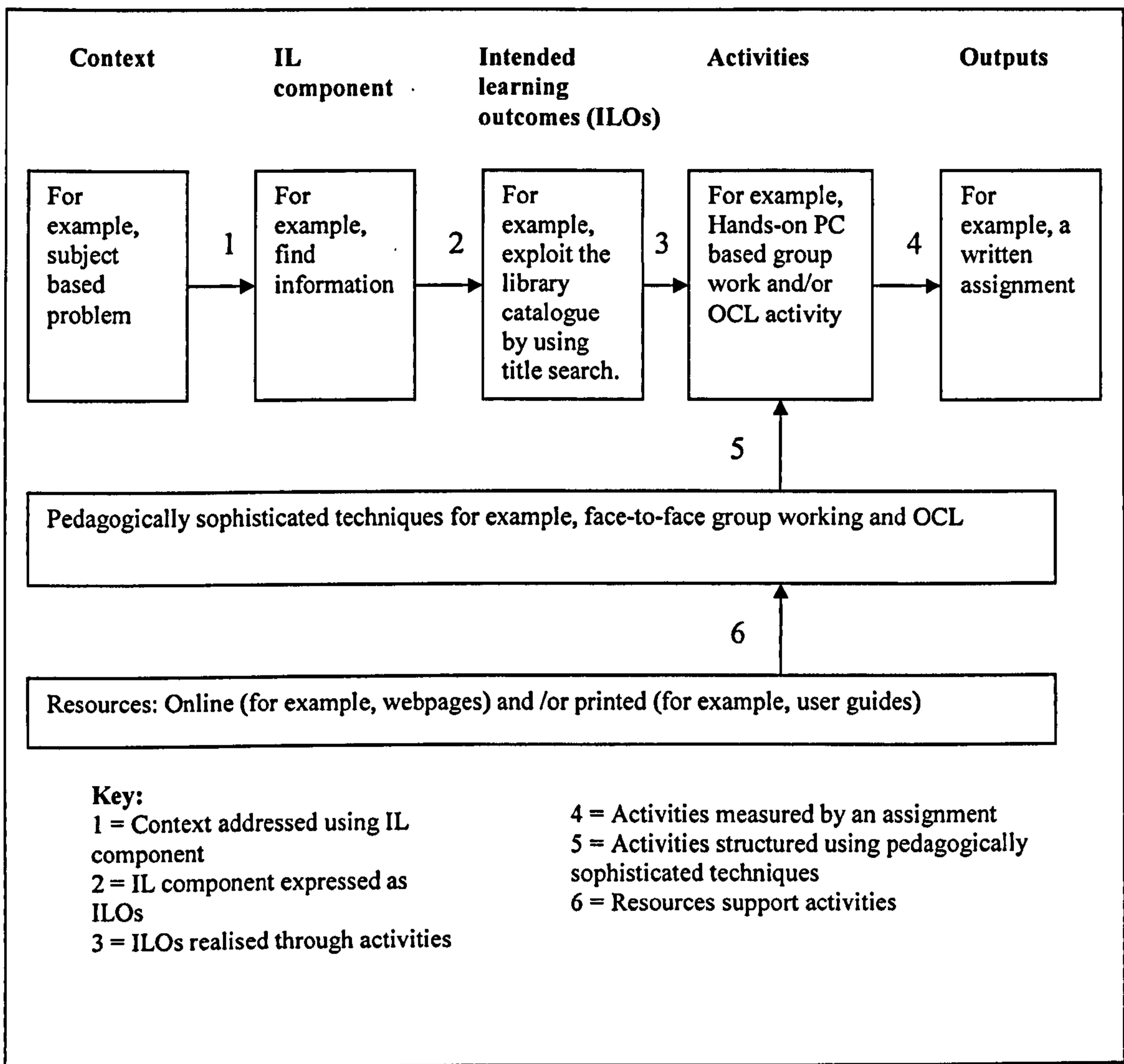
interactions of various kinds including online learning (e-learning). However, JISC also note that VLEs can act as the focus for students' learning activities (as well as their management and facilitation) and as result implies that not all the interactions have to be online. These systems enable the student tutor interaction to take place remotely as well as locally or face-to-face. For the student group it means that students can work in a collaborative manner to share and generate knowledge within the VLE without having to travel from their local setting to achieve this.

There are many commercial VLE packages available (for example *WebCT* and *Blackboard*) along with open source packages such as *COSE*. Staffordshire University uses both Blackboard and COSE. Blackboard is the main VLE delivery tool for the University and it is assumed that it will be used to deliver the online component of an IL learning and teaching intervention devised here.

It is recognised that though these structures and resources attempt to address the formal learning context there is also an informal learning context which takes place outside this intervention via peers, family, and the media. In so doing it is recommended that tutors encourage students to use these avenues to enrich their learning experience.

Bringing these notions together provides us with a highly detailed provisional model ready for delivery and testing shown in Figure 15 below.

Figure 15: A provisional model for delivering IL teaching & learning in a blended setting:



### **3 Research Questions, Methodology, Research Strategies & Ethical Considerations**

#### **3.1 Introduction**

This chapter restates the research questions to be asked in order to address Objective 2. To carry out this research in a professional manner it was necessary to have a methodological foundation based on sound philosophical principles. These are put forward below and discussed in detail. In addition, a set of ethical principles were devised and these are outlined below.

#### **3.2 Research questions**

Based on the literature review the following research questions were proposed:

1. Does the teaching of information literacy in a blended environment (using face-to-face and OCL IL learning opportunities) structured using a scaffolded approach improve students' learning of IL?
  - a. What kinds of reflective practice questions best aid students in collaborating online?
  - b. Are tutor online interventions (specifically summaries of online postings from the group) perceived by students as a useful way of distilling output from the group for later use?
2. How do psychological states associated with information behaviour and thinking help explain the learning processes in an information literacy blended learning and teaching intervention?



### 3. Hypothesis A

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater degree of knowledge in information literacy at the end of a module than at the outset than students who have not been exposed to OCL (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001).

### 4. Hypothesis B

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater ability to apply evaluation criteria in their assessed work than students who have not been exposed to online collaborative learning (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001). This will be manifest in two ways:

- (i) students who participate in OCL will tend to use a greater variety of evaluation criteria in their assessed work and
- (ii) will tend, on average, to use these criteria more frequently.

The methodological basis for these research questions, the research strategies they imply and how they were to be answered are set out below.

### 3.3 Methodology

#### 3.3.1 Research Philosophy

This research seeks to test out ideas, structures and principles identified in the literature review (see Figure 15 section 2.6.1) which make up the *provisional model for delivering information literacy teaching and learning in a blended setting* and because of this it is argued that this research is generally considered as ‘testing-out’ research rather than ‘problem-solving’ or ‘exploratory research’ as defined by Phillips & Pugh (2000). The testing-out approach to be adopted will involve attempting to:

1. locate the limits of previously proposed generalisations for example, students prefer learning by doing, where the amount of testing out to be done can be endless and continuous;
2. improve by specifying, modifying and clarifying for example, through trying out an online delivery technique, the important but possibly dangerous generalisations on which a discipline is based and develops from (Phillips & Pugh, 2000). For example, the view that online discussion groups facilitated using a scaffolded collaborative approach enhances learning for students working in an online setting that is, the employment of tertiary courseware (Goodyear, 2001) as discussed in section 2.4.7.

It is argued that there is no need to take an exploratory approach - which involves investigating an area where little previous knowledge is available and as a consequence the research idea at the outset is not well formulated (Phillips & Pugh, 2000) given that there are many theories, for example Kolb et al (1991), and some knowledge in this area, for example Moseley et al (2004), as shown in the literature review. Additionally, the problem-solving approach, which usually involves the deployment of a variety of theories and methods cutting across disciplines, is also rejected because it is likely that real-world problems are likely to prove too complex and insoluble within the confines of one

academic domain (Phillips & Pugh, 2000). However, it should be noted that the testing-out approach carried out here took place in a real-world setting.

This research seeks to uncover to what extent a scaffolded collaborative working structure (following Teles, 1993; Jonassen et al, 1995; Mayes & de Freitas, 2004; Salmon, 2004) will affect either positively or negatively students' learning of IL, using an IL model or models or parts of models identified in section 2.2, by investigating the objectives set out above. Given that the primary focus concerns the outputs and interactions between individuals and how they perceive these interactions and outputs it is argued that the underlying 'epistemology' for this research should be that of 'interpretivism' and the subsequent 'ontology' should be that of 'social constructionism' or 'constructivism' as put forward by Bryman (2004) in order to achieve a robust methodological foundation.

Therefore, this research should not be considered a natural scientific study. However, this is not to say that it does not embody a 'scientific attitude' as put forward by Robson. Robson (2002) argues that a 'scientific attitude' is demonstrated by giving systematic serious thought to: what is being done; how to do it; making explicit observations that are made; the role of the observer; approaching the subject sceptically so that research ideas are open to disconfirmation and that the whole endeavour follows a code of conduct, that is, that it is ethical. Specific ethical criteria are set out in section 3.5 below. These approaches and their underlying philosophical assumptions beg many questions which require further detailed examination and justification.

Epistemology, which is a branch of philosophy concerned with theories of knowledge, assists us in understanding these assumptions concerning how and what we can know (Willig, 2001). This involves thinking about the nature of knowledge itself, its scope and the validity and reliability of claims to knowledge. Research methods provide ways of approaching and answering research questions and therefore gaining new knowledge. Research questions provide the route to that goal. Hence, we need to identify the research goal, justify the choice and have a sense of what the limits of the research are, in

short, we need to adopt an epistemological position. There are several epistemological positions which all imply their own methodology; the reasons for taking an interpretivist stance are detailed below.

### **3.3.2 Epistemological considerations**

The central question regarding methodology is whether or not a natural science or 'positivist' model of the research process is suitable for studying the social world and is the social world something external to social actions or something that people are in the process of fashioning? Differing epistemologies indicate the extent to which our understanding of the world can approach objective knowledge or even truth. The spectrum ranges from 'naïve realism', a notion akin to positivism, to extreme relativism, which bears similarities to constructivism, which rejects concepts of truth and knowledge altogether (Willig, 2001).

Positivism and its associated concepts 'empiricism'<sup>32</sup> and 'hypothetic-deductivism'<sup>33</sup> characterised as the traditional approach to science, especially natural science, is a theory of knowledge which regards the relation between the world and our perceptions, and therefore our understanding, of it as straightforward. This position assumes that the world itself such as, objects, events and phenomena determine that there is one single correct view that can be taken which is independent from the process or circumstances of viewing. Positivism assumes that all research will produce objective knowledge where understanding is unbiased and without personal involvement or vested interests on the part of the researcher. However, it is generally accepted that observation and description

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<sup>32</sup> Empiricism is used in a number of ways but two stand out (Bryman, 2004). Firstly, that which regards knowledge as being derived from facts of experience and can be gathered systematically that is, through experimentation and not generated from theory (Willig, 2001). Secondly, the belief that the accumulation of facts is a legitimate end in itself, this is usually characterised as naïve empiricism (Bryman, 2004). In brief only knowledge gained through experience is valid and these experiences should be tested before being accepted as new knowledge (Robson, 2002).

<sup>33</sup> Hypothetic-deductivism seeks to test hypotheses in order to find evidence which confirms or refutes a theory and by so doing research moves incrementally closer to the truth where variations in data are acknowledged (Willig, 2001).

are selective and our understanding of the world is in turn partial (Willig, 2001). Kuhn (1970) argues that scientists rarely attempt to test existing knowledge by seeking alternatives to established beliefs but prefer to find methods which substantiate existing beliefs. It has been found that there are many ambiguities in the results of scientific experiments and unexpected flexibilities in theory (Walliman, 2001). Therefore, it can be concluded that science itself depends upon what society accepts as believable, in essence it has a social context and as a consequence can be regarded as socially constructed (Walliman, 2001; Willig, 2001).

We have an individual interpretation of external reality, based upon our own interpretation of the world. This has implications for reliability because it is believed that personal perceptions cannot be reliably shared (Willig, 2001). It should be recognised that whilst our understanding of a situation may lead to greater knowledge, it is not always possible or even desirable to ensure that this understanding can be made into a generality.

'Interpretivism' rejects many of the tenets of positivism in relation to social research questions as do other epistemological critiques of positivism such as the 'feminist critique' and the 'barriers approach' which is a 'disability critique'. This takes the following position: the argument which states that direct experience is the only means by which a sound basis for scientific knowledge can be provided should be rejected; the language of observation and the language of theory are inseparable; theoretical concepts do not have a direct correspondence with reality as observed and that facts and values are inseparable (Robson, 2002). Interpretivism holds that: social phenomena exist in the minds of people it is not 'out there'; reality can only be defined subjectively, it is interpreted social action; quantitative measures are unable to capture the real meaning of social behaviour; quantitative measures narrow human experience by directing research only to that which is perceived by the senses and by employing only standardised tools based on quantifiable data to test hypotheses (Robson, 2002). This theoretical outlook strongly resembles notions of current teaching and learning practice and thinking skills expounded by Kolb et al (1991), Biggs & Moore (1993), Fry et al (1999), Race (2001a)

and Moseley et al (2004). Therefore, where social action is concerned and particularly within the context of learning, it would appear that qualitative strategies provide a more appropriate methodological way forward than quantitative strategies. However, this thesis does not entirely reject the need for hypotheses to be tested. Consequently a quantitative strategy was adopted for part of this research and how this was done is explained in section 3.4.2.

Interpretivism respects the differences between people and the objects of the natural sciences and as a result requires the social scientist to grasp the subjective meaning of social action (Bryman, 2004). Hence, the study of people requires a different logic of research procedure – one that reflects the distinctiveness of humans as opposed to the natural order (Bryman, 2004). The natural world has no meaning for the molecules and atoms studied only the observer that is, the scientist. However, the world has a common sense meaning for the subject of study that is, people, as well as for the observer that is, the social scientist. Therefore, to grasp social reality social research must attempt to gain access to people's common-sense thinking and interpret their actions and views from their perspective whilst recognising that the researcher also has a view which is brought to the research situation (Bryman, 2004). The researcher's role is addressed by means of 'reflexivity' (Bryman, 2004, p543). The notion of reflexivity is discussed in more detail below.

This research accepts this view and argues that interpretivism (rather than positivism and its associated approaches) is a more productive epistemological stance to take when researching human actions and interactions. This stance strongly echoes the theoretical and empirical evidence put forward in the literature review by Kolb et al (1991), Biggs & Moore (1993), Fry et al (1999), Race (2001a) and Moseley et al (2004). This now establishes a position regarding epistemology and a way of addressing the question 'How we can know?' It is also necessary to recognise the kinds of assumptions that methodology makes about the world. To achieve this, the ontological position this research can adopt in order to answer the question 'What is there to know?' must be considered. This is discussed in more detail below.

### **3.3.3 Ontological considerations**

Ontology is primarily concerned with theories regarding social entities. It is argued that there are two distinct ontological positions to consider that of 'objectivism' and 'social constructionism'. 'Social constructionism' acknowledges that the experience of the researcher and the subject is mediated by history, culture and language (Bryman, 2004). Therefore what we perceive in the world is not a direct reflection of these factors but a specific reading of these. Again strongly resembling the ideas put forward by Kolb et al (1991), Biggs & Moore (1993), Fry et al (1999), Race (2001a) and Moseley et al (2004). Social constructionism seeks to recognise that there is no single knowledge to be discovered but many knowledges to be revealed. It dovetails neatly with interpretivism - in that social phenomena exist in the minds of individuals and not 'out there' - and is the antithesis of objectivism; a positivist ontology which takes the view that social phenomena and their meanings have an existence that is independent of social actors (Bryman, 2004).

Social constructionism directly recognises the issue of reflexivity – that the researcher directly affects the research process in that, an awareness is required of the researcher's contribution to the construction of meaning throughout the research process (Willig, 2001). In addition, it requires an acknowledgement that it is impossible for a researcher to remain outside one's subject matter whilst involved in the research in question. It is essential to recognise that the ways in which the researcher's involvement and influence on a particular study effects and inform such research (Willig, 2001) for example, because the tasks and boundaries of the environment in which students will work are set by the researcher, acting in the role of tutor, there is bound to be an affect on student behaviour which may not occur if the researcher were not also the tutor. There are two types of reflexivity to examine that of 'personal' and 'epistemological'.

### 3.3.4 Reflexivity

Personal reflexivity involves reflecting on the ways in which our own values, experiences, interests, beliefs, political commitments, wider aims in life and social identity shape the research (Willig, 2001). For example, for the purposes of this research; it is explicitly recognised that the researcher is committed to the idea of embedding IL or information skills into the subject curriculum. In addition, it is imperative that the ways in which the research has changed the researcher as a person (Willig, 2001) for example, it may cause the researcher to reflect more deeply on delivery; use different learning and IL models to realise delivery.

‘Epistemological reflexivity’ requires us to engage in questions such as:

- How has the design of the study and the method of analysis<sup>34</sup> informed the data and findings for example, is using Gratton and Jones’ content analysis<sup>35</sup> framework (Gratton & Jones, 2004) as an analytical tool likely to cause inbuilt assumptions which may lead to a certain way of thinking when analysing the findings?
- Were there other ways in which the research question could have been investigated for example, a different quantitative approach?
- To what extent would this have given rise to a different understanding of the phenomenon under investigation?

In essence, epistemological reflexivity assists us in reflecting upon what assumptions about the world and knowledge that have been made during the research and helps to understand the implications of such assumptions for the research and its findings.

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<sup>34</sup> See section 4.3.5.

<sup>35</sup> A way of analysing documents and text which attempts to quantify content by using predetermined categories in a systematic and replicable fashion – parallel approaches are semiotics and ethnographic content analysis.



Now that an idea regarding what can be known about reality is established, it is now necessary to determine a position regarding discovering and measuring social reality and notions regarding the limits to this discovery and measurement; in short a set of research strategies.

### **3.4 Research Strategies**

From the underlying philosophy outlined above two strategies are proposed:

- qualitative and
- quantitative

#### **3.4.1 Qualitative strategy**

Inductive reasoning<sup>36</sup> using constructionist ontology based on an interpretivist epistemology (where the role of reflexivity is acknowledged) was employed to examine the process of learning IL in an online collaboration setting through a *qualitative strategy*.

This element of the research was designed to answer the question:

1. Does the teaching of information literacy in a blended environment (using face-to-face and OCL IL learning opportunities) structured using a scaffolded approach improve students' learning of IL?
  - a. What kinds of reflective practice questions best aid students in collaborating online?

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<sup>36</sup> The process of induction involves drawing generalisable inferences from observations, in other words theory is the outcome of the research. Inductive reasoning is associated with qualitative strategies and deductive reasoning is associated with quantitative strategies.

- b. Are tutor online interventions (specifically summaries of online postings from the group) perceived by students as a useful way of distilling output from the group for later use?
2. How do psychological states associated with information behaviour and thinking help explain the learning processes in an information literacy blended learning and teaching intervention?

Research questions 1 and 2 were addressed by using Focus Group interviews, questionnaire data, assignment data in the form of written reflective practice statements, OCL output in the form of student postings and interview data from the module leader. How these techniques were deployed is set out in the Pilot Qualitative Strategy detailed in Chapter 4.

### **3.4.2 Quantitative Strategy**

Whilst qualitative and quantitative strategies are regarded by some as incompatible (Willig, 2001); Robson (2002) argues that in fact these seemingly opposing methodological viewpoints share some common epistemological assumptions that:

- enquiry is value-laden;
- facts are theory laden;
- reality is multiple, complex, constructed and stratified; and
- any data set is explicable by more than one theory.

Therefore, it is appears that a research strategy can legitimately accommodate these two positions and be highly pragmatic rather than dogmatically adhere to a single epistemological position which may lead to valuable research and data-gathering opportunities being lost. For this reason this research will also adopt a quantitative strategy in order to create an opportunity for triangulation.

This quantitative strategy will deploy deductive reasoning<sup>37</sup> using an objectivist ontology based upon a positivist/realist approach.

Hence, this part of the study necessitated that two hypotheses were devised and tested:

#### Hypothesis A

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater degree of knowledge in information literacy at the end of a module than at the outset than students who have not been exposed to OCL (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001).

#### Hypothesis B

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater ability to apply evaluation criteria in their assessed work than students who have not been exposed to online collaborative learning (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001). This will be manifest in two ways:

- (i) students who participate in OCL will tend use a greater variety of evaluation criteria in their assessed work and
- (ii) will tend, on average, to use these criteria more frequently.

For Hypothesis A, a diagnostic questionnaire at the beginning (*pre-delivery diagnostic test*) and end of a collaborative working opportunity (*post-delivery diagnostic test*) was used to measure via questionnaire responses whether there were any differences in

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<sup>37</sup> The process of deduction involves taking a particular theory, devising an hypothesis and then gathering data to test the hypothesis from which findings can be deduced which either confirm or reject the hypothesis. The end result being a revision of the existing theory in some way.

learning displayed (by students) after having engaged in such work. Andretta's diagnostic questionnaire (Andretta, 2005) was used as a basis for developing these tests. The pre and post-delivery diagnostic test designs are detailed in Chapter 4; A timetable for carrying out all elements of the research is detailed in Appendix 1.

To address Hypothesis B it was necessary to analyse students assessment output. A formula for converting students' evaluation criteria from written statements into numerical data for statistical analysis is detailed in Chapter 7.

### ***3.5 Ethical considerations***

The researcher noted the considerations discussed below in addition to the university's Ethical Clearance Checklist.

It is essential that any research adopts and adheres to recognised ethical principles (Cohen, Manion & Morrison, 2000; and Phillips & Pugh, 2000). It is important that the identity of the researcher and their background is fully revealed to reduce any uncertainty regarding the nature of the research. The purpose, procedures and the arrangements of the research should be fully explained to subjects to give greater clarity and enable participants to focus on the questions being asked. The research and its ethical consequences should be seen from the subjects' and institution's viewpoint. Most ethical concerns in research are focussed on ensuring that no harm comes to the participants (Cohen et al, 2000; Bryman, 2004; Robson, 2002). This is a highly unlikely outcome here. Rather the converse is more probable because the intervention proposed is, in effect, an addition to the normal teaching framework. Research that can be considered to be educational, such as the research strategy in this thesis, where the intervention can be regarded as desirable and which by definition is not available to a control or comparison group, may create undue advantage for an experimental group over any control group or groups (Cohen et al, 2000). Therefore, it is argued that the researcher should take steps to minimize any advantageous effects of the intervention and in so doing address this

ethical dilemma. This can be achieved by ensuring that equal access to all materials is made available to the control groups immediately after the research has taken place. Hence, it can be seen that measures can be put in place to ascertain whether the research benefits the subjects in any way and that these effects can be mitigated. By the same token it should still be ensured that the research does not harm the subjects in any way. Possible controversial findings should be anticipated and where they ensue, handled with sensitivity. Informed consent should be sought from all participants by alerting them to the nature of the research and its possible benefits. Sometimes it is desirable to obtain informed consent in writing (consent forms can be seen in Appendix 2). Some students may not like the idea of being part of a study or change their minds regarding involvement. Therefore, students should have the option to refuse to take part and the right to terminate their involvement at any time. It is intended that the research will be published widely within the HE community but until that moment arrangements should be made during initial contacts to provide feedback for those requesting it, for example, in the form of a written résumé of findings. The dignity, privacy, and interests of the participants should be respected at all times. Subsequent privacy of the subjects after the research is completed should be guaranteed – it is intended that participants' names will not appear anywhere in the final report unless their permission has been given so to do.

## **4 Pilot Study Research Strategy**

### **4.1 Introduction**

This chapter sets out in detail the Pilot Study quantitative and qualitative research strategies and how they were implemented. Quality issues which arise for each strategy are examined and addressed.

### **4.2 Pilot Quantitative Research Strategy**

This strategy was devised and implemented to test Hypothesis A<sup>38</sup>:

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater degree of knowledge in information literacy at the end of a module than at the outset than students who have not been exposed to OCL (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001).

This part of the research strategy in tandem with the Pilot Qualitative Research Strategy aimed to uncover changes in students' knowledge across the duration of a module. By examining students' responses to pre and post-delivery diagnostic tests it aimed to discover to what extent OCL have benefited (or seemed detrimental to) students' learning. This was triangulated by analysing assessment data and student postings (via content analysis) during the course of the IL programme and their detailed experiences of the IL intervention elicited via the analysis of interview data (the design for these are detailed below).

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<sup>38</sup> It should be noted that Hypothesis B emerged from the Pilot Study see Chapter 5.

It was essential that a dependable account regarding changes in students' knowledge was sought. This was achieved by gathering student test responses to certain questions based on the skills they had learned. It was suggested that the most appropriate way of gaining this data was via a closed questionnaire administered in controlled conditions. This generated specific responses which were analysed in a numerical fashion (for example, the percentage of correct answers to a particular question and whether these percentages differed significantly over time). By doing research in this manner the data was considered to be relatively value free and the design can be repeated by others with ease (Bryman, 2004).

This section details the pre and post-delivery diagnostic test element of the Pilot Quantitative Research Strategy.

#### **4.2.1 Design**

This part of the quantitative study was realised by administering of pre and post-delivery diagnostic tests, in the form of a questionnaire, to students immediately before the IL intervention and one week after delivery of the intervention was completed.

The pre and post-delivery diagnostic tests were based on the IL learning outcomes devised in the delivery model (see Appendices 3 and 4) and focused on the skills students were expected to learn through the module, for example, the effect of the Boolean term 'and' in a simple two keyword search strategy. The pre and post-delivery diagnostic tests were comprised of closed multiple-choice questions where the correct answer was unambiguous and straightforward. These two phases were necessary to detect differences in student responses over time. To detect whether OCL fostered greater learning in those students that received it over those that had not it was necessary to ensure that a control group of students who had not received this delivery were also tested. Questions were designed following those used by Andretta (2005).

## **4.2.2 Procedure**

Students were administered the pre and post-delivery diagnostic tests at the beginning of the module before the IL intervention was delivered and the post-delivery diagnostic test was administered one week after the completion of the IL intervention. The tests were administered in examination conditions, students were not allowed to discuss answers and were given a set time to complete the test. It was anticipated that students would gain a greater degree of correct answers to questions at the end of the module than at the beginning. It was also anticipated that the Group C (control group) would display fewer correct answers than Group A (experimental group) who received the full IL blended intervention.

Groups received the IL blended intervention in the following way:

### **GROUP A (experimental group)**

1. One 50 minute workshop delivered face-to-face to students;
2. One 50 minute session workshop delivered in blended fashion each week for seven weeks which used OCL techniques that is, tertiary courseware and contained primary courseware elements, for example web pages and online course documents and secondary courseware elements, for example interactive online quizzes.

### **GROUP C<sup>39</sup> (control group)**

1. One 50 minute workshop delivered face-to-face to students;
2. Access to primary courseware elements, for example web pages and online course documents only for the subsequent seven weeks.

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<sup>39</sup> For convenience the Control Group was named Group C in both the Pilot and Main Studies. Therefore, there was no Group B in the Pilot Study.



Group C were regarded as the control group because the IL intervention they experienced matched the normal delivery pattern had this research not taken place (See Appendix 5 for the delivery timetable).

During the research period Groups C (control group) did not experience OCL. They gained access to this element after the post-delivery diagnostic test was administered, that is, when the research was completed.

### **4.2.3 Participants**

The pre and post-delivery diagnostic tests were administered to two groups of students (Group A, n=21 and Group C, n=18) from the same cohort. These were all students who were organised by the Faculty of Health into their seminar groups for the Level 1 core module *Effective Learning, Information & Communication Skills (ELICS) in Sport & Exercise*<sup>40</sup> (2005-06 entry) at Staffordshire University. Students knew that they were part of a piece of research, but did not know to which group they had been assigned.

### **4.2.4 Techniques**

A closed question multiple-choice diagnostic test administered pre and post-delivery was devised and administered in controlled conditions. All students received exactly the same instructions and time to complete the tests.

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<sup>40</sup> The ELICS module was chosen for a number of pertinent reasons: it was, and continues to be, a core module in Sport & Exercise meaning that the researcher had potential access to a whole cohort of students; the researcher was an established part of the teaching team obviating the need to negotiate with faculty staff to become part of the teaching team; IL activities had been embedded in the module structure for three years and were an established part of the module programme; module materials and resources were established within the Blackboard VLE and finally the module leader was interested in enhancing the IL component of the module.

### **4.2.5 Data analysis**

Data was analysed using statistical methods advised by Field (2005) and available via the Software Package for the Social Sciences (SPSS). The pre-delivery test results were compared with the post-delivery test results using the *Mann-Whitney* statistical test to detect any significant differences in levels of 'true'/'false'/'don't know' answers. Tests were also carried out to detect differences between the two groups in the post-delivery diagnostic test. (See Chapter 5 for more details).

### **4.2.6 Findings**

The findings are detailed in Chapter 5 and were used to make a set of recommendations in order to improve and modify the techniques for the Main Study. Findings were also disseminated to the wider IL and academic community.

### **4.2.7 Quality issues**

Reliability was addressed by ensuring that the pre-delivery diagnostic test was administered in the same manner and under the same conditions as the post-delivery diagnostic test. The researcher's input was standardised to minimise the inevitable influence the researcher's presence had on the responses given. This made it possible for any other researcher to repeat this element of the research.

Validity was addressed by ensuring that any question put into the pre and post-delivery diagnostic test directly measured the skill being analysed. Furthermore, caution was exercised when drawing inferences from the data collected.

Objectivity was addressed by ensuring that the pre and post-delivery diagnostic test were based solely on the intended learning outcomes, and assessed the skills students were

expected to learn, and that unambiguous responses were generated by using multiple choice true/false/don't know questions.

It should be taken into account that tests of this type are limited in a number of ways: respondents may guess at an answer rather than actually know the correct response or they may display an habitual response by answering all questions in a particular way, that is, select the option 'true' for all questions; respondents may not want to give an appropriate response or they may want to give an entirely different answer to the appropriate response in order to please the researcher. In addition, questionnaires of this type are unable to uncover more complex behaviour for example, where more than one response was possible or where the response may involve more than one skill, idea or issue.

### ***4.3 Pilot Qualitative Research Strategy***

This design will be employed to answer the questions:

1. Does the teaching of information literacy in a blended environment (using face-to-face and OCL IL learning opportunities) structured using a scaffolded approach improve students' learning of IL?
  - a. What kinds of reflective practice questions best aid students in collaborating online?
  - b. Are tutor online interventions (specifically summaries of online postings from the group) perceived by students as a useful way of distilling output from the group for later use?

2. How do psychological states associated with information behaviour and thinking help explain the learning processes in an information literacy blended learning and teaching intervention?

This part of the study aimed to uncover student experiences across the duration of a module. By examination of students' reported experiences via interview and questionnaire responses this study aimed to discover to what extent IL collaborative working structures had benefited, or appeared detrimental to, students' personal perceptions of their personal learning. This was triangulated in a number of ways: by analysing students' assessed reflective practice statements via content analysis; examining student postings and via quantitative measures discussed above which were used to measure changes in IL knowledge and/or behaviour.

Given that reflective practice is seen as an essential part of learning *per se* (Moseley et al, 2004) and an integral part of OCL (for example JISC, 2004) it was necessary to gain students' thoughts and feelings regarding the way in which the OCL was structured by seeking their views on the kinds of reflective practice questions they were asked and whether these helped them (or otherwise) to frame reflective statements in such a way that it caused them to think clearly about what they had learnt and subsequently turn that into a meaningful reflective statement for posting online.

An essential part of OCL is the way in which tutors scaffold this activity (Teles, 1993; JISC, 2004; Mayes & de Freitas 2004). One such way of doing this is by tutors summarising a discussion and then posting it to the whole group. Students' views on the ways in which the online postings of the group were summarised by tutors was investigated to find out whether they found this a useful way of distilling the output of the group and of providing information they could use for subsequent tasks or for their assignment.

It was essential that a dependable account regarding viewpoint of the student (that is, the meanings which they attribute to processes) was sought. It was believed that the most

appropriate way of gaining the 'rich description' which defines qualitative study would be achieved was by using a number of techniques such as: one focus group interview, after the module delivery, using open ended questions to elicit detailed responses from a group of five students to discuss issues with students in more detail; a questionnaire administered to Group A after the module delivery using open and closed questions and finally by analysing assessed work.

It should be noted that focus group sizes vary widely and can be as few as four and as many as ten individuals (Bryman, 2004). It was decided to aim towards the lower end of this range because of the difficulties in transcribing which large groups present for example, identifying who said what or what was said when people talk at the same time. The advantage of focus groups is that they allow participants to respond to each other's views and build up a view out of the interaction and the amount of data generated is much greater than for one-to-one interviews (Robson, 2002). It also allows an interviewee's views to be challenged by other participants, something that doesn't happen in a one-to-one interview (Bryman, 2004). In effect the group tends to impose a natural quality control on responses (Robson, 2002). They are limited in that the researcher has less control over the data, inaudible elements in the tape can occur and because of the numbers of individuals involved they can be very difficult to organise. Finally, confidentiality between participants could be problematic when using this approach. One-to-one interviews also were considered as a viable approach and there are several advantages to this technique such as, questions can be put directly to individuals and issues can be uncovered which are not amenable via observation, questionnaire or assessment data (Robson, 2002). These issues can be investigated in great depth and flexibility can be built in to this approach (Bryman, 2004). Interviews allow lines of enquiry to be modified in the light of responses given and nonverbal cues can lend meaning to a response which is not available in a questionnaire response (Robson, 2002). However, carrying out many individual interviews and then transcribing them can be time consuming. In the light of these concerns it was felt that, at this stage, the advantages afforded by carrying out a focus group interview outweighed those of the one-to-one interview.

By using the techniques detailed above the data gained revealed the closest account of students' real experiences of online learning. The method for data analysis used was 'ethnographic content analysis'<sup>41</sup> a subset of 'qualitative content analysis' (Bryman, 2004, p542). In effect the codes devised emerged from the analysis itself and are detailed in the Pilot Study Chapter 5.

It was essential that the examination of student OCL output via the textual statements they made and exchanged during the course of one or more OCL activities took place to reveal the way in which participants communicated and shared their thoughts and ideas in an online setting, seen by Wilson (1999) as an essential, but under-researched aspect of information behaviour.

### 4.3.1 Design

The Pilot Study Qualitative Strategy was taken forward by focussing on one group of students (labelled Group A, experimental group) enrolled on a specific module at Staffordshire University that of *Effective Learning, Information & Communication Skills (ELICS) in Sport & Exercise*. It was proposed that there was a Pilot Qualitative Study and a Main Qualitative Study. The Pilot Study Qualitative Strategy involved two groups of students enrolled on the module for 2005-6. The findings made in the Pilot Study lead to a number of recommended changes for the Main Study which are detailed in Chapter 5. Interview questionnaire and questions were designed following recommendations made by Burton (1990).

It was necessary to carry out a Pilot Study Qualitative Strategy to test whether procedures (for example OCL activities) and techniques used (for example, the way in which interview, questionnaire, written assessment and Discussion Board data was recorded and

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<sup>41</sup> Also known as Qualitative Content Analysis defined by Bryman (2004, p542) as 'an approach to documents that emphasises the role of investigator in the construction of the meaning of and in texts. There is an emphasis on the allowing categories to emerge out of the data and on recognising the significance for understanding the meaning of the context in which an item being analysed (and the categories derived from it) appeared.'

analysed) were suitable for the Main Qualitative Study or required revision. The Pilot Study itself served as a way of ensuring that all the OCL activities underwent 'cognitive walkthrough' as recommended by Goodyear (2001, p98) before the implementation in the Main Study.

### **4.3.2 Procedure**

This involved delivering the intervention put forward in section 2.6.1 as part of the Level 1 core module (*ELICS*) in *Sport & Exercise*). This involved the following delivery pattern to Group A (experimental group) comprised of 21 students:

1. One fifty minute workshop delivered face-to-face to students (see Appendix 6 for the learning outcomes, Appendix 7 for the lesson plan and Appendix 8 for the assignment);
2. One fifty minute session workshop delivered each week for seven weeks using OCL techniques (tertiary courseware) which contained primary courseware elements, for example web pages and online course documents and secondary courseware elements, for example interactive online quizzes (see Appendix 9 for text of OCL activities and see Appendix 5 for the delivery timetable).

Therefore, during the research period Groups C (control group) did not experience the OCL intervention. They gained access to this element after the post-delivery diagnostic test was administered, that is, when delivery of the intervention was completed.

The contribution that students made to OCL tasks, by sending messages to the Discussion Board, were 'captured' in Blackboard as they worked through the IL programme. Capture of Discussion Board activity was done automatically by the Blackboard software and remained on the system unless deleted. Blackboard allows whole discussions (including important data such as, the time a message was sent and to whom) to be

copied and pasted into word-processing packages such as *Word*. This backup procedure was carried out as a matter of course.

A semi-structured interview was carried out on a focus group of selected students to ascertain what they felt about the programme in terms of content and how they felt that it affected their learning (see Appendix 11 for the list of questions). The selection for the semi-structured interview could have been carried out in a number of ways:

at random;

by selecting those students that had given the greatest and most detailed responses in the Discussion Board during the delivered programme;

or those that participated the least,

or a mixture of the last two possibilities.

It was decided to select five students at random from Group A to gain as broad a perspective as possible regarding students' views.

The interview took place during Semester 2 of academic year 2005-06 after the intervention had finished.

### **4.3.3 Participants**

Detailed analyses of the OCL intervention necessitated focusing on one group of students (Group A, experimental group, n=21) who attended a subject specific module at a UK university. These were students organised into their seminar groups by the Faculty of Health for the Level 1 core module *Effective Learning, Information & Communication Skills in Sport & Exercise* (2005-06 entry) at Staffordshire University.

Given that this study focused on students at a specific university means that generalised statements regarding the findings should be made with great care. This issue is discussed in more detail in Chapter 10.



#### **4.3.4 Techniques**

The following techniques were adopted to gather appropriate data for analysis:

- All online discussion output was captured and stored digitally and in hard-copy;
- A questionnaire containing open and closed questions to ascertain various aspects of participants' experiences regarding the OCL intervention was administered after the programme was completed (see Appendix 10).
- A focus group was convened using the interview schedule devised to elicit various affective, motivational or other aspects of students' experiences were carried out (see Appendix 11).
- Access to students' written assessed work was gained and their output analysed.

#### **4.3.5 Data analysis**

- Analysis of written reflective practice statements and online postings was achieved using techniques as suggested by Bryman (2004) such as ethnographic content analysis where coding of data emerged from the coding process.
- Focus group and questionnaire responses were analysed using ethnographic content analysis to examine interview responses.

#### **4.3.6 Findings**

Findings were used in three ways:

- (1) To modify and improve the programme for delivery in the Main Study;

- (2) To modify and improve the data gathering techniques for the Main Study;
- (3) To report preliminary findings to the wider community.

A detailed report of these is put forward in Chapter 5.

### 4.3.7 Quality issues

Bryman (2004) argues that qualitative strategies require the notions parallel to that of reliability<sup>42</sup>, validity<sup>43</sup> and objectivity<sup>44</sup> to be adopted in order to judge the quality of the research. Qualitative research can be judged against the parallel notion of 'trustworthiness' and its sub-categories of 'credibility'<sup>45</sup> (Willig, 2001; Robson, 2002; Bryman, 2004), 'transferability'<sup>46</sup> (Willig, 2001; Robson, 2002; Bryman; 2004), 'dependability'<sup>47</sup> (Robson, 2002; Bryman; 2004) and 'confirmability'<sup>48</sup> (Robson, 2002; Bryman, 2004) .

The criterion of credibility<sup>49</sup> was addressed by carrying out detailed interviews with a selection of five student participants to elicit a range of responses to the interviews and via administering the questionnaire to all of Group A (experimental group). These were triangulated by analysing assessment data. This by default accepted that there would be several possible accounts to be had of the social reality in question. In this case

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<sup>42</sup> Reliability is concerned with stating to what extent a study is repeatable and whether measures used are stable, for example, if an intelligence test was administered to a group of individuals and it was found that people's scores differed greatly on two separate occasions then it would be necessary to accept that the measure used was not reliable. It is a notion linked closely to replication in that it is necessary to detail procedures followed in great detail to ensure that replication is possible and in so doing enhance its reliability.

<sup>43</sup> Validity is concerned with the integrity of a piece of research and whether the conclusions made from a study are justified. There are a number of aspects to validity which include: measurement, internal, external and ecological validity.

<sup>44</sup> Associated with experimental approaches in science where the experimenter must distance himself from the experimental participant so that any interaction that takes place between the two is formalised, e.g., delivering instructions via a script or even by tape recording (Robson, 2002).

<sup>45</sup> Credibility parallels the notion of internal validity.

<sup>46</sup> Transferability parallels the notion of external validity.

<sup>47</sup> Dependability parallels the notion of reliability.

<sup>48</sup> Confirmability parallels the notion of objectivity.

<sup>49</sup> This is concerned with the need to gain multiple accounts of the same social reality – in this case an online IL course.

participation in an online IL module. It is recommended by Bryman (2004) that accounts gleaned in interviews be submitted to participants to gain confirmation that the investigation has correctly understood that social world. The degree of credibility of the account presented was determined by the extent to which it was acceptable to others.

Transferability was dealt with by ensuring that the 'rich descriptions' of the settings were produced to orientate the study towards the contextual uniqueness of the social world being studied. Hence, a dataset of descriptions which has enabled judgements to be made regarding the possible transferability of findings to other settings was gained to give a sense of triangulation between different data.

Bryman (2004) puts forward that some research has addressed the criterion of dependability by keeping detailed records of all research phases: problem formulation, selection of participants, fieldwork notes, interview transcripts, data analysis and decisions in an accessible form to enable the study to be as transparent as possible and for other researchers to use. This study sought to emulate this recommendation.

Confirmability was ensured by keeping detailed records of all interviews, interview procedures, questionnaire formulation and responses, decisions regarding questionnaire design, decisions regarding content analysis and detailing the researcher's viewpoint at the outset. In addition, by showing that the researcher has acted in good faith by demonstrating that the personal values and theoretical inclinations have not overtly swayed the conduct of the research and the findings derived from it. This was dependent upon the detail and transparency of the research record.

The implementation of the Pilot Study Research Strategy as discussed above enabled findings to be produced and recommendations made for the Main Study which are detailed in Chapter 5.

## 5 Pilot study

### 5.1 Introduction

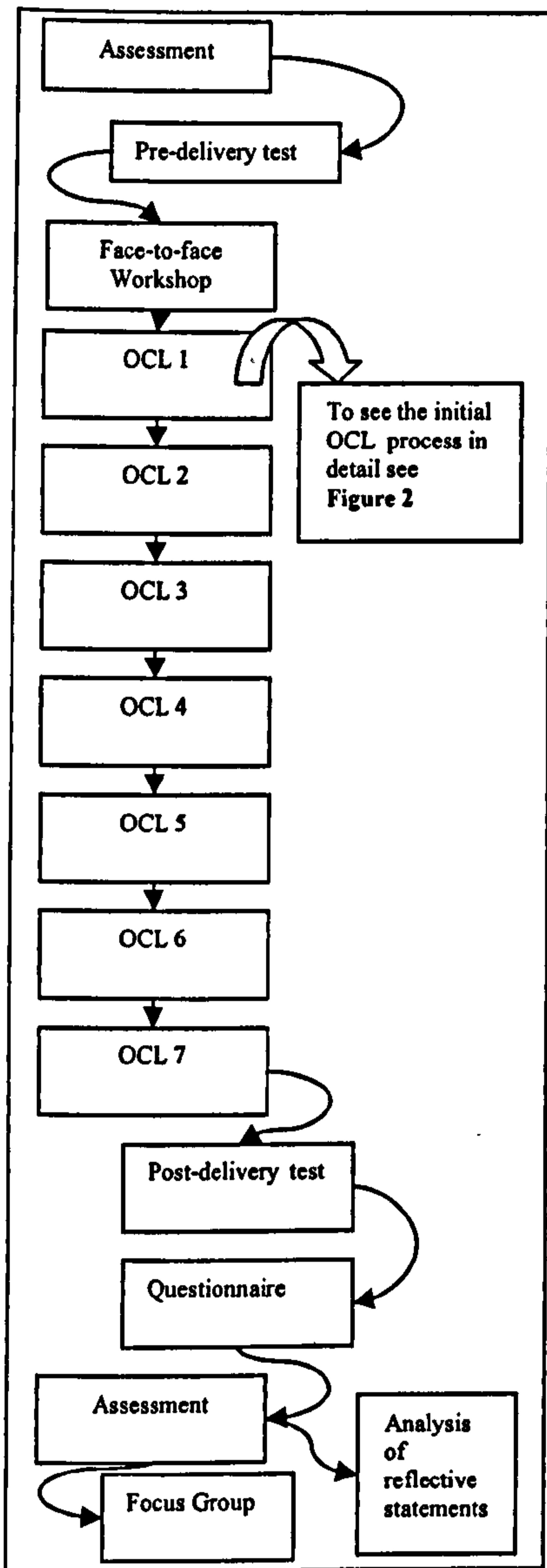
This pilot study<sup>50</sup> attempted to set out a structure for delivering IL Online Collaborative Learning (OCL) based on the findings of the literature review and a timetable for data gathering based on the methodology. The OCL activities were delivered to the Experimental group (n=21) via Blackboard over seven weeks immediately after the face-to-face workshop: the control group (n=18) received the face-to-face delivery only (as specified in the methodology). The structure for the whole blended programme (in chronological order) and the data gathering instruments<sup>51</sup> are represented in Figure 16 below.

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<sup>50</sup> This Pilot study was published as, Walton, G., Barker, J, Hepworth, M. and Stephens, D. (2007). Using online collaborative learning to enhance information literacy delivery in a Level 1 module: an evaluation, *Journal of Information Literacy*, 1 (1), pp13-30. [Online] <http://jil.lboro.ac.uk/ojs/index.php/JIL/article/view/RA-V1-I1-2007-2/3> (accessed 12 July 2008).

<sup>51</sup> In addition to these the textual output from the Discussion Board in the form of student postings and summaries were captured at the time by copying and pasting all discourse into a Word document.

Figure 16: IL blended programme and data gathering instruments



**Assessment:** A problem-based scenario which directed students to identify and evaluate 2 web sites; 2 books or e-books; 2 journal or e-journal articles to deliver a talk to 'A' level students on the subject of football hooliganism. This contextualised the whole IL delivery.

**Pre-delivery test:** Administered at the start of the workshop and comprised of 11 questions which tested students' prior knowledge of the Library Catalogue, searching e-journals and evaluating information.

**Face to face activity.** This 50 minute workshop consisted of: a demonstration on searching the Library Catalogue using title, author and keyword; a whole group discussion on identifying keywords for the scenario (including identifying synonyms for example soccer or football); a demonstration of Swetswise using simple Boolean keyword searching; a worksheet of tasks (mirroring the assessment) for students to complete in class and a plenary where students discussed their answers with the tutor. **OCL activity 1<sup>52</sup>** consisted of an Online Reflective Practice Task of three questions for students to answer for example 'What did I actually learn in this session today?'

**OCL 2:** This focused on devising general evaluation criteria to identify what makes information resources of sufficient quality for an assignment.

**OCL 3:** In order to scaffold and seed this activity a statement was produced from summarised responses from OCL 2, that is it generated the questions used to focus students on more detailed issues of evaluation.

**OCL 4:** The scaffolded activity for OCL 4 was drawn from a different student posting made in OCL 2 enabling us to focus this and OCL 5 on how web pages can be evaluated and what criteria might be used.

**OCL 6:** This activity focused on the referencing of sources, was not linked directly previous discussions and took place over two weeks.

**OCL 7:** An Online Reflective Practice task which asked students to: look back over all the OCLs; answer two questions for example, 'Have you developed other skills and knowledge which may be useful elsewhere at another time'; post a response and then they were asked to 'look at fellow students' postings and make at least one constructive comment'.

**Post-delivery test:** Administered at the end of the workshop and comprised of the pre-delivery test questions to tests students' new knowledge of the areas as detailed previously.

**Questionnaire:** This consisted of 20 questions (3 closed and 17 open questions) and administered after the post-delivery test to gain students' views on all aspects of the OCL part of the IL programme.

**Assessment:** Students were required to present, in written format, their 6 resources with a short evaluation for each. Furthermore, they were required to submit a 150 word reflective practice statement on the skills they had learned and how they would apply them in the future.

**Focus Group:** A one hour interview convened at the beginning of

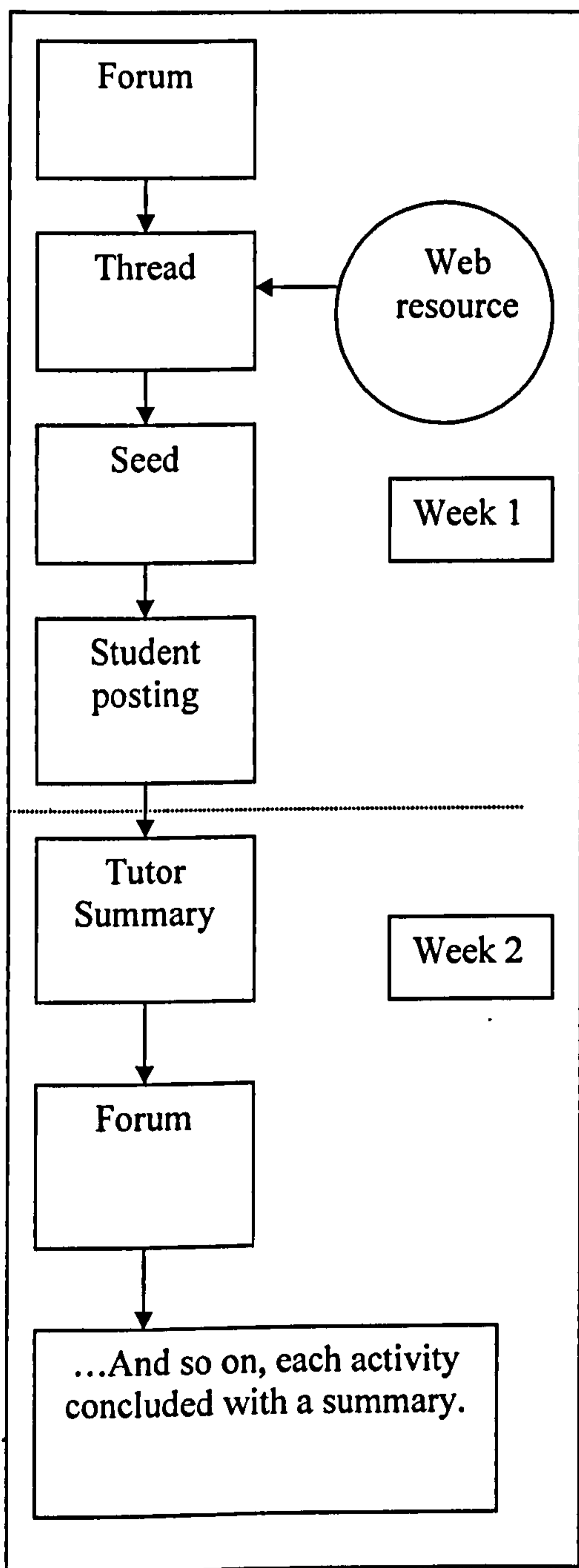
Semester 2 which comprised of 5 students chosen at random from the Experimental group. Questions were based on responses given by students in the Questionnaire.

**Analysis of reflective statements:** Carried out using content analysis methods based on Miles & Huberman (1994).

<sup>52</sup> OCL and face-to-face activities were structured following the recommendations made in Figure 15, the OCL activities were managed as shown in Figure 17

The initial process devised to manage the OCL IL activities is represented in Figure 17. This represents the various components required to use Discussion Board in Blackboard effectively.

Figure 17: Initial process for managing OCL activity



**Forum:** This constitutes the title of a Discussion Board activity for example, 'Referencing your sources.'

**Thread:** This contains the instructions for the task that students are expected to complete for example, '1) Think about what you have covered today. 2) Answer the questions set out below. 3) Send your response to the discussion board. 4) Read the responses your fellow students have made and make at least one comment on any of the postings.'

**Seed:** This contains the starting point for the discussion for instance this was used to start a discussion on URLs, 'It was mentioned in the previous discussion that you can check the URL of a web page to work out its origin for example, educational, personal, commercial, governmental, sporting organisation etc. What is a URL and how do you work out its origin?'

**Student Posting:** This is the output from students once they have opened the Forum, read the Thread and Seed and engaged with the online activity. Here is one example, 'I would judge a book by determining how referenced the book is & what references it included. It would probably be of a higher calibre if the references that are included are from authors that have been more highly publicized.'

**Tutor Summary:** This is constructed by the tutors and contains salient points raised from student postings with additional comments from tutors. This extract demonstrates how the summary was presented to students via Blackboard, 'You have identified some excellent criteria - we have added some extra points you should consider when using web pages. These are the questions we should we have in mind when using web pages as an information source. General point - There are no guarantees that any web page is unbiased, error free or reputable but if you adhere to the criteria you have put forward - which is summarised below - then you should get a reasonable idea as to how reliable the source is.'

This was envisaged as a linear process with each activity concluded and closed with a summary before moving on to the next new Forum. The threads would be generated each week by tutors. Hence, the content would be tutor rather than student lead.

## **5.2 Pilot Findings**

### **5.2.1 What was learned from the Pilot Study?**

#### **5.2.1.1 What worked and why?**

##### *5.2.1.1.1 Pre-delivery diagnostic test*

It was anticipated that students would return low scores regarding their prior knowledge of the Library Catalogue, e-journals and evaluation of sources because either, they did not yet possess the knowledge or, would have only a rudimentary awareness when answering the questions, for example, on understanding the effect of certain Boolean operators. As expected the Control group scored a relatively low number of correct answers to the e-journals questions (questions 4 – 7) and evaluation questions (questions 9 – 11). On average 34% of their answers to these questions were correct. This indicated that the questions were working well in identifying low base line skill levels for these areas. This was not the case for questions 1 – 3 and these are discussed in section 5.2.1.2 below.

Therefore, to uphold the hypothesis the difference in scores for these questions required a statistically significant result in two ways:

1. Between the pre and post-delivery test scores for the Experimental group only where the post-delivery test scores are significantly higher than pre-delivery test scores and
2. Between the post-delivery test scores for the Experimental and the Control group where the Experimental group scores are significantly higher than the post-delivery test scores for the Control group.

In effect it showed that the questions used (apart from questions 1 – 3) would be useful in measuring increases in learning to test the quantitative study hypothesis<sup>53</sup>.

#### *5.2.1.1.2 Face-to-face workshop*

The library catalogue exercise worked well because students were able to actively engage in learning new skills by: searching the Library Catalogue; identifying appropriate keywords to answer a problem-based scenario; searching an e-journals service; viewing and manipulating full-text and participating in a plenary to discuss their answers.

Students gained the opportunity to: become familiar with relevant electronic services; employ the user guides supplied to them as study aids and to clarify any points of detail they were unclear about before attempting the assessed work. It also provided an occasion for the researcher to become familiar with the group, explain the research and ask for volunteers to participate in the Focus Group.

#### *5.2.1.1.3 OCL: Emergence of a new process for managing OCL IL Activities*

Students produced some excellent output that could be used as threads for many of the subsequent OCL activities for example, a scaffolded discussion was developed by selecting a student comment regarding URLs (from Online Discussion 4). This was then used as the thread for Online Discussion 5 by re-iterating the previous discussion, but this time in more detail. This is an extract from the student posting used, *"You can check the URL of a web page to see if it's an educational piece or a personal piece which contains someone's own opinion."* The subsequent task derived from the student comment was posted as follows: *"It was mentioned in the previous discussion that you can check the URL of a web page to work out its origin for example, educational, personal, commercial, governmental, sporting organisation etc. So what is a URL and how do you*

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<sup>53</sup> Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater degree of knowledge in information literacy at the end of a module than at the outset than students who have not been exposed to online collaborative working (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001).



*work out its origin?*” Hence, students were re-iterating the task completed during the previous week, but in much greater depth. This demonstrated there was a recursive element to this activity which was harnessed for future online discussions. This process of iteration is mentioned as an essential part of information literacy in, for example, SCONUL (1999); Big Blue Project (2002) and Andretta (2005); as part of the information behaviour process in, for example Hepworth (2004) and Ford (2004) and as part of the learning process in, for example, Race (2001) and Moseley, et al (2004). Finally, it has the desirable outcome of making the process student rather than tutor led, allowing the programme to adopt a more constructivist approach to learning.

It can be seen that the literature anticipated this occurrence of the iterative nature of the online discussion task (and learning itself) but was not planned for in the original process. As a result a new process map was devised for managing online discussion for the Main Study and is illustrated in Figure 19 (see section 5.2.1.3.6) below.

#### *5.2.1.1.4 Post-delivery test*

As predicted the Control group did less well in the post-delivery test than the Experimental group. The Control group scored less well than the Experimental group in questions 2, 3, 4, 5, 6, 7, 8, 9, 10. The greatest difference in scores was in question 5 (an e-journals question) where the Experimental group scored 31% more correct answers than the Control group. The question with the least difference was question 6 (also an e-journals question) where the Experimental group scored 2% more correct answers than the Control group. The average difference between scores was 13% (in responses where the Experimental group gained a better score than the Control group).

#### *5.2.1.1.5 Questionnaire*

This gained many full and useful responses of both a positive and negative nature towards the online activities. It can be assumed that there was no ‘social desirability bias’ (Bryman, 2004, p544), where students may provide answers that they believe will

please the tutor, researcher or peers rather than reporting a truthful indication of their thoughts, because students gave some very negative comments in the questionnaire. This is an example of a typical negative comment made when asked to say what they didn't like about the online activities, *"Some of the activities were a bit useless"*. Most of the open ended questions were answered fully for example, when asked what they found useful about the online activities a typical positive response was *"I think learning about references was useful and improved my understanding of it"*. This helped to reach the conclusion that the referencing exercise was the most successful online activity. A typical response to the question regarding what they found not so useful was, *"I did not find reflecting on the work of another useful"*. This was a useful indicator in revealing that the online reflective practice activity was not going to work in its present form. All the closed questions were answered appropriately for example, the questionnaire revealed that none of the students had looked at the tutor summaries after the online activity had been completed. This showed that it was necessary to find an alternative method for ensuring students used the tutor summaries for example, by producing a printed handout for them to refer to as well as the existing electronic copy in Blackboard.

#### *5.2.1.1.6 Assessment*

A content analysis of the assessed written reflective practice statements revealed that this was a particularly rich source of data in term of learning and in terms of the IL process. A number of categories emerged from the analysis, for example, student statements could be divided into seven discrete areas:

1. **Reinforced existing knowledge (learning) for example:**

*"I have had some previous experience is using the Internet to search topics during my spare time so this exercise did not pose any problems"*.

*"This material has significantly reinforced my existing knowledge [...]"*.

*"The use of the Internet to find information was a reinforcement of knowledge because it is something that I have regularly done with other pieces of work".*

**2. Gained new knowledge (learning) for example:**

*"Completing this task has given me a great insight into how electronic resources can be utilised. I feel I now have a basic knowledge in using the e-resources and the Swetswise service".*

*"Before completing this task I had only looked at the electronic resources once, using this the 2<sup>nd</sup> time has reinforced my knowledge further and with more experience I will surely be able to locate material easier".*

*"Before undertaking this task I knew very little about Swetswise, e-books, journals and the online library. I now feel that I have learned a great deal by using these electronic devices, however I still feel that I have a lot to learn".*

**3. Acquired some technical language regarding using and searching e-resources (learning and IL process) for example:**

*"I am now confident in using search connectors like 'and' and 'not'. I also know how to use advanced searches properly".*

*"[I] Finally found a number of sources by changing the keyword in the search box".*

*"By typing in certain words I can find good articles and abstracts that will come in handy."*

**4. An intention to transfer what they have learned (learning and IL process) for example:**

*"This new knowledge will help me in all my module areas and will be useful to me throughout my entire time at university".*

*"The knowledge I have gained in using these different sources properly, by refining searches and finding precisely what I am looking for should aid me when writing essays or having to do further reading on subjects".*

*"Using the electronic resources will be extremely useful to me for my future studies and research".*

**5. Confidence in using these new resources (learning and IL process) for example:**

*"I am confident that I can use these skills in the future when searching for various articles, books and websites for information to help with various assignments".*

*"I am now confident in using search connectors".*

*"I feel that I have familiarised myself with these resources so now feel I can obtain any of the information that I require".*

**6. Motivation to use these new resources now and in the future (learning) for example:**

*"I have had no previous experience in using the various online services and initially found it difficult to understand. I did however persist with these problems and finally found a number of sources by changing the keyword in the search box".*

*"Before starting university I never knew that there was a library on the Internet so when I realised I have tried to use it quite a few times. At first I found it hard to use but then got used to it".*

*"Because I had never used the [Swetswise] program before I found it reasonably hard to find appropriate material, after playing around with the program I eventually figured out how to use the program".*

**7. Some awareness of the need to evaluate information (IL process) for example:**

*"The skills learnt in this particular exercise will be very beneficial for the future. For example when writing an essay on a sport related topic, the research found will be up to date, genuine and good enough for an academic piece of work".*

*"Using the Internet services can only improve my knowledge in the future only if the validity of a resource is good."*

*"I will use this new knowledge to hopefully produce better and more specific work with more reliable references".*

These examples demonstrate that because this part of the data gathering exercise produced such rich data it must be re-used in the Main Study. In particular the emergence of the category of motivation is particularly significant because it gives the opportunity to comment critically on current IL models, for example, the statements in the motivation category reveal tenacity and persistence, essential components of IL, that are largely overlooked by IL models as these mention iteration without explaining what it involves and how it is to be achieved. This supports the assertion made in the literature review that in essence IL models can be regarded as manifestos for successful action rather than explanations of reality. Similarly, information behaviour models such as the one promoted by Wilson (1999)<sup>54</sup>, mention perseverance as an essential component in the information seeking process and this is illustrated by the comment above which specifically points to a failure at first, but through persistence the student completes the task successfully. It may be useful and productive to use these emergent areas as a basis for analysing the content of online discussions.

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<sup>54</sup> As mentioned in the literature review the ultimate purpose of Wilson's model is to provide a framework for hypothesis testing regarding information retrieval systems in order to produce design suggestions, for example, by designing clearer navigation routes to reduce the risk of failure and increase the user's feelings of self-efficacy.

#### **5.2.1.1.7 Focus Group**

The Focus Group worked very well in the Pilot Study in that a great deal of valuable data was elicited from the group discussion. Five students from the Experimental group participated. Using responses from the Questionnaire as prompts for discussion proved extremely valuable and students participated willingly and gave full, honest and frank accounts. For example questions took the following format, *“One of your fellow students said that he or she found all of the activities useful, what do you think about that statement?”* As students commented the researcher used supplementary questions such as, *“Why?”*, *“In what way?”* and *“Could you be more specific?”* The discussion lasted for 50 minutes during which time a number of issues emerged such as students reporting some reticence regarding the first online activity where one comment was, *“I was nervous of sending a reply (to the Discussion Board) because I didn’t want the wrong answer up there for all to see”* which was affirmed by the rest of the group by participants nodding heads in agreement. This offers a credible explanation as to why it took students so long to complete OCL1 (the reflective practice task).

#### **5.2.1.2 What did not work and why?**

##### **5.2.1.2.1 Face-to-face workshop**

###### **5.2.1.2.1.1 Swetswise demonstration and exercise**

Due to technical difficulties this e-journals service did not load correctly on some of the PCs students were using during the timetabled period. As a result of this it was recommended that an alternative service, for example Science Direct, be used in the Main Study as a backup if necessary.

## 5.2.1.2.2 OCL

### 5.2.1.2.2.1 Online reflective practice activity

It became very clear in the first OCL session (timetabled for one hour<sup>55</sup>) that there would be no time for students to do an IL online reflection, complete a face-to-face study skills task and then do another IL OCL task in the same session (which is what had been envisaged). There was insufficient time because students were taking over 25 minutes to post their initial response. It was decided to change the way in which this element should be delivered in the future. This problem was compounded by the fact that students found online reflection problematic and that it took them a long time to accomplish this partly due to “*nervousness*” in posting a comment for others to see and partly because of negative feelings towards this activity as a learning opportunity. Most students were negative in their comments regarding reflective practice and they were particularly negative towards having to comment on a fellow student’s work stating that:

*“I did not find reflecting on the work of another useful”*

*“I’m not really interested in other people’s comments, I’d rather be learning.”*

In the Questionnaire a total 11 of the 16 respondents made one or more negative statements regarding the online reflective practice activity. Student postings for this task contained a few words or one sentence compared to the much fuller postings made in later OCL activities. In addition, the online reflection took students longer to complete than any other task. This does appear to point to a fundamental issue that students may have tacit expectations that learning should be provided by ‘experts’ such as tutors and that they can’t possibly learn anything from their peers. It may explain why the online reflection task obtained zero secondary postings.

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<sup>55</sup> Given that students have to travel from elsewhere to find the room and leave to meet other commitments the amount of teaching and learning time in practice tends to be 50 minutes at most.

#### *5.2.1.2.3 Pre-diagnostic test*

Question 1 was framed in such a way, that is, ambiguously, that to answer either 'true' or 'false' could be construed as correct. No questions were presented on referencing sources which was a serious omission on the part of the researcher as it meant that qualitative data gathered had no equivalent quantitative data for triangulation.

#### *5.2.1.2.4 Post-diagnostic test*

Although predicted differences in test scores between Control and Experimental groups were observed these differences were not statistically significant (calculated using the Mann-Whitney test at  $p > .05$  (one-tailed),  $n=29$ ). In addition, an unpredicted outcome was that the Control group did better in Question 11 than the Experimental group. Solutions to these issues are discussed below.

### **5.2.1.3 What needed changing and why?**

#### *5.2.1.3.1 Groups to be tested*

Only two groups were tested in this study whereas it seemed more sensible to have three groups for testing in order to more accurately reflect the primary, secondary and tertiary courseware distinctions made by Goodyear, (2001). By having three groups available in this way would enabled differences in the effects of these types of courseware to be measured and discussed.

#### *5.2.1.3.2 Changes to the pre and post-diagnostic tests.*

Question 1 was re-worded for the Main Study. Questions 2, 3 and 8 were changed to make them less obvious or open to guessing, a category of 'don't know' was already included to minimise this effect, because the average number of correct answers for these was 83% giving too high a result to enable a significant difference in scores between pre



and post tests to be detected. When administering the test it was emphasised most strongly in the instructions that students should not guess the answers. A set of questions on the APA referencing style reflecting what was taught in the OCL activities was included in the Main Study to ensure that an important data gathering triangulation was not lost. In addition, it was recognised that these tests reflect knowledge gained by students in doing the IL programme rather than on the process of becoming information literate.

#### *5.2.1.3.3 Additional quantitative data opportunities*

It was noted that the individual evaluations that students were required to present as part of their assessed work may provide an added dimension to the data gathering process. It appeared that it would be possible to devise a means of converting these evaluation narratives into a numerical score.

#### *5.2.1.3.4 Changes to learning materials*

The user guide was changed to incorporate good practice from known exemplars in the field of software and IT guides, for example by using Apple software guides. It was also recommended that the Plain English web site (Plain English Campaign, 2006) be consulted and its good practice adopted. The main recommendations they make include, using short sentences, simple words, refrain from using jargon where possible and using an active 'voice' as appropriate.

In this example it can be seen how the very 'wordy' instructions (a comment made by the Focus group) for the Library Catalogue guide has been streamlined using these principles:

Wording for an instruction in the Library Catalogue guide for the Pilot Study (18 words):

**Step 1:** To do this select the **Alphabetical** search option from the top of the library catalogue screen

New wording for an instruction in the Library Catalogue guide for the Main Study (13 words) is shown below,

- Select the **Alphabetical** search option from the top of the library catalogue screen

It can be seen that the wording is reduced, instructions are preceded by a bullet icon and the sentence begins with a verb as recommended by the Plain English Campaign (2006).

#### *5.2.1.3.5 Changes to the OCL activities*

Comment from students in the Pilot Study were that the OCLs were "*repetitive*" and "*tedious*". It was also observed that in OCL 6 the numbers of secondary postings were far greater than any of the other OCLs. OCL 6 was the only discussion held over two weeks. Therefore, with these points in mind fewer OCLs were to be deployed in the Main Study and each taking place over at least two weeks to minimise repetition and maximise the available time for students to engage in the discussion.

In addition, in tandem with the user guides shorter instructions using Plain English Campaign (2006) recommendations as mentioned above were deployed within the seeds and threads of OCL activities.

Following recommendations by Nicol, Minty and Sinclair (2003) tutor summaries were made more personal using students' and tutors' first names, to identify the origin of online postings, and using coloured text or bold to separate student comments from tutor comments as shown in the example below,

*“Tracy said that a good resource should consist of many different points of view which allows us to assess it against our own ideology or work.”*

*“Jamie and Geoff would add that bias is minimised by using evidence to back up the points that are made with detailed explanations of the information that is needed (in other words lots of facts and figures).”*

In addition the technique of ‘weaving’ was to be employed where tutor and student comments are ‘stitched’ together in one seamless narrative (Salmon, 2002) where tutor comments are identified in bold for example:

*“A valid and effective book, as a resource, needs to be easy to access, straight to the point, should use language that is subject specific and easy to understand, should be relevant to your studied subject, accurate, reliable and up to date for what is needed to further your own knowledge”.*

To ensure that students read tutor summaries it was intended that these summaries preceded a task or activity within the same document. In effect students were to read the summary before reading the instructions for the new task. In addition, as suggested above students were to be given the summary as a printed handout for future reference.

#### *5.2.1.3.6 Changes to online reflective practice*

It was decided that a completely new approach to online reflection was devised for the Main Study.

It was recommended that it would be more productive to construct a reflective multiple-choice ‘quiz’ in the form of an Instant Reflective Practice Activity (IRPA). This was to fill the secondary courseware gap and provide a quicker way for students to do their reflective practice. Recommendations on how to do this for the Main Study are suggested here.

At the end of any activity students were to complete an IRPA rather than an open ended reflection. These, it was estimated, take up to 10 minutes to complete and were designed to enable students to actively reflect on their learning. In addition, it was envisaged that by reading and then choosing a 'ready made' reflective statement students would gain a clearer idea as to how to construct a reflective practice statement for their assessed work.

Students were then able to select one of the 'ready made' statements or write a reflection in their own words. If students chose the latter they could do this by a hyperlink in the document (this e-mails their statement to the tutor). The prepared statements were 'stitched' together using reflective statements made by previous students. It was felt that, by using real reflective statements, students were able to identify with, and as a consequence choose, at least one provided. If they did not then they had the option to write their own.

For the Main Study it was recommended that the IRPA would replace the Online Reflective Practice Activity (Online Discussion 1) with the aim of addressing the problems surrounding the online reflective activity illustrated above. This new way of delivering an online reflective task is shown in the IRPA future delivery example 1 below. Students also found the process of reflection very time consuming thus the selection of ready-made reflective statements would ensure that students actively engage in reflective practices while at the same time challenging them to think about their new knowledge and how they will apply it. It was realized that this may lead to less verbal processing (Davies, 2000) a necessary part of making learning conscious. However, this was mitigated by the opportunity for students to either choose an appropriate statement or write their own. Furthermore, students were still able to submit a 150 word written reflective statement in their own words for assessment at the end of the Semester as part of their portfolio.

The wording of the instructions and reflective questions used for IRPA follows the style recommended by the Plain English Campaign (2006) characterised by short, active, and first person sentences. The aim here is to embody a 'voice' which uses a textual style

that sits between the academic and the informal as identified by Nicol, Minty and Sinclair (2003). After each online collaborative learning activity, students were directed (in Blackboard) to do an IRPA as shown here<sup>56</sup>:

#### Example 1: IRPA instructions

In the attachment irpa\_1.doc above there are THREE questions to answer. Read the instructions below then open the attachment (there are no right or wrong answers!).

Each question has three alternative answer statements A, B or C.

What we would like you to do is:

Take a step back in your mind and think about the activities you did in the library workshop;

Open the attachment, have a look at the questions and read the answer statements;

Decide which statement A, B or C best describes what you have learned so far;

Select the appropriate link EITHER A, B or C;

You will then receive some instant feedback from us.

If NONE of the statements match your experience then please follow the instructions in the attachment to e-mail your statement to us.

If you submit a reflection in your own words we will give you feedback within 24 hours.

This activity will take no more than 10 mins to do.

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<sup>56</sup> The full text of an IRPA is shown in Appendix 12

Example 1: IRPA question, selected statement and automated feedback:

**1. Which ONE of these THREE alternative statements best describes what you learned from last week's activity?**

1 A. Completing the activity last week has given me a greater overview of what to look for when studying sport related areas and where I need to be looking for relevant books. Plus, I now appreciate the vast amounts of resources the University provides and I am pleased to know how much information you can find relatively easily on varying subjects. I now feel that I have learned a great deal by using these electronic resources.

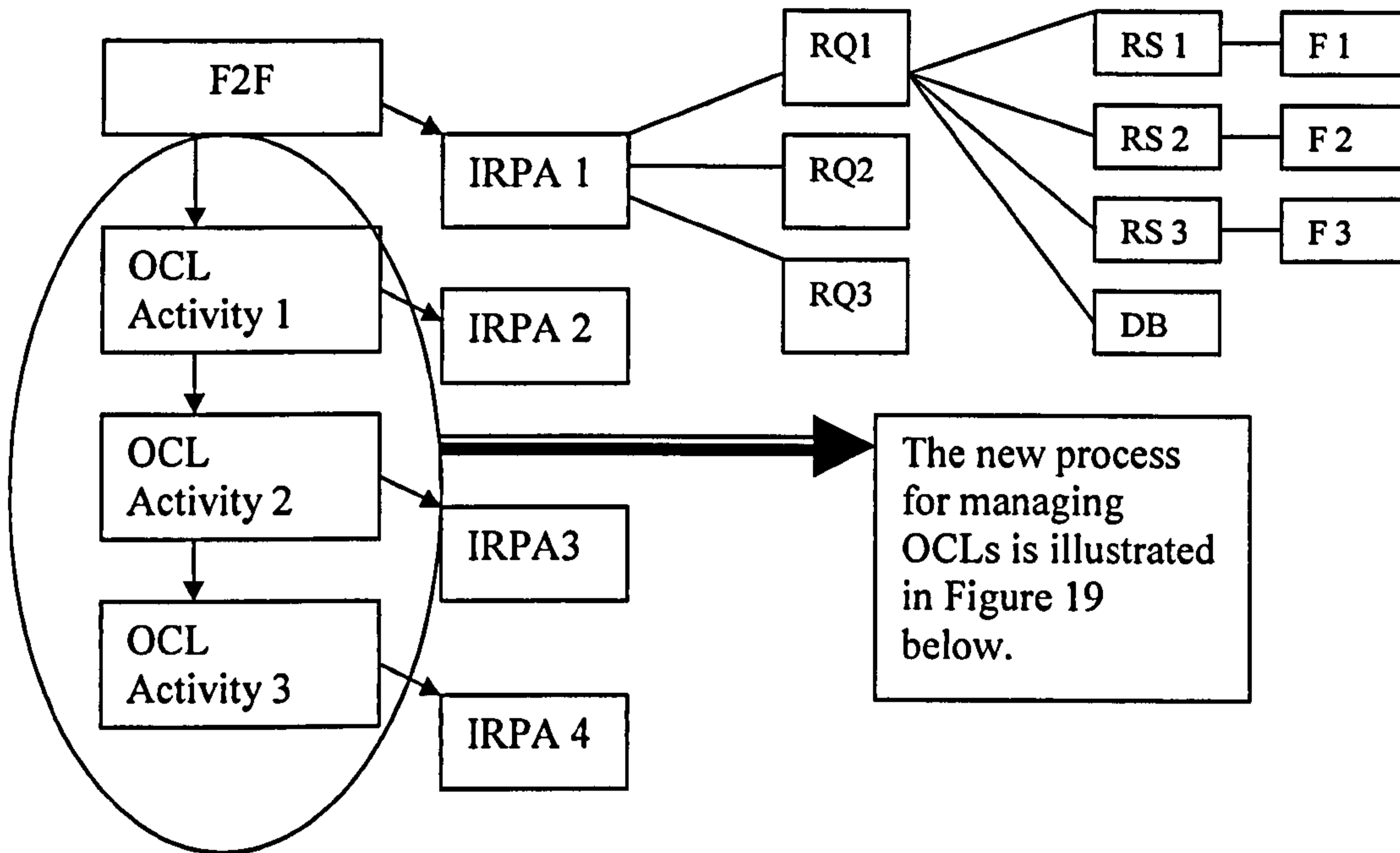
**Instant Feedback 1 A**

1 A. It's great that you feel that you have a good overview of the services on offer and know where to look to find books. You can use the online library to find full-text e-books (via e-brary) and full-text articles via the e-journals such as Swetswise too. Don't forget, all these resources are gathered together on the **Online Library** web page – think about using this as your starting point for all your information needs.

Make sure you familiarise yourself with all these e-resources so that you know where to start when you are looking for information for your assignment.

The employment of such an innovative approach to reflective practice is only possible after running the IL programme as no examples of real student feedback from which to create the reflective statements associated with IRPA 1 were available in the Pilot Study. Figure 18 illustrates that the students will complete an IRPA after the face-to-face activity and each online collaborative learning activity.

**Figure 18: Scheme for the new IL programme indicating new features**



**KEY**

**F2F: Face to Face Workshop Session**

**OCL Activity x: Online Collaborative Learning Activity**

**IRPA x: Instant Reflective Practice Activity**

**RQ x: Reflective Questions**

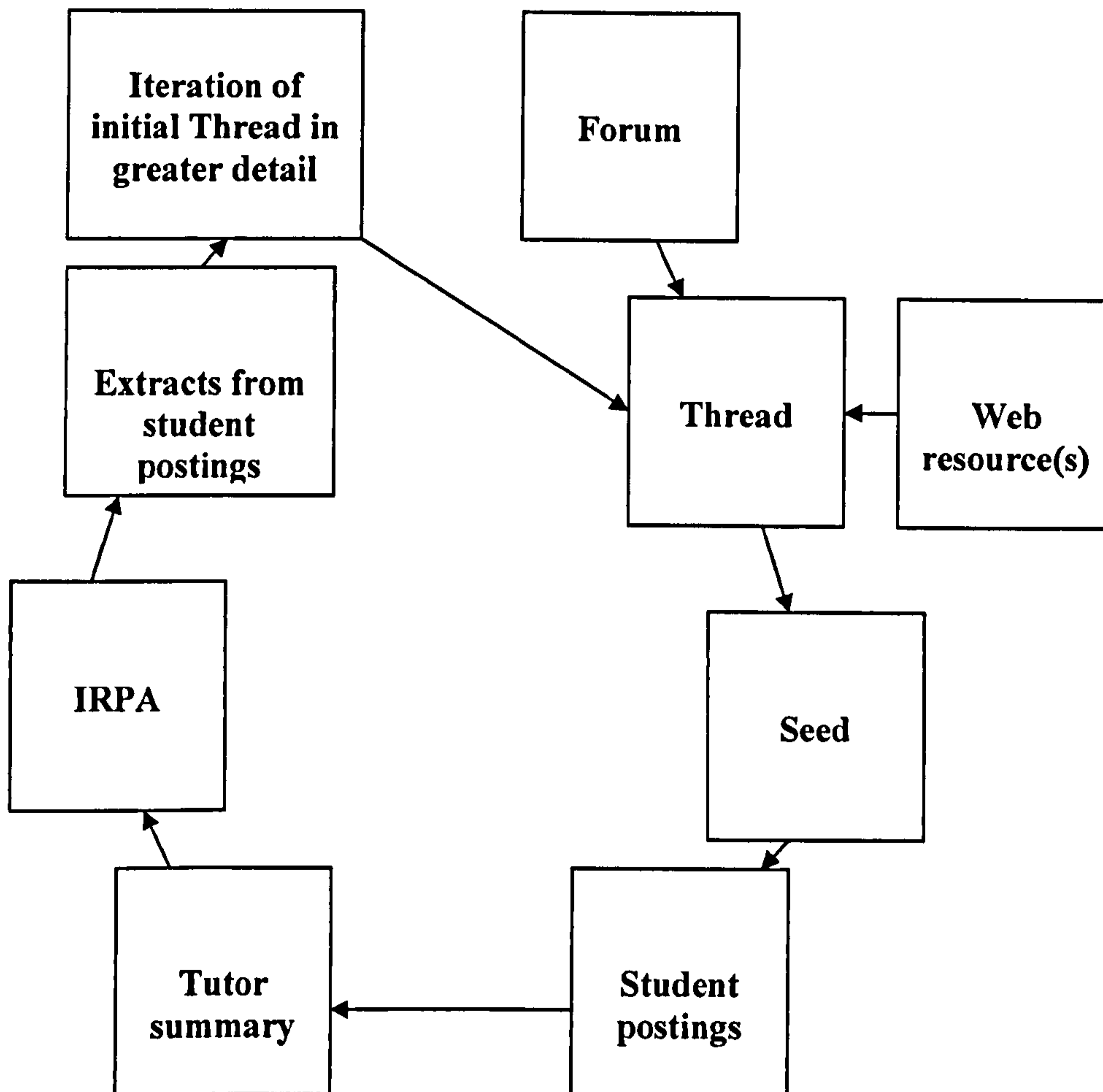
**RS x: Reflective Statements (NB: Two statements only presented in IRPAs 2-4).**

**DB: Dialogue Box for students to do a reflective statement in their own words**

**F x: Instant Feedback Statements**

To replicate the findings of the Pilot Study and take advantage of the new OCL process which emerged it was recommended that the OCL process be managed as shown in Figure 19 below.

Figure 19: New process for managing student centred OCL activities:



#### 5.2.1.3.7 Changes to the Questionnaire

Questions that gained zero responses should be restructured. In total 90% of respondents selected NO in answer to question 6 "Each online discussion was summarised by the tutors. Have you looked back at previous summaries?" It was recommended that a



supplementary question which asks why students did not consult the summaries were added to tease out the reasons for this.

#### *5.2.1.3.8 Changes to the Focus Group*

It was envisaged that a focus group would be selected at random as soon as possible ideally before the start of the programme and data gathered from its individual members at regular intervals. A whole Focus Group meeting will be held as soon as practically possible after the IL programme has finished. In effect this means week 1 or 2 of Semester 2. Interview schedules will be based on the Questionnaire questions which gained the richest responses for example, *“In what ways did you find x useful?”*

#### *5.2.1.3.9 Assessment*

In the assignment template the following changes were to be carried out:

1. Add exemplars for each resource to provide additional information on how to reference to APA standard.
2. Add an example evaluation for each resource to show students how an evaluation should be constructed.
3. In the reflective practice statement instruct students to reflect on the process of evaluating information sources.
4. Check that instructions adhere to guidance as used above for other activities.

### **5.3 Conclusion**

It can be seen that it is possible to use OCL to engage students in even the most detailed aspects of IL. From the tutors' perspective the process of iteration used in the evaluation activities worked very well despite the fact that this was an unplanned outcome of the delivery. The simplicity of the referencing task indicates how future activities could be constructed. However, the research also revealed that more work is required both in

terms of courseware development and in the process of managing online discourse. In terms of courseware development it is the formulating of instructions upon which more work should be concentrated. For example by making instructions short active and in Plain English as follows:

- 1. Use the web address (URL) of a web site you analysed last week.*
- 2. Decode the address - to help you do this have a look at the following resource on decoding URLs: <http://www.vts.intute.ac.uk/detective/urlclues.html>*
- 3. Post your decoding to your partner.*

In terms of managing the discourse it is the summaries which need most work and guidance as illustrated above was to be deployed.

Student participants proved remarkably articulate and honest. Though they proved willing to do the activities presented, a certain amount of negativity toward some aspects of the online programme was evident in the students' feedback. The reflective practice activity was perhaps a task too far and the IRPA is an attempt to make this less onerous for students to complete whilst still introducing them to the value of reflective learning.

The pre and post-diagnostic tests need to be changed and expanded to better reflect the knowledge students will gain in the module. It was envisaged that these would be administered to three groups as outlined in the recommendations. It was also noted that the assessed work, in terms of the evaluation of sources students present in their work, appear to provide further opportunities for quantitative data analysis.

It should also be noted here that the module leader made a number of interesting comments during the course of the IL blended delivery but the researcher failed to record any of these as they were not part of the original strategy. This seems to be a missed opportunity and it was felt should be rectified for the Main Study.

Whilst some useful coding categories emerged in the content analysis of the assessed reflective practice statements it was felt that these required a greater number of categories to fully articulate the processes evident in this IL blended intervention. It was decided, therefore, that coding categories defined using Hepworth's IB model (Hepworth, 2004), Bloom's taxonomy (Bloom et al, 1956) and Moseley's definition of metacognition (Moseley et al, 2004) should be deployed.

In completing the OCL activities described here students readily demonstrated an ability to be producers as well as consumers of knowledge. By recognizing and harnessing this fact it was planned that future online activities will include an opportunity for students to create a publicly available blog populated by appropriate external web resources chosen and evaluated by them. In effect this would be in addition to the OCL programme. It was envisaged that this additional activity would add a sense of purpose to the online activities beyond that of assessment. This would be described to student participants as an opportunity to share their knowledge more widely and build up a useful resource of relevant information. Initially this would be specifically for the Experimental group. However, it was envisaged that as students become more involved the blog would be opened up to all Level 1 students and then all Levels. It was envisaged that this could be expanded later to include other useful resources such as, journal articles and books to reinforce the fact that these remain of paramount value. Finally, from the evidence gathered and discussed it was decided that a new process model shown above in Figure 19 (for structuring IL OCL activities) was required in order to realise future delivery and research planned in the Main Study.

## **5.4 Summary of recommendations for the Main Study**

From the issues that emerged from the Pilot Study it is envisaged that the following recommendations should be adhered to:

### **5.4.1 Groups**

- To reflect Goodyear's definition of primary, secondary and tertiary courseware (Goodyear, 2001) it was recommended that three groups be tested, an experimental group that receives the whole intervention, that is, face-to-face workshop, plus OCL activities; an intermediate group which receives the face-to-face workshop plus access to primary and secondary courseware and a control group which receives the face-to-face workshop plus access to primary courseware only.

### **5.4.2 Assessment**

- To contain exemplars for each resource.
- To contain an example evaluation for each resource.
- Include an opportunity for students to reflect on the process of evaluating information sources.
- Ensure instructions adhere to guidance used for other activities.
- The narrative evaluations that students are required to provide as part of their assessment should be converted to numerical data to enhance the quantitative data analysis segment of this study, thereby providing further relatively value free data for analysis. This suggests an additional hypothesis (Hypothesis B) for testing. This is shown in Chapter 6.

### **5.4.3 Pre and post-delivery diagnostic tests**

- Make questions less obvious or open to guessing.
- When administering the test it must be emphasised most strongly in the instructions that students should not guess the answers.

### **5.4.4 Face-to-face delivery**

- Provide a clear statement to students given at the start of the face-to-face workshop and re-iterated throughout delivery indicating how IL online activities contribute to assessed work.
- Ensure that e-resources guides (for example Library Catalogue and Swetswise) are written in Plain English.
- Prepare alternative e-journals resource in case of access problems.

### **5.4.5 OCL activities**

- To be delivered as illustrated in Figure 18.
- Online discourse to be managed as illustrated in Figure 19.
- Ensure tasks take no more than 20 minutes to complete.
- Personalise tutor summaries.
- Ensure that summaries are available as hard-copy handouts.
- Ensure one format for all activities so that it becomes routine for the students to complete them.
- Attempt more online interventions by tutors during online discussions – as appropriate. This can be done by stretching task over a greater number of weeks allowing more summaries of discourse to be made. Alternatively, more tutor interventions in class time by replying to individual postings as discourse takes place.

- Provide a reflection for each activity in the form of an online Instant Reflective Practice Activity (IRPA) as outlined above.
- Provide an opportunity for students to upload their chosen web resources (the focus of the OCLs) with their evaluations onto the Sport & Exercise blog.
- Use the coding categories defined using Hepworth's IB model (Hepworth, 2004), Bloom's taxonomy (Bloom et al, 1956) and Moseley's definition of metacognition (Moseley et al, 2004) to articulate the cognitive and IB processes which occur during the intervention.

#### **5.4.6 Questionnaire**

- Ensure that questions reflect changes made to delivery as outlined above.

#### **5.4.7 Focus group**

- Ensure participants are selected at the commencement of the programme and interviewed individually after each OCL.
- Ensure that the whole focus group is interviewed as soon as practically possible after delivery of the programme is completed.

#### **5.4.8 Module Leader**

- Ensure that module leader's views on the perceived effects of the IL blended intervention on his students are sought after the intervention is completed.

## **6 Main Study Research Strategy**

### **6.1 Introduction**

This chapter sets out in detail the Main Study quantitative and qualitative research strategies, with modifications resulting from the Pilot Study, and how they were implemented. The same quality issues which arose for the Pilot Study Research Strategy (see Chapter 4) apply here and so are not reiterated in this chapter.

### **6.2 Main Quantitative Research Strategy**

This strategy was devised and implemented to test the following Hypotheses:

#### **1. Hypothesis A**

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater degree of knowledge in information literacy at the end of a module than at the outset than students who have not been exposed to OCL (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001, 2001).

#### **2. Hypothesis B**

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater ability to apply evaluation criteria in their assessed work than students who have not been exposed to online collaborative learning (that is, students

who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001). This will be manifest in two ways:

- (i) students who participate in OCL will tend use a greater variety of evaluation criteria in their assessed work and
- (ii) will tend, on average, to use these criteria more frequently.

This part of the research strategy in tandem with the Main Qualitative Research Strategy intended to address Hypothesis A by uncovering changes in students' knowledge across the duration of a module. It also sought to discover, through examination of students' responses to pre and post-delivery diagnostic tests, to what extent OCL had increased students' knowledge.

It was felt that responses given in the modified pre and post-diagnostic tests would reveal a dependable account regarding changes in students' knowledge. Given the results of the Pilot Study it was decided that the most appropriate way of gaining this data for the Main Study was via a closed questionnaire administered in controlled conditions. This generated specific responses which were analysed in a numerical fashion by allocating responses a score and using a statistical test to detect differences. It can be said that by doing research in this way the data can be regarded as relatively value free and the design can be repeated by others with ease (Bryman, 2004).

Hypothesis B was addressed by gathering students assessed work for analysis. The specific element of the assessment used was the short evaluative statements students had written for each information source they had found. To test Hypothesis B(i) the variety of evaluation criteria used were counted and made into a score. These raw scores were then analysed for significance as described in section 7.4. To test Hypothesis B(ii) the same set of data was used again but for this test each time an evaluation criterion was deployed by the student participant was recorded and made into a score, see section 7.5 for the precise way in which this was achieved.



These were triangulated by analysing assessment data and student postings during the course of the IL programme (via content analysis) and their detailed experiences of the IL intervention elicited via the analysis of interview data (the design for these are detailed below).

### **6.2.1 Design**

This part of the study was realised by administering of pre and post-delivery diagnostic tests, in the form of a questionnaire, to students immediately before the IL intervention and one week after delivery of the intervention was completed.

The pre and post-delivery diagnostic tests (see Appendices 13 and 14 respectively) were based on the IL learning outcomes devised in the delivery model (see Appendix 15) and focused on the skills students were expected to learn through the module for example, the effect of the Boolean term 'and' in a simple two keyword search strategy. The pre and post-delivery diagnostic tests were comprised of closed multiple-choice questions where the correct answer was unambiguous and straightforward. These two phases were necessary to detect differences in student responses over time. To detect whether OCL fostered greater learning in those students that received it over those that had received only a partial online intervention (primary and secondary courseware as defined by Goodyear, 2001) or those that received only the standard IL delivery (primary courseware as defined by Goodyear, 2001) it was necessary to ensure that there was an intermediate group (Group B) and a control group (Group C) received the diagnostic tests.

Assessed work data was gathered and recorded in Semester 2 of 2007, six weeks after the intervention was completed.

## **6.2.2 Procedure**

Students were administered the pre and post-delivery diagnostic tests at the beginning of the module before the IL intervention was delivered and the post-delivery diagnostic test was administered one week after the completion of the IL intervention. The tests were administered in examination conditions, therefore, students were not allowed to discuss answers and were given a set time to complete the test. It was anticipated that students would gain a greater degree of correct answers to questions at the end of the module than at the beginning. It was also anticipated that the Group B (intermediate group) would display fewer correct answers than Group A (experimental group who received the full IL blended intervention) and Group C would gain the fewest correct answers, that is, less than Groups A or B.

Groups received the IL blended intervention in the following way:

### **Group A (experimental group)**

1. One 50 minute workshop delivered face-to-face to students (see Appendix 16 for the lesson plan);
2. One 50 minute session workshop delivered in blended fashion each week for four weeks using online collaborative working techniques (tertiary courseware) which gave access to primary courseware elements, for example web pages (see Appendix 17 for a sample of these web pages) and online course documents (see Appendix 18 for the problem-based scenario and e-resources guides) and secondary courseware elements, for example interactive online quizzes (see Appendix 19 for a sample of these web pages).

### Group B (intermediate group)

1. One 50 minute workshop delivered face-to-face to students;
2. One 50 minute session workshop delivered in blended fashion each week for four weeks with access to secondary courseware techniques such as interactive online quizzes which also contained primary courseware elements, for example web pages and online course documents.

### Group C (control group)

1. One 50 minute workshop delivered face-to-face to students;
2. Access to primary courseware elements, for example web pages and online course documents only for the subsequent four weeks.

Group C (control group) can be regarded as the control Group because they received the IL delivery pattern students would normally receive if this research had not taken place. During the research period Groups B and C did not experience OCL. They gained access to this element after the post-delivery diagnostic test was administered, that is, when the research was completed.

### 6.2.3 Participants

The pre and post-delivery diagnostic tests were administered to three groups of students (numbers of students registered in each group were: Group A, n=17, Group B, n=17 and Group C, n=17) from the same cohort. These were students organised by the Faculty of Health into their seminar groups for the Level 1 core module *Effective Learning, Information & Communication Skills in Sport & Exercise* (2006-07 entry) at Staffordshire University.

#### **6.2.4 Techniques**

A closed question multiple-choice diagnostic test administered pre and post-delivery was devised and administered in controlled conditions. All students received exactly the same instructions and time to complete the tests.

#### **6.2.5 Data analysis**

Pre and post-delivery diagnostic test data was analysed using statistical methods advised by Field (2005) and available via SPSS. All tests were carried out using the raw data. The pre-delivery diagnostic test results between groups were compared using the SPSS statistical software package to detect any significant differences in test scores. This was repeated for post-delivery diagnostic tests between groups. Statistical tests were also carried out on the assessed work, again using SPSS, and are discussed in sections 7.4 and 7.5. These tests were carried out to detect differences specific differences between the three groups. In this case how each grouped used their knowledge of evaluation criteria to judge an information source, .

#### **6.2.6 How the findings will be reported**

A detailed report of these is put forward in Chapter 7, a discussion is furnished in Chapter 9 and conclusions are drawn in Chapter 10.

### **6.3 Main Qualitative Research Strategy**

This design was employed to answer the questions:

1. Does the teaching of information literacy in a blended environment (using face-to-face and OCL IL learning opportunities) structured using a scaffolded approach improve students' learning of IL?
  - a. What kinds of reflective practice questions best aid students in collaborating online?
  - b. Are tutor online interventions (specifically summaries of online postings from the group) perceived by students as a useful way of distilling output from the group for later use?
2. How do psychological states associated with information behaviour and thinking help explain the learning processes in an information literacy blended learning and teaching intervention?

This part of the study, modified as recommended in the Pilot Study in Chapter 5, sought to uncover student experiences across the duration of the IL blended intervention within the ELICS module. Through examination of students' reported experiences via interview and questionnaire responses it sought to ascertain to what extent IL OCL structures have benefited students' personal perceptions of their personal learning. This was triangulated in a number of ways: by analysing students assessed reflective practice statements via content analysis; examining student postings and via quantitative measures discussed above which were used to measure changes in IL knowledge and/or behaviour.

Given that the reflective practice (IRPA) component of the OCL intervention was a radical change from the Pilot Study it was seen as an essential to gain students' thoughts and feelings regarding the way in which the OCL was structured by seeking their views

on the reflective practice questions they were asked and whether the automated reflective statements provided caused them to think clearly about what they had learnt and therefore engage in meaningful reflection.

It was clear from the Pilot Study that more work needed to be done on the tutor summaries. Therefore, students' views on the ways in which the online postings of the group were summarised and presented by tutors was investigated to find out whether they found this a useful way of distilling the output of the group and of providing information they could use for subsequent tasks or for their assignment.

It was evident from the Pilot Study that a dependable account regarding viewpoint of the student, such as the meanings which they attribute to processes, was achieved. It was, therefore, decided that the techniques such as, semi-structured interviews using open ended questions to elicit detailed responses via a focus group of five students to discuss issues with students in more detail, a questionnaire and by analysing assessed work would be re-used with modifications recommended in the Pilot Study. By using these techniques the data gained revealed the closest account of students' real experiences of online learning. The method for data analysis used was 'qualitative content analysis' as recommended by Bryman (2004) with coding categories used from Hepworth's IB model (Hepworth, 2004), Bloom's taxonomy (Bloom et al, 1956) and Moseley's definition of metacognition (Moseley et al, 2004).

Student OCL output via the textual statements they made and exchanged during the course of one or more OCL activities was also examined to reveal the way in which participants communicated and shared their thoughts and ideas in an online setting.

### **6.3.1 Design**

The Main Study Qualitative Strategy was taken forward by focussing on one group of students (labelled Group A, experimental group) enrolled on a specific module at

Staffordshire University that of *Effective Learning, Information & Communication Skills (ELICS) in Sport & Exercise*. This part of the strategy focussed on revealing student experiences in order to determine what processes are evident within this intervention. It was necessary to carry out a Main Study Qualitative Strategy using the procedures, techniques and analysis set out below to fully test the research questions stated above in order to meet the objectives of this thesis.

### **6.3.2 Procedure**

This involved delivering the IL blended intervention, devised from the findings from the Literature Review in Chapter 2 and modified by the Pilot Study in Chapter 5, as part of the Level 1 core module (*ELICS) in Sport & Exercise*. This involved the following delivery pattern to 17 students in Group A (experimental group):

1. One fifty minute workshop delivered face-to-face to students. For the learning outcomes see Appendix 15, for the lesson plan see Appendix 16 and for the assignment see Appendix 18);
2. One fifty minute session workshop delivered each week for four weeks using OCL techniques (tertiary courseware) which will also contain primary courseware elements, for example web pages (see Appendix 17) and online course documents (see Appendix 18) and secondary courseware elements, for example an interactive online quiz (see Appendix 19). The text of OCL activities can be seen in Appendix 20. The delivery timetable can be seen in Appendix 21.

Therefore, during the research period Groups B and C (control group) did not experience the OCL intervention. They gained access to this element after the post-delivery diagnostic test was administered, that is, when delivery of the intervention was completed.

The contribution that students made to OCL tasks, by sending messages to the Discussion Board, were captured in Blackboard as described in Chapter 4.

Semi-structured interviews (see Appendix 22 for interview schedules) were carried out on five students to ascertain what they felt about the programme in terms of content and how they felt that it affected their learning. As with the Pilot Study it was decided to select students at random from Group A.

Each student was interviewed individually within one week of each part of the OCL delivery. In effect, each member of the focus group was interviewed on an individual basis every week in which the intervention took place. It was felt necessary to carry out individual interviews first (prior to the whole group interview) in order to explore issues in greater depth and capture their individual responses, thereby gaining a richer picture than the Pilot Study. In so doing it was felt that the advantages of one-to-one interviewing, outlined in Chapter 4, would be harnessed for the Main Study. It also meant that themes which emerged from individual interviews could be used as a basis for discussion with the whole focus group.

Themes from these individual interviews were extracted and used as a basis for the whole focus group interview held after the IL blended intervention had taken place (see Appendix 23 for interview schedule). Hence, only one whole group interview (where all focus group members were present) took place.

An additional recommendation from the Pilot Study was that the module leader's views on the intervention should be sought. This interview took place in Semester 2 of the academic year in question.



### **6.3.3 Participants**

Detailed analyses of the OCL intervention necessitated focusing on one group of students (Group A, experimental group, n=17) who attended a subject specific module at a UK university. These were students organised into their seminar groups by the Faculty of Health for the Level 1 core module *Effective Learning, Information & Communication Skills in Sport & Exercise* (2005-06 entry) at Staffordshire University. In addition, the module leader also took part in this round of the study.

### **6.3.4 Techniques**

The following techniques were adopted to gather appropriate data for analysis:

- All online discussion output was captured and stored digitally and in hard-copy.
- Semi-structured interviews using the interview schedule devised to elicit various affective, motivational or other aspects of students' individual and then collective experiences were carried out (Appendix 23).
- A semi-structure interview held with the module leader to ascertain his views on the perceived effect of the module on his students (Appendix 24).
- Access to students' written assessed work was gained and their output analysed.

### **6.3.5 Data analysis**

- Analysis of written reflective practice statements, online postings and assessed work was achieved using techniques as suggested by Bryman (2004) where the coding regime was defined by using categories drawn

from Hepworth's IB model (Hepworth, 2004), Bloom's taxonomy (Bloom et al, 1956) and Moseley's definition of metacognition (Moseley et al, 2004).

- Interview and questionnaire responses were analysed using qualitative content analysis to examine interview responses.

### **6.3.6 How the findings are reported**

Findings were organised into a detailed report. This is put forward in Chapter 8, a discussion is furnished in Chapter 9 and conclusions are drawn in Chapter 10. Given that this study focused on students at a specific university means that generalised statements regarding the findings should be made with great care. This issue is discussed in Chapter 10. Finally, the findings and their implications are to be reported to the IL and academic community via peer reviewed publications and conference presentations.

## **7 Quantitative Data Findings**

### **7.1 Introduction**

Three groups were involved in the study. Each received a separate intervention as outlined below.

#### **Group A (experimental group)**

1. One 50 minute workshop delivered face-to-face to students;
2. One 50 minute session workshop delivered (in blended fashion) each week for 4 weeks using online collaborative working techniques (tertiary courseware) which gave access to primary courseware elements, for example web pages and online course documents and secondary courseware elements, for example interactive online quizzes.

#### **Group B (intermediate group)**

1. One 50 minute workshop delivered face-to-face to students;
2. One 50 minute session workshop delivered (in blended fashion) each week for 4 weeks with access to secondary courseware techniques such as interactive online quizzes (this also contained primary courseware elements, for example web pages and online course documents).

#### **Group C (control group)**

1. One 50 minute workshop delivered face-to-face to students;
2. Access to primary courseware elements, for example web pages and online course documents only for the subsequent 4 weeks.

Group C (control group) can be regarded as the control Group because they received the IL delivery pattern students would normally receive if this research had not taken place. During the research period Groups B and C did not experience online collaborative working.

For this analysis two data gathering instruments were used:

1. a diagnostic test administered before and after the teaching intervention – known as the pre and post-delivery diagnostic tests;
2. assessed work in the form of students' written evaluations of information sources (two books, two journal articles and two web pages) submitted as part of an assessed piece of work.

## ***7.2 Pre and post-delivery diagnostic test results***

The hypothesis (Hypothesis A) drawn up for testing was as follows:

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater degree of knowledge in information literacy at the end of a module than at the outset than students who have not been exposed to OCL (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001).

The pre and post-delivery diagnostic tests were administered to all three groups under examination conditions that is, students were not allowed to confer or check their answers before handing in their completed test sheet. The pre-delivery diagnostic test took place before any of the information literacy (IL) elements of the module had been delivered. The post-delivery diagnostic test was administered one week after the final information literacy element of the module was delivered, that is, six weeks after the pre-delivery

diagnostic test. The tests comprised fourteen questions based on the learning outcomes for the information literacy segment of the module and covered the areas of using the library catalogue, searching e-journals, evaluating information sources and referencing. Pre and post-delivery diagnostic test questions were identical in order to detect whether there were any differences in students' scores before and after delivery of the IL component of the module. In short to what extent students IL knowledge had increased as a result of the intervention.

Students were allowed to answer each question either 'true', 'false' or 'don't know'. A correct answer was allocated 3 points, an incorrect answer 2 points and a 'don't know' answer 1 point. A summary of the diagnostic test scores for all groups, pre and post-delivery, are presented below. It should be noted that a greater number of students participated in the pre-delivery diagnostic test than the post-delivery diagnostic test which may have a bearing on the results themselves, the implications of these issues are discussed in section 10.4.

**Table 3: Pre-delivery diagnostic test scores descriptive statistics for each group (see Appendix 28 for raw data)**

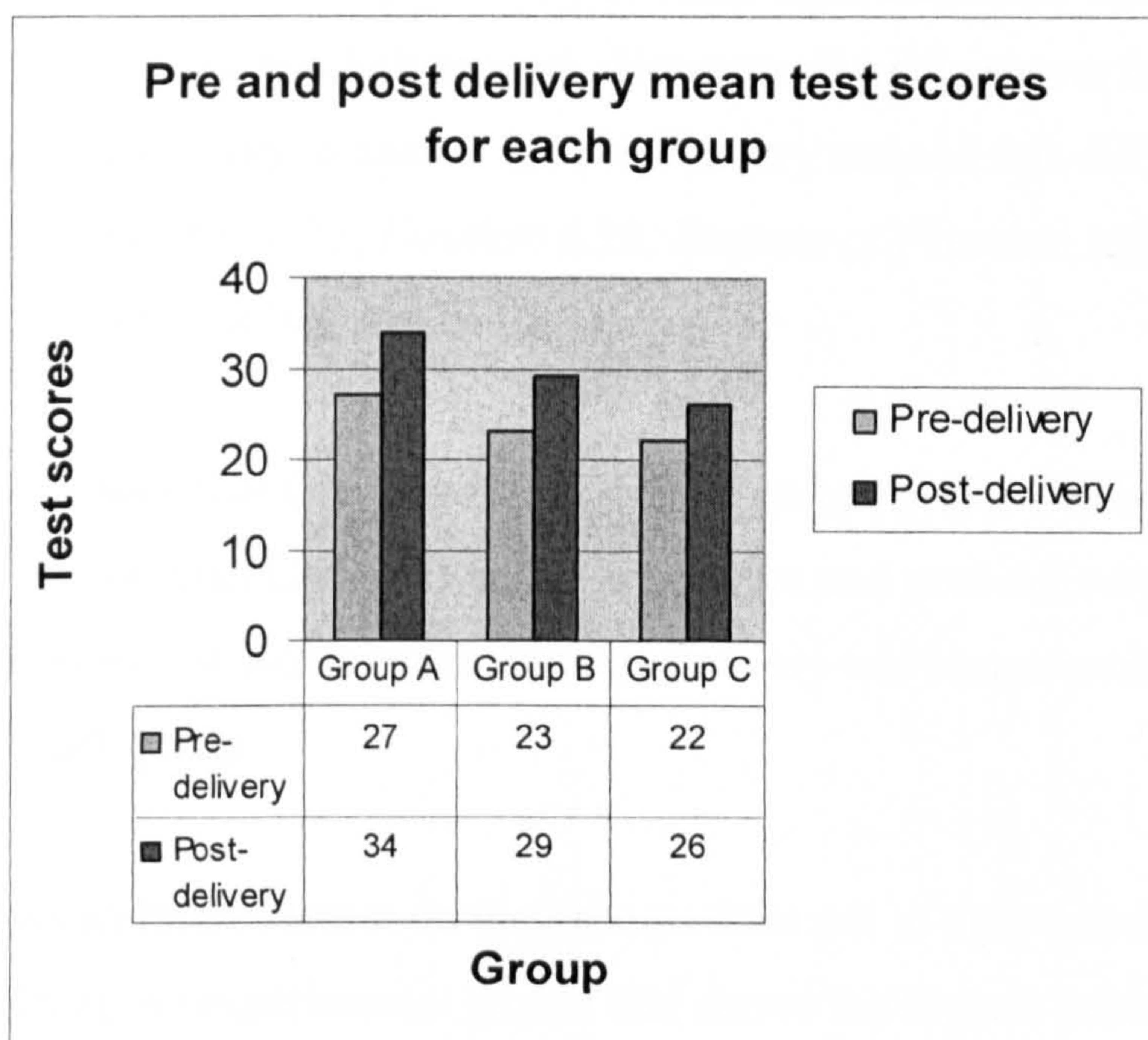
	<b>Group A (experimental group) scores</b>	<b>Group B (intermediate group) scores</b>	<b>Group C (control group) scores</b>
	n=12	n=11	n=12
Means	27.00	23.09	22.00
Standard deviation	4.37	3.42	5.17

**Table 4: Post-delivery diagnostic test scores descriptive statistics for each group (see Appendix 29 for raw scores)**

	<b>Group A (experimental group) scores</b>	<b>Group B (intermediate group) scores</b>	<b>Group C (control group) scores</b>
	n=8	n=8	n=9
Means	34.25	28.63	25.56
Standard deviation	4.13	7.74	7.55

These scores are summarised descriptively in graphical form for comparison in Figure 20 below.

Figure 20: Pre and post-delivery mean test scores for each group



It can be seen that pre-test scores are not equal between groups.

Whilst statistical tests could be carried out between groups for pre and post-delivery diagnostic tests it should be noted, because of the way the data was gathered, that direct statistical comparison of pre and post-delivery tests within group was not possible. Initial inspection of the histograms generated via SPSS (Appendix 30) for each group indicated that data is symmetrical and not skewed and therefore provides evidence that the data are not skewed in the population. This allows the assumption to be made that the data is parametric in nature<sup>57</sup>. This indicated that it would be more suitable to use a parametric statistical analysis such as the one-way ANOVA test to determine significant differences or otherwise. This test was then deployed to examine differences between groups pre-

<sup>57</sup> It should be noted that this approach was carried through into the assessed work statistical calculations and the same conclusion drawn.

delivery and then post-delivery. The *Tukey*<sup>58</sup> post-hoc test (as recommended by Field, 2005 and Clark-Carter, 2004) was carried out as a follow up to ANOVA to confirm significance (see Appendix 31).

It was assumed that the three groups would not differ significantly in their ability to answer the questions in the pre-delivery test. However, the data shows that the groups were not equal in their ability to answer the pre-delivery test and this difference is statistically significant at  $p < .05$ ,  $F\text{-ratio} = 4.29$ , *Degrees of Freedom* (df)= 2 (between groups), 32 (within groups) (see Appendix 31).

In general it can be seen that Group A (experimental group) performed better, that is, their scores are higher, than Groups B and C in both pre and post-delivery tests. Comparisons between test scores show that post-delivery test scores were higher than pre-delivery for each group.

Each group shows an improvement on their scores from pre to post-delivery test. However, it is Group A (experimental group) that shows the highest post-delivery test score. This set of statistics gives an indication of the positive effect of the OCL intervention on the degree of knowledge gained by Group A (experimental group) over the other two groups (Groups B and C).

Further tests were carried out on the post-delivery test score data to confirm that differences in performance were present across the groups. This was done by using homogeneity of variance and was checked using rule of thumb. Results showed that there was a lack of homogeneity (see Appendix 32) and so *Welch's* test was deployed and it was found that:

Post-delivery test scores between Group A (experimental group) and Group C (control group) are significantly different at  $p < .025$ ,  $t = 2.66$ , *Degrees of Freedom* (df)= 22 (within groups).

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<sup>58</sup> Tukey compares two group means at a time.

Post-delivery test scores between Groups A (experimental group) and Group B (intermediate group) are not significant  $p > .62$ ,  $t = .94$ , *Degrees of Freedom* (df)= 22 (within groups).

These statistical tests and descriptive statistics considered as a whole allow us to suggest that the hypothesis can be upheld. This is probably the most important result as it indicates that not only did Group A (experimental group) gain the higher scores in the post-delivery diagnostic test than the pre-delivery diagnostic test but also gained a statistically significantly greater score in the post-delivery test than Group C (control group).

### **7.3 Assessed work evaluation criteria results**

This analysis was devised in order to test the following hypothesis (Hypothesis B):

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater ability to apply evaluation criteria in their assessed work than students who have not been exposed to online collaborative learning (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001). This will be manifest in two ways:

- (i) students who participate in OCL will tend use a greater variety of evaluation criteria in their assessed work and
- (ii) will tend, on average, to use these criteria more frequently.

Students assessed work scripts were used for this part of the analysis. Students were instructed to find and evaluate six information sources (two books, two journal articles and two web pages) to answer the problem-based scenario.



Each evaluation within each student's assessed work was examined separately and two sets of data were produced:

1. Variety of evaluation criteria used to analyse information sources - in answer to Hypothesis B(i).
2. Frequency of evaluation criteria used to analyse information sources – in answer to Hypothesis B(ii).

### **7.3.1 Variety of evaluation criteria used to analyse information sources**

Before data could be analysed it was necessary to turn the assessed work into numerical data for statistical analysis, to do this each use of a specific evaluation criterion was allocated a score of '1'. This established, in numerical terms, the variety of evaluation criteria that students had used in their assignments. Given the nature of this exercise there was no upper limit to the number of criteria students might have deployed in analysing their information sources.

The way in which evaluation criteria were made into a numerical score is illustrated here (see Appendix 25 for complete examples of students' work). This is an example of how students had used the 'authority' criterion in their assessed work to evaluate an information source:

*'This is a good reference because it is of an academic nature because it was published by Cardiff University [...]*

In this example the student has used the 'currency' criterion in their assessed work:

*'This is an excellent resource because it is such a recent journal<sup>59</sup>.'*

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<sup>59</sup> The information source used by the student was published in 2006.

This further instance exemplifies that the ‘relevance’ criterion has been used in a piece of assessed work:

*‘It covers all aspects of football hooliganism [...]’*

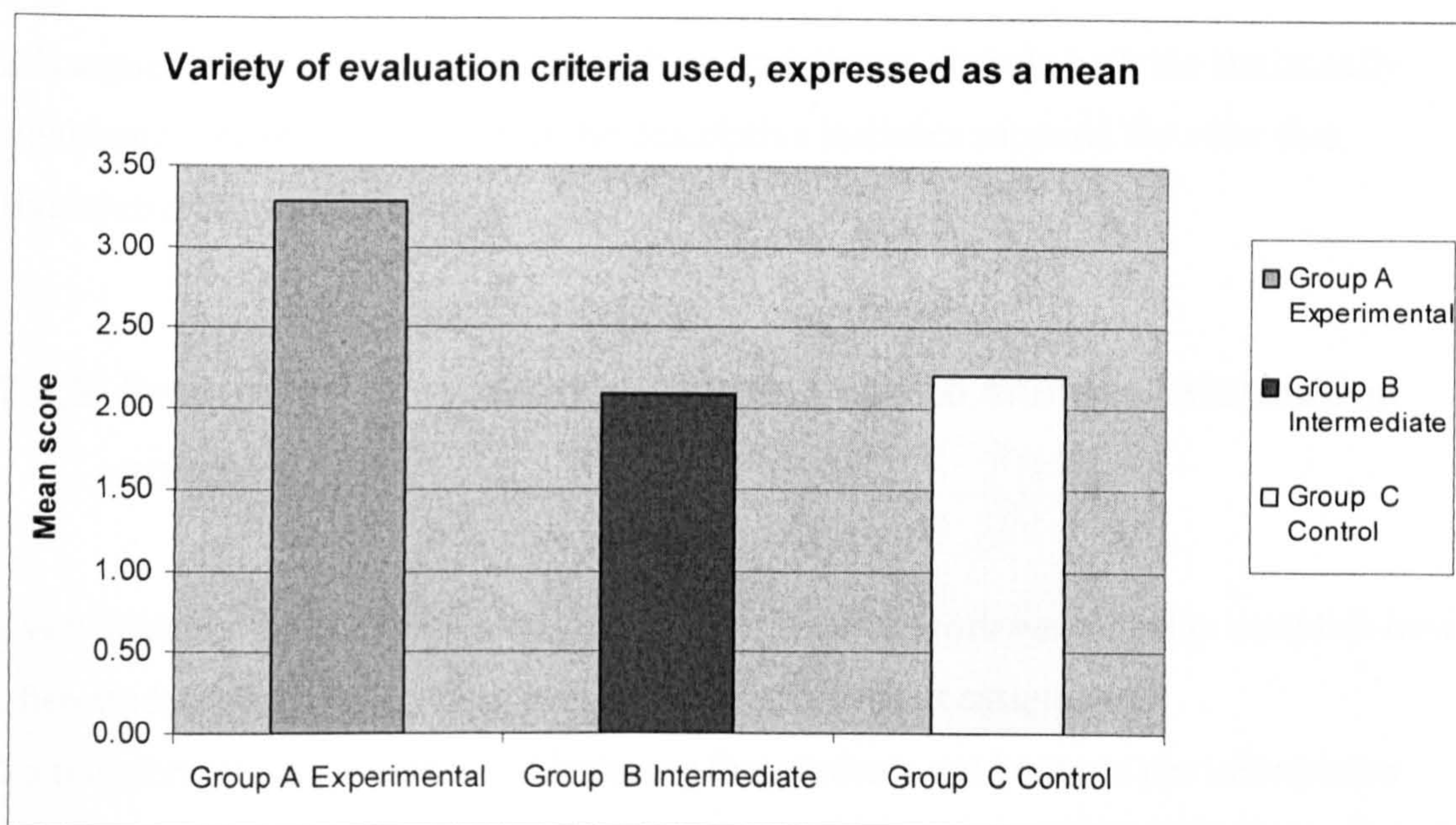
Hence, each instance of a particular evaluation criterion used was allocated one point. Therefore, for a piece of assessed work where currency, relevance and authority criteria were used a score of ‘3’ was recorded. If a student used only the relevance criterion across the assessed work then the score allocated was ‘1’. A summary of scores for each Group is shown in Table 5 below.

**Table 5: Descriptive statistics for variety of evaluation criteria (see Appendix 33 for raw data)**

	<b>Group A (experimental group)</b>	<b>Group B (intermediate group)</b>	<b>Group C (control group)</b>
	n=14	n=11	n=10
Means	3.29	2.09	2.20
Standard deviation	1.59	1.22	1.23

Results are summarised diagrammatically in Figure 21 below:

**Figure 21: Variety of evaluation criteria used, expressed as a mean**



The descriptive statistics in Figure 21 above illustrates the differences between the three groups with Group A (experimental group) scoring much higher in this analysis than either Groups B or C. Statistical analysis using the one-way ANOVA showed that these differences are not statistically significant. This indicates that students in Group A (experimental group) used a greater variety of evaluation criteria in their work than either groups B or C, but that this greater use is not statistically significant.

To further investigate the possible significance of the results it was decided to examine the 'effect size' for these results. Where small samples such as these are involved measuring effect size enables the researcher to determine how many subjects are required per group to replicate the statistical effect noted using the one-way ANOVA to give the test sufficient statistical power (Clark-Carter, 2003). Running the test  $\eta^2$  (*Eta squared* see Appendix 34 where partial *Eta squared* for the Group is 0.152) and then inspecting appropriate tables in Clark-Carter (2004, p604) indicates that with such a large effect size to replicate this study with statistical power of 0.8 in a future study would require at least

nineteen (19) subjects per condition. In short, a large effect size exists for these results and means that if this part of the study was carried out again with nineteen subjects per condition it would have produced statistically significant results.

It is argued that in taking into account these statistics as a whole both the statistically significant results, effect size plus the descriptive statistics supports the view that Hypothesis B(i) can be upheld.

### 7.3.2 Frequency of evaluation criteria used to analyse information sources

Every instance that a criterion was used in the assessed work was noted to establish how often students were using these evaluation criteria in their assignment.

To transform the total number of instances that students used criteria per information source into numerical data for analysis each instance of an evaluation criterion recorded was allocated a score of '1'. This established, in numerical terms, the total number of instances evaluation criteria were used in their assignments. Hence, for example a student who used three types of relevance criteria, two currency criteria and two authority criteria across their assessed work would be allocated a score of '7'. If this same student evaluated '6'<sup>60</sup> sources in total in their assignment then their average score would be '7' divided by '6' giving a numerical value of '1.17', illustrated in the formula below:

$$\begin{aligned} \text{Average number of instances} &= \frac{\text{number of instances of criteria used}}{\text{number of sources evaluated}} \\ \text{of evaluation criteria per} & \\ \text{information source cited} & \\ \\ \text{Average} &= \frac{7}{6} = 1.17 \text{ (rounded to two decimal} \\ & \text{places)} \end{aligned}$$

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<sup>60</sup> In theory all students should have evaluated six sources that is, two books, two journal articles and two web pages

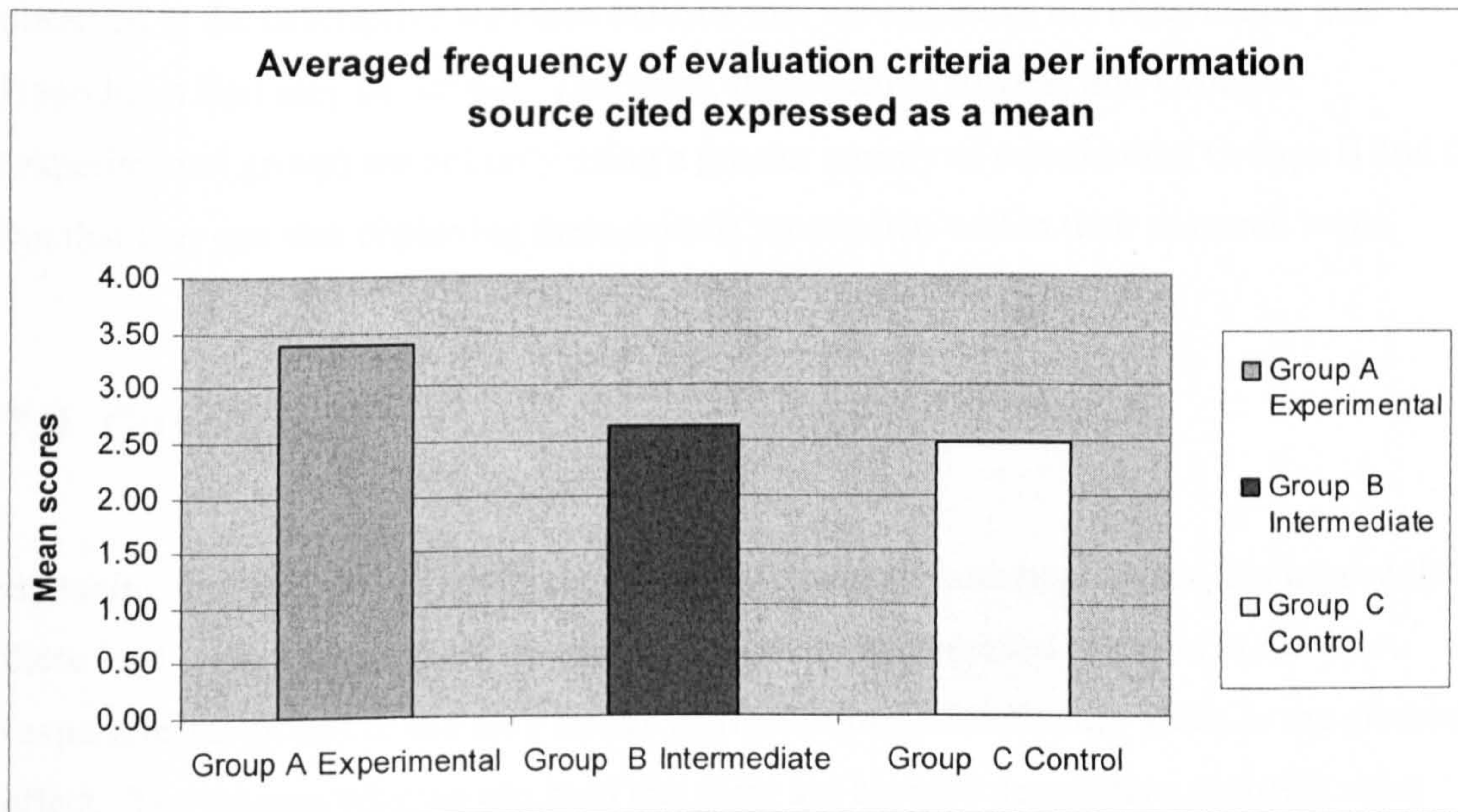
Scores obtained are shown in Table 6 below:

**Table 6: Averaged frequency of evaluation criteria used per source cited descriptive statistics (see Appendix 35 for raw scores)**

	Group A (experimental group)	Group B (intermediate group)	Group C (control group)
	n=14	n=11	n=10
Means	3.39	2.64	2.47
Standard deviation	1.12	1.05	1.07

Scores are summarised diagrammatically in Figure 22 below:

**Figure 22: Averaged frequency of evaluation criteria per information source cited expressed as a mean**



Raw data scores for Group C (Control Group) have one 'outlier' – a datum which appears to be unusually high with respect to the other data gathered in the group (see Appendix 35). However, because this is real data from a real event (an assignment) it is assumed that this datum should be included in the analysis.

Using the one-way ANOVA established that differences in scores were not statistically significantly different between Groups. However, it can be seen in Figure 22 that the averaged scores were greater for Group A (experimental group) over Groups B (intermediate group) and C (Control Group).

Again, by using the effect size measure, as calculated for Variety of evaluation criteria using the same method as outlined above, demonstrates a large effect size for eta squared (see Appendix 36). Running the test  $\eta^2$  (*Eta squared* see Appendix 36 where partial Eta squared for the Group is 0.139) and then inspecting appropriate tables in Clark-Carter (2004, p604) indicates a large effect size and that to gain a statistically significant result in a future study would require between 20 (twenty) and 25 (twenty five subjects) per condition.

Taking into account the large effect size between Groups for this test plus the differences observed in the descriptive statistics indicate that we can make the observation that Hypothesis B(i) may be upheld. Therefore, these results suggest that Group A (experimental group) are not only using a greater variety of criteria than Groups B and C, but that they are also deploying these criteria more often within their assessed work.

## **7.4 Conclusion**

By taking into account all the statistics for the results to both hypotheses it is argued that these lend weight to the view that the OCL activity had enabled students in Group A (experimental group) to use their newly learned information literacy skills to the greatest effect. The reasons why we can hold this view are because descriptive statistics show that Group A gained higher scores than Groups B and C in the two diagnostic tests and the assessed work; Group A (experimental group) performed statistically significantly better in the post-delivery diagnostic test than Group C (allowing Hypothesis A to be upheld) and finally calculations indicate that whilst statistical significance is not present in either evaluation criteria test there is a large effect size for both. By taking into

account effect size in this way, as recommended by Clark-Carter (2003; 2004) allows both (i) and (ii) of Hypothesis B to be upheld. It also permits the conclusion to be made that if the study were to be replicated with a larger sample size statistically significant results would be obtained.

## 8 Qualitative Data Findings

### 8.1 Introduction

The specific research questions addressed in this chapter are:

1. Does the teaching of information literacy in a blended environment (using face-to-face and OCL IL learning opportunities) structured using a scaffolded approach improve students' learning of IL?
  - a. What kinds of reflective practice questions best aid students in collaborating online?
  - b. Are tutor online interventions (specifically summaries of online postings from the group) perceived by students as a useful way of distilling output from the group for later use?
2. How do psychological states associated with information behaviour and thinking help explain the learning processes in an information literacy blended learning and teaching intervention?

Data was coded using Hepworth's model of information behaviour<sup>61</sup> (Hepworth, 2004) detailed previously. In addition, Bloom's Taxonomy of learning objectives<sup>62</sup> (Bloom et al, 1956) and Moseley et al's definition of metacognition<sup>63</sup> (Moseley et al (2004) provided extra coding dimensions to further articulate the knowledge and cognitive states identified in Hepworth's model (see Appendix 37 for coding framework). Evidence here centres on Focus Group responses (members were selected at random from Group A) and

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<sup>61</sup> Hepworth's model of information behaviour<sup>61</sup> (Hepworth, 2004) is examined in section 2.3.1

<sup>62</sup> Bloom's taxonomy (Bloom et al, 1956) is covered in detail in section 2.4.2 above

<sup>63</sup> Moseley et al's definition of metacognition (Moseley et al, 2004) is covered in detail in section 2.4.2 above



is corroborated, where appropriate, by other data such as questionnaire responses, online discourse, diagnostic test results and written assessment data. From the verbal and written data provided by interviewees and participants the behaviours associated with information literacy can be identified. These provide, in a sense a verbal and written log of activities undertaken by the student and indirectly an audit of information behaviours that to a greater or lesser extent the learner has implemented.

Section 8.2 of this analysis is concerned with data associated with face-to-face workshop: section 8.3 is focussed on the OCL activities. Comparisons with Groups B and C are made and significant differences are reported.

## **8.2 Face-to-face workshop**

### **8.2.1 Sociological data**

Responses indicate that initially students attempted to develop a sense of context (Hepworth, 2004, identifies this as *sociological data*<sup>64</sup> particularly that which is associated with *norms*) in a number of ways. Firstly, regarding both their wider role as a student at university:

A1 “[...]”<sup>65</sup> *we’ve only been here a few weeks and we are getting used to everything and me personally, like, it was a bit new [...]*

Particularly significant are the comments: “*we’ve only been here a few weeks*” and “*it was a bit new*” which gives a sense of the novelty of the situation, and a degree of uncertainty, which the student has to come to terms with; “*getting used to everything*” indicating that the student was working out how to be at university by determining the

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<sup>64</sup> Coding components derived from Bloom et al (1956), Hepworth (2004) and Moseley et al (2004) are shown in italics.

<sup>65</sup> Squared brackets and ellipsis thus [...] at the beginning, within text and/or at the end of an extract indicates that some of the comment has been omitted for clarity.

normative boundaries. The responses shown below corroborate this view regarding the newness of their situation:

A2 “[...] you’ve just moved into halls and you’ve got thirteen friends waiting probably just started drinking and you’ve just been there two weeks, all of a sudden you just want to get back.”

A2 “[...] in the first year obviously everyone is settling in [...]”

Secondly, their *role* as a student within the learning situation itself (in this case the face-to-face workshop):

A2 “[...] I remember having to find out which books were in the library, how many books were in the library, how long we could take them out for, how many books there were of that kind, where to search the library.”

In this instance it appears that the student recognised one of the main functions of being a student at university in that she needs to look for relevant books, that they are in the library and there are limits to how many are available and that they can be borrowed for a finite time. It also relates to the *task* which students have to complete, in short a specific learning outcome, that of becoming familiar with the Library Catalogue (See Appendix 15 for the full list of learning outcomes). Additionally it shows that the student has gained detailed knowledge of the purpose of this artefact and how this tool enabled them to achieve the *task* and gain *knowledge* that would be useful to them. Finally, the comment also indicates a sense of confidence that is, a *positive style state*, and *certainty* in using them.

In addition, this *task* orientation is further alluded to in these comments:

A3 “I’ve used it for a couple of my essays and a lab report I’m doing at the moment.”

A6 *“I have learnt how to search for material in the library and the online e-brary which is a great help when researching topics.”*

In this instance the student is talking about how she has used her learning for two specific goals. This student is clearly operating at a high order in that the student distinguishes between two specific types of subject related tasks: *“my essay”* and *“a lab report”*. It also indicates that the student had transferred their skills across assignments. Furthermore, it shows that the student accepted the *norms* associated with completing the *task* by producing output in the form of a written document. Additionally it provides evidence that the student has demonstrated *behaviour* that they may have not engaged in previously.

These comments below further demonstrate task orientation via the normative behaviour of intending to complete an *“assignment”* by using the e-resources they were exposed to in the face-to-face workshop:

A7 *“I would say that the most important thing I have learnt for sure is that the online library is the best starting point when researching an assignment in the future.”*

A8 *“I will incorporate this new knowledge and skills in the future by using these skills when completing a new task e.g. I can use the online library to search for e-books and books. I can also use Swetswise to find e-journals to use for assignments.”*

Thirdly, and perhaps not unusually, the realisation that it is acceptable to do one’s learning independently and away from the confines of the university buildings, that is, the library:

A2 *"It showed me that, obviously, you could do it at home instead of coming into the library, it helped knowing that I could sit in my room and basically search the library in my own comfort."*

A2 *"[...] and being able to, like, go on the internet instead of having to come into the library."*

A3 *"It helped because [...] it saves me coming up here as well."*

One of the main implications of these comments for academic staff and librarians is to accept that Level 1 students, in the first weeks of Semester 1, are coming to terms with a completely new way of learning and that allowances should be made for that.

Interestingly one student mentions, in very positive fashion, the learning and teaching method used in the face-to-face workshop (Gibbs, 1998a, p15, calls this technique 'touring'):

A1 *"I liked the way you went through everything with us, like, the guy before he was, like, sort of rushing us but you, like, came around and made sure that we were all at the same stage and all keeping up to date and I appreciated that [...] so it was good that you came around and you showed us what to do and you didn't let us, like, get behind in the work and that was good."*

This highlights the insecurity of the new learner; the concern about being left behind and the need for explicit support and intervention enabling the learner to participate and continue with the learning process. It also indicates that this pedagogic intervention as described by the student, in a sense the learning context or *source character*, appeared to instil a *positive affective state* in the student which served to mitigate their apparent insecurities.

This student corroborates the assertion made above:

A3 “[...] we actually went off and tried it ourselves, you learn it better then, don't you, like, how to do it.”

What students are describing here is being engaged in a hands-on activity using an e-resource and the resulting *positive affective state* it engendered. It can be seen that students appear to be very positive towards what they had learned, seemed to value their new knowledge and also seemed to instil a *positive style state*. A further instance of this is shown below:

A2 “I remember going through, obviously, searching the e-books, e-journals on the internet which worked really well.”

In addition to these states shown above, students exhibit certain other *psychological* characteristics, Hepworth (2004) articulates these as *psychological data*, which appear to mediate their *behaviour* in specific ways when they attempt to come to terms with this new situation and understand its *norms, roles* and *tasks*. These further categories are unpacked and evidenced in detail below.

### 8.2.2 Psychological data

In Hepworth's IB model (Hepworth, 2004) a distinction was made between *knowledge state, cognitive state, style state* and *affective state*. *Knowledge state* referred to the learner knowledge of the subject domain but also of the resources that will help them to become informed. This knowledge state can be further unpacked using Bloom's taxonomy (Bloom et al 1956) and the relevant subsets emerging here are that of *factual knowledge, knowledge of specifics* and *knowledge of a process*. *Cognitive state* is related to the thinking processes, the questions in the mind of the individual. Bloom et al (1956)

is also helpful here in disaggregating the cognitive state into further sub-sets<sup>66</sup>, that of *comprehension, application, analysis, synthesis* and *evaluation*. It is also useful at this stage to equate the IL category of *find information* with that of Bloom et al's *application*, the IL categories of *evaluate information* and *use information* with that of Bloom et al's *analysis* and *synthesis* respectively. *Style state* is related to those characteristics of the individual that may affect their learning, for example, learning style and motivational states. *Affective state* referred to the emotions, the feelings, of the individual that as with the other states may affect the information behaviour and the information needs of the individual. Finally, it will also be useful to use Kulthau's notion of *uncertainty* (Kulthau, 1991). Evidence for these states is discussed below.

### 8.2.2.1 Knowledge state

Student responses indicate that they had gained new *factual knowledge* of specific e-resources, that is, e-books and e-journals, in essence they exhibit knowledge of the *source character*:

A1 "I have acquired new knowledge on the Library Catalogue, Swetswise, e-journals and the Web. I now know how to look for E-journals and E-books on Swetswise and E-brary, something I did not know how to do before."

A9 "I have also learnt how easy it is to find a text on the online library by using keywords, or a title of a book or an electronic journal [...]."

A10 "I found looking at the online library and catalogue very useful, it allowed me to see what books were available and where I could get them from. "

Additionally, students appear to fulfil the IL category of being able to find information.

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<sup>66</sup> Bloom's Taxonomy is discussed in detail in section 2.4.5

In this instance the student indicates another *knowledge* category, that of *process knowledge* exemplified in a description of a keyword search:

A2 *"If you are given a subject, obviously, in sport especially you might be just given psychology, just psychology or hooliganism you don't necessarily need to know what book you are looking for, you can look for a certain subject."*

This student demonstrates that she has grasped the nature of the discipline and the subject domain and how terms associated with the subject domain can be used for searching for information expressed as keywords, how to combine them in subject searching and why that can be a useful way of searching. Again, fulfilling the IL category of being able to *find information*. Also demonstrated here is the student's *knowledge state* regarding the systems or artefacts, in this case the Library Catalogue, and how they work and enable the searching for and the retrieval of information on a subject. This indicates a close relationship between *knowledge* and *comprehension* in that the student has expressed the process in their own terms for example:

A2 *"The keywords we did the searches for, which was really helpful, we did the exact journals, authors which was...(nods positively)"*

The example below further corroborates this assertion:

A1 *"[...] didn't we do searches then we had to put in one word, then we put in another word, then we saw how many less or more searches that was useful advice 'cos (sic) it shows you can restrict things down or maybe there'd be more searches, that was pretty good."*

This example illustrates how *process knowledge* is represented by a description of the search, *'we had to put in one word, then we put in another word'*, how it was conducted *'we saw how many less or more searches that was'*, the functionality of the artefact, *'it shows you can restrict things down'* and the *positive affective* way in which this new

learning was regarded, *'that was pretty good'*. In addition, it also indicates how, in comprehending this new knowledge regarding the *source character*, students *behaviour* is changed.

Test results show that the experimental group (Group A) performed better in the post-delivery diagnostic test compared with the pre-delivery test. This corroborates students' statements regarding the acquisition of new knowledge and supports the view that students had not only gained new knowledge after receiving this pedagogic intervention but were also more able to confirm the acquisition of this new knowledge in a short test<sup>67</sup>. In addition, written assessment data<sup>68</sup> demonstrates that students could readily *apply* this new knowledge.

### 8.2.2.2 Cognitive state

There are a number of cognitive processes evident, both in terms of IB and in terms of learning.

Here students indicated their new *knowledge* by stating what they remembered in their own words, the first two statements regarding the Library Catalogue and the third regarding e-journals:

A1 "*[...] we searched football hooliganism – was it the university search engine?*" *[...] we searched it and that to look at articles, then you like made us write down words that we thought would be in the search catalogue*".

A10 "*I was able to list the books in order of publication date which also helped me to find the most recent books.*"

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<sup>67</sup> Detailed results from the pre and post-delivery diagnostic tests are shown in section 7.2.

<sup>68</sup> Detailed results of the quantitative analysis of assessed work are shown in sections 7.3, 7.4 and 7.5.



A16 *“Use AND/ OR in between search words [...]”*

It is argued that this is further evidence of the cognitive process of *comprehension* mentioned above in relation to *knowledge state*. The respondent knows that new knowledge has been learned but expresses it in her own terms as “*university search engine*” and “*search catalogue*”. It is evident that she has the essence of what the Library Catalogue is and what can be done on it, that is, doing a search with particular subject keywords. She has also realised that there are artifacts to be found but labels them as “*articles*” rather than the more correct terms of *book records*, *item information* or a similar label.

This response further exemplifies this state:

A2 [...], *we did the exact journals [...]*

It can be surmised that the respondent in this instance is referring to a journal title search in the Library Catalogue, another subset of the Learning Outcomes (see Appendix 15) for the module. Again this indicates that there is a realisation that a journal search can be done but again the student articulated it in their own terms. This also links to the previous point made regarding *process knowledge*.

Here the respondent has indicated evidence of *comprehension* by describing in their own words the process of doing a title keyword search:

A3 *“The ones where you had to search for books by title, by author and stuff, sometimes you don’t know the books exist, so you put a little bit of what you are looking for in there and you get the matches, put the word in there.”*

It is posited that this is further evidence substantiating the relationship between *process knowledge* and *comprehension* within this context.

In addition, in revealing their learning in this way students indicate that they are fully aware of what they know by reporting thinking about their *behaviour* which is in itself a reflection of their *knowledge* about sources. Hence, indicating that a *metacognitive state* and its processes underpin this activity.

A further cognitive dimension evident in students' responses is that of the transition from a greater to lesser degree of *uncertainty* regarding their current situation in relation to using e-resources. These comments exemplify this transition:

A3 *"It helped because I didn't know how to use the system before [...]"*

A6 *"Although at first I found it a bit difficult to find texts it did not take long for me to get used to using these systems."*

A3 *"Before I completed the workshop on electronic sources I would not have known how to search for online books and journals. However now I have completed both the workshop and this study skills task I am now fully aware of how to search for online resources."*

Written assessment data gathered from students on completion of the module indicates evidence of further cognitive categories emerging. These have been coded using Bloom's Taxonomy (Bloom et al, 1956).

Assessed work indicates that students were able to engage in the cognitive activity of *application* by employing their new knowledge some time after the face-to-face session. The data demonstrates that students used the following electronic tools to gather information:

- The Library Catalogue to find relevant books
- E-brary to find relevant e-books
- Swetwise or ScienceDirect to find relevant e-journal articles

- The web to find relevant web pages

These were then included in their assignment portfolio. There appeared to be no difference between groups in terms of the quantity of resources found, in that, with one or two exceptions in each group the majority of students found two books, two journal articles and two web pages as specified in the assignment instructions (See Appendix 18). Further demonstrating that students had become information literate by being able to *find information*.

Differences do appear to have emerged between experimental Group A and the other Groups B and C regarding the higher order cognitive functions *analysis*, *synthesis* and *evaluation* (the IL categories of *evaluate information* and *use information*). These differences are particularly evident in the judgements, that is, the range of evaluation criteria students have used, the depth of *analysis* in selecting resources and subsequent *synthesis* which has impacted on the quality of the resources selected. Finally, the complexity of language used in the assessed reflective statements also more pronounced in Group A relative to Groups B and C. Evidence regarding these differences is put forward in section 8.3 of this chapter.

### 8.2.2.3 Style state

All student interview comments regarding the face-to-face workshop can be categorised as indicating a positive *style state*. It emerges very clearly that students regarded the pedagogic intervention positively and that it appeared to motivate them to learn:

A2 “*I think Effective Learning<sup>69</sup> is better presented as a seminar rather than a lecture,*”

A3 “*You can get involved in the sessions yourselves, more hands-on [...] “It was*

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<sup>69</sup> The colloquial term students use for the module in this study

*active you could get involved you weren't just being lectured to [...]"*

*A4 "It's more hands-on [...] broke (sic) it down and told us what we had to do, this bit is important."*

#### **8.2.2.4 Affective state**

In addition to the evidence regarding *affective state* in relation to the learning context, particularly the pedagogical intervention, mentioned above further examples of this state are offered here:

*A2 "Being able to find out the books was really interesting, where they were, how many in stock, really interesting."*

Indeed, when students were asked what they didn't like about the activity tended to reiterate their feelings in positive terms:

*A3 "Not really, it was good"*

*A2 "Nothing really, it was a really good workshop"*

The interviewer noted that students' tone of voice indicated that they felt very positive about the workshop and seemed almost surprised to have to make a negative comment. In addition, the module tutor felt that the mode of delivery, that is, a problem-based approach, made the whole task meaningful and worthwhile which appeared to motivate students by engendering a *positive affective state*.

The module leader's views support this assertion:

*ML1 "I think it's a good way to get them into the study skills, library skills, because it's giving them tasks, it's giving them real tasks, [...], go and collect web*

*resources relevant to a topic of interest, it's more meaningful. You, know, "here is the library catalogue, go and search it". Why?" here's the library catalogue go and search it on the premise to collect information for a presentation, all of a sudden there is a rationale, a need if you like, and I think that motivates them."*

### **8.2.2.5 Metacognitive state**

This statement clearly indicates the process of knowing about knowing and the realisation that new knowledge has been acquired:

*A3 "It was quite informative actually, I learnt quite a few things"*

It can be seen below that the reflective practice statements extracted from the assessed work promulgated rich reflections which appeared to externalise the metacognitive process assisting students to become more aware of their own learning:

*A11 "From carrying out this research I have found it valuable to use a wide range of sources such as the libraries and the online journals. I have realised that these sources contain information that can help me to develop while studying at university."*

*A9 "Since completing the electronic resource study skill session and visiting the Thompson Library and the Online Library I have realised the importance of visiting these on a regular basis to become familiar with them."*

Not only do these students have a sense of having learnt something, *"I have realised"* but also an awareness of the value of their learning for the future, *"these sources contain information that can help me develop"* and *"the importance of visiting these on a regular basis to become familiar with them"*.

### 8.2.3 Behavioural data

In these cases the recognition by the student of the need to “*search*”, where the search itself and the purpose of the search were evident. The following words and phrases shown here all evidence the activity of searching: “*searched*”, “*searching*”, “*searches*” and “*search the library*”. In addition these words and phrases characterise the intended goal of finding information which completes the *task*, that is, the assessed work: “*Get online*”, “*find out*”, “*getting a couple of articles*”, “*look at articles*”, “*you can look for a certain subject*”, “*keywords*”, “*authors*” and “*having to find out which books were in the library*”.

It has also emerged that in engaging with this programme students reported two things, either a change in their behaviour:

A3 “*Learning to access journal and books online as provided me with a much easier means of research.*”

A12 “*[...] I have been able to find more in depth information about the key areas of study needed for the module.*”

or, an intention to change their behaviour:

A5 “*I will use the online library more in the future, for future pieces of work that I have to complete.*”

A1 “*I will incorporate this new knowledge in future by making sure I use E-brary to look up [...] books on sports related topics.*”

These reported changes in behaviour, or intended changes, are further evidence that learning may have taken place. Not only do these statements indicate a change in *behaviour* but they also show judgements “*I have been able to find more in depth*

*information*", in relation to the e-resources used. In addition, these statements are further evidence of *process knowledge* in relation to *source character* by reporting that they would "use E-brary to look up [...] books on sports related topics" and "find more in depth information about the key areas of study".

## **8.2.4 Source data**

### **8.2.4.1 Source character**

It is evident that students had realised which electronic information sources (in addition to the web) were of value to them in completing their task and identified them in three distinct ways: either directly, "Library Catalogue", "Swetswise" and "ebrary"; in generic terms, "the catalogue", "e-journals" and e-books; or in their own words "university search engine". They also identified the library itself as a resource:

A13 *"When I do attend to the library I understand where to find what I am looking for and able to use the resources available to me to help I find what I need."*

A5 *"I know where I have to go and find the information that I need from the books from the library."*

A6 *"I have learnt how to search for material in the library."*

A minority specifically identified library staff as an essential resource in their information gathering:

A8 *"[...] if I am stuck and do not know where a book is I will "enlist the help of library staff."*

A13 *"The resources are the library computers and also the librarians."*

It is also clear from evidence presented above that the tutor was perceived as an important part of the learning context and therefore their information behaviour:

A1 [...] *it was good that you came around and you showed us what to do and you didn't let us, like, get behind in the work and that was good."*

It can be seen that this positive perception of a source is closely related to the *norms*, *roles* and *tasks* and the *affective state* of the individual. It seems to indicate that if a student has a positive perception of the learning context then this affects directly how they perceive the *source* and its usefulness. Hence, *knowledge* of a *source* appears to promote in students thinking about its use and how they feel about using it which links to their *style state* affecting their *behaviour* when using it.

#### 8.2.4.2 Source behaviour

This category appeared to be reported in terms of knowing or '*being able*' to use resource functionality to "*look for*" or "*view*" a book and the usefulness of keyword searching:

A2 *"[...] you don't necessarily need to know what book you are looking for, you can look for a certain subject [...] especially just being able to search from the keywords [...]"*

A9 *"The online library will also allow me to view if certain books are available in the library"*

Also, as seen above the practical aspect of finding out whether resources are available are also mentioned:



A10 *"I now know where I can search for e-journals, e-books and where I can find certain books, seeing whether they are on loan or not."*

In addition, it appeared that students realised that the sources were of benefit to them in terms of what it *"enabled"* them to do in finding information or in saving time and in taking ownership of their learning (Andretta, 2006):

A6 *"Since using the online library catalogue (sic), swetswise (sic), e-journals and also the web, it has enabled me to access text and information a lot quicker."*

As well as a sense of changed *behaviour*, as mentioned above, there is also a definite sense of having *"found out"* something concrete particularly in terms of the amount of relevant information available:

A12 *"I have found out since being made aware of the Library catalogue (sic), swetswise (sic), e-journals [that] I have been able to find more in depth information about the key areas of study needed for the module."*

As mentioned above, the positive way in which the tutor's actions (the technique of 'touring') were viewed is also clearly an important source characteristic because it appeared to instil, within the learning context, a *positive affective state*, in student participants.

Finally, the impact of using the resource can have on their *knowledge* of the subject and the ability to complete a *task* is evident:

A5 *"I have found that looking at the online library and looking for the information that I needed that I have learnt more about the subject that I was researching about."*

A9 *"I will also have to try to find e-journals to help me with my learning this can be a basis for my research before researching further into the subject."*

A12 *"I will try to use the new knowledge I have when I am searching for information to aid me with my studies, especially when it comes to searching a specific area in depth."*

## **8.3 OCL activities**

### **8.3.1 Sociological data**

#### **8.3.1.1 Roles**

Students quickly (within ten minutes of receiving the activity instructions) took on the *role* of the online learner and understood what was required within the OCL context:

*A1 "Made our replies on the Forum, we had to feedback on each others. I remember I was commenting on his, he was commenting on mine and I was writing about how he hadn't actually writ (sic) about all the actual points you were meant to evaluate [...]"*

*A2 "[...] post a reply to them saying well look at this look at that and also got their feedback to yours."*

The statements above indicate some of the complex behaviour evident in this online task. Here students indicated that they were making judgements about fellow students' statements, giving advice on what to evaluate and giving feedback on what others had written. These behaviours appear to be linked to a *cognitive questioning state* and underpinned by a *metacognitive state* which are examined in more detail in section 8.3.2.2.

### 8.3.1.2 Norms

Students appeared readily to transfer the *norms* associated with face-to-face discourse into the online environment:

A4 *"Everybody's got limits ain't they and you've got to respect the other person's opinion and they have to respect your opinion at the end of the day"*

A2 *"Posting a bulletin, looking at your pair's bulletin, seeing if you agreed with what they've said and then posting a reply to that, things you agreed with things you didn't."*

The above statements show that the professional behaviour of respect began to emerge '*you've got to respect the other person's opinion and they have to respect your opinion*'. In addition the realisation that a balanced view should be put forward stating, *things you agreed with things you didn't.*" In addition, the nascent professionalism of not being overly critical emerged:

A3 [...] *"you don't go full-on, you are like, under critical sort of thing, because you are in the same class as these people."*

Students, with some minor exceptions, posted bulletins which were focused on the *task* and replied constructively as instructed by the tutor. By stating the evaluation criteria in their own words, students began to comprehend their new knowledge regarding how to judge a web site these examples of student postings given below illustrate this focus:

A2 *"The web page is a bbc (sic) news page with links to hooligan interviews and reports. You could evaluate the web page by looking at other pages with the same topic and compare. You could also look through and see how relevant it is to the information you are after. What can the URL tell you? it (sic) informs you that it is from a popular and reliable source, BBC. It also gives you the date and the*

*subject topic. It tells you it is not somebody's (sic) personal page. -Are sources documented with footnotes or links? yes (sic) they are. There are links to reports and interviews. -Does it all add up? it (sic) looks like a decent web site with all of the relevant information around the subject. It is well supported (sic) and linked to reliable interviews."*

*A12 "The web page highlights football hooliganism interviews (sic) and reports with links to look deeper into the articles (sic). You could evaluate the web page by looking at other football hooliganism webpages and compare them to (sic) see how they are set out and how they get their information across (sic). You can also look at how relevant (sic) the information in the web page is. What can the URL tell you? It tells the user it is from a well known and is a reliable source that could be user friendly. It also tells you the date in which the programme took place telling you how old the information is. Is the page dated? Yes within the URL"*

*A11 "When looking at a website it is important to check the author or who it was created by. You can check if it is a government website by looking at the web address. Some websites have headings saying, 'Background' or 'who am i (sic)?' this enables somebody to look for reliability."*

*A14 "I would evaluate a web page by; looking at the URL address and seeing whether it is e.g. a government source, which would mean the source is reliable. You can also look at the author and find out whether (sic) they have a good reliable background and you should also be able to find any related links and other sources used. Finally look at the last time when the web page was updated especially when stats are involved."*

### 8.3.1.3 Tasks

Within the OCL environment students showed that they quickly achieved a sense of what was required in this setting:

*A1 "Went onto the links you gave us (in Blackboard) read the article, went onto the other links (Evaluating web pages link) and I remember I writ a few paragraphs, oh no, I went into the link about what you should look for when you go onto the internet websites and using them as references, and taking that information and then so I took all that in then basically just writ (sic) a few paragraphs on what I thought was important, when looking for like real references and things for true information."*

The above response indicates that the student understands their *role* via the *task* given, "*I went into the link about what you should look for when you go onto the internet websites and using them as references*" It also indicates that students, in engaging with the OCL activity, may be working at a higher cognitive level in that they are making intellectual judgements "*what I thought was important*" about the resource they were evaluating by recognising its *source character* "*article*" via appropriate *behaviour* "*read the article*" and "*taking that information*" and in the contribution they were making to the online discussion "*writ (sic) a few paragraphs*".

Student postings shown above indicate that students were on *task* and had begun to comprehend some of the material regarding evaluating information. These statements, taken from student interview responses, further evidence the assertion that students were on *task*:

*A2 "We went through different websites, having a look, how reliable they were, evaluating what you think, the sources, the links, and posting a bulletin at the end [...]"*

A3 *“I think it asked us to check, was it, the strength of a web site, in terms of whether it was reliable or not, we had to check was it the URL [...]”*

## **8.3.2 Psychological data**

### **8.3.2.1 Knowledge state**

The OCL activity enabled students to learn something new about the IL notion of evaluating information:

A15 *“Because it let me see what type of criteria I should be using to evaluate websites.”*

A2 *“Being able to evaluate the URLs I found really useful instead of having to go through the website to find out what’s real and what’s been made up. It was nice knowing you could go through the URL to decide how decent a web site was going to be, it was very informative in the way that it was done [...]”*

A16 *“Helped decide which resources were reliable and useful and why [...] Evaluating web sites – looking at URL e.g. .com/ .uk- taught me that website URLs mean something important”*

In effect students had gained new factual knowledge about the *source character*, in this instance the characteristics regarding URLs.

The activity appeared to get students thinking about what was being written by their fellow students and this appeared to help them with their own learning, that is, gain new knowledge, by reflecting on what other students had posted to the Discussion Board:

A4 *“Good, good opinions, on it really, really good, I read through everybody’s really and could see what everybody was getting at and it made me understand more clear (sic) because at first, as I said before, I didn’t get it and that helped by reading other people’s statements on the activity and it worked better for me like that [...] The way how I learn is by seeing things and by looking at other people’s opinions, the subject, and it worked better for me.”*

The way in which this student reports on the OCL activity clearly indicates a *positive affective state* *“Good, good opinions, on it really, really good”* is linked to the gaining of *new knowledge*. There is also a hint that the student, in engaging with the activity, is moving from a high degree of *uncertainty*, *“before, I didn’t get it”* to a lesser degree of *uncertainty*, *“could see what everybody was getting at and it made me understand more clear (sic)”*. Underpinning these processes is the behavioural process of reading, *“I read through everybody’s”*. The student also made observations regarding her own learning process, or *style state*, *“The way how I learn is by seeing things and by looking at other people’s opinions, the subject, and it worked for me”* which appears to be evidence of metacognition possibly promoted by the OCL activity itself.

In addition, the metacognitive<sup>70</sup> aspects of gaining *new knowledge* are evident in these responses in that students indicate a real sense of having learnt something valuable (in learning how to evaluate web sources) which appeared to direct their *behaviour* towards *task* completion and in so doing reduced their level of *uncertainty*:

A1 *“[...] it was good because I didn’t really know about what type of things you should look for when you are looking at web sites to get references so now obviously when I’m looking at references in the future I’m going to look and see whether it is from a big company where it’s very probably going to be factual or whether it’s from someone’s own personal website or something that’s less formal*

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<sup>70</sup> The *metacognitive state* relating to this context is explored in section 2.4.5.



*and I'll be able to tell whether to take information from it or not, so that was very useful."*

The following statement indicates the close relation between *knowledge* and *comprehension*.

A1 *"[...] you are learning about what references will be real and not real, maybe it would have been good if you'd done a reference from an internet site that wasn't real and then you could see the differences then you would know what to look out for even more."*

Students demonstrate that they have comprehended the new information on evaluation criteria by putting the criteria into their own words, *"real and not real"*.

The following statement further demonstrates that *comprehension* has taken place:

A5 *"Really when you first go on a web site you don't read all the information, from this one you really had to read it and write down what you saw so it all went in, so that you knew more about the web site than one that you'd just basically click on. [...] You knew more about the web site was saying, you knew the point of the web site, knew that was also advertising another programme for you to watch which get you to another web site so it was giving you a lot of information. [...] it was good actually because it gives you something to do and you're actually reading and writing down what you see, you're finding out more about what the web site is about, than just not knowing anything at all."*

This statement also indicates that the student has moved from an initial state of non-knowledge regarding evaluating information for example, *"when you first go on a web site you don't read all the information"* then has engaged in some *behaviour*, *"you really had to read it and write down what you saw"* in order to engage with the activity. The respondent also suggests that they have *knowledge* of their own *style state*, *"it all went*

*in*” which further evidences the presence of a *metacognitive state*. It also indicates that the OCL activities engendered a *positive affective state* and a sense of motivation, “*it was good actually*”. This appears to fit well with this student’s *style state*, “*because it gives you something to do and you’re actually reading and writing down what you see*”. The student appears to recognise that the OCL activity has helped her to judge a web site more effectively and seems to value this new *behaviour*, “*you’re finding out more about what the web site is about, than just not knowing anything at all.*”

The statement below further exemplifies the relationship between cognitive processes:

A2 “*You got to like evaluate the website, I found it really useful, you didn’t realise how many web sites could be frauds because it gave you the links and the ideas to know that web sites you are using and referencing in lectures or essays are actually real or actually good, worth looking at, which is really good.*”

The close relation between *knowledge, comprehension* and *metacognitive state* is evident, “*you don’t realise how many websites are frauds*”. It indicates how this is brought about by engaging in certain behaviours for example, “*you got to like evaluate the website to complete an appropriate task such as, ‘referencing in lectures or essays’*”. In addition, the OCL activity appears to have engendered a *positive affective state*, for example, “*I found it really useful*” enhancing its effectiveness as a learning process. It may also imply that the student is also beginning to realise the *norms* required to fulfil their *role* as a good student via the effective completion of the *task*.

### **8.3.2.2 Cognitive state**

Some processes within the *cognitive state* have been identified above, especially those which link directly to new *knowledge*. Other processes are also evident in students’ responses and are detailed below.

Firstly, the cognitive process evident in student responses was that of a transition from a greater to a lesser degree of *uncertainty* regarding their ability to evaluate web pages for an assignment:

A3 *"It makes you aware, a little bit more aware of what web sites are more useful to you than others and there are quite a lot of web sites on line and you don't want to be writing stuff in your assignments that's not true. [Before] I didn't know what the things at the end like .ac. org meant [...]."*

A5 *"Before [...] I'd just put in staffs.co.uk and it would come up with a totally different web site and I couldn't find anything but now I know the difference. [...] when you've got .uk, .com, some web sites are different but you've got Staffs Uni (sic) ends in .ac.uk or government web sites end in .gov it just depends on which sort of web site you want to go for."*

The statements shown above seem to pertain mainly to new *knowledge*. However, the following statements imply a role for OCL itself and how it may have played a part in this *uncertainty* transition:

A4 *"At first I didn't understand it then I tried to get my head round it and there was another student who was working with me and we bounced off each other so it got easier, so yeah it was ok."*

A4 *"The opinions got on it were really, really good, I read through everybody's really, and I seen (sic) what everyone was getting at and it made me understand more clear (sic) because at first, as I said before, I didn't get it, it didn't click, that helped by reading other people's statements on the activity so it worked better for me [...]."*

These two statements above from the same student also indicate a sense of shared *behaviour* towards learning and indicate a nascent community of practice at work which

is investigated further in section 8.4.3. This is in addition to the new *knowledge*, diminishing *uncertainty* and *metacognitive state* revealed by the second of these two statements made by A4 and discussed in section 8.3.2.1 above.

In addition, linked with this cognitive change appears to be a related change in *behaviour*, ‘*you don’t want to be writing stuff in your assignments that’s not true*’ and a sense of new *knowledge* as mentioned in section 8.3.2.1, ‘*when I’m looking at references in the future I’m going to look and see whether it is from a big company where it’s very probably going to be factual or whether it’s from someone’s own personal website or something that’s less formal*’ which Squires (1994) argues is indicative of learning having taken place.

Secondly, it appears that by being engaged in online discourse students adopted a *cognitive questioning state* during the activity which appears to be related to the metacognitive process underpinning the act of reflection:

A2 “*Allowed me to see what other people thought of the web site, the way they had evaluated it, not just myself. Then you got, obviously, to post a reply to them saying well look at this look at that and also got their feedback to yours [...] “You got to see what you was (sic) missing out or something you hadn’t looked at, so they could bring up the points saying may be look at this, look at this.”*”

A1 “[...] *I was writing about how he hadn’t actually writ (sic) about all the actual points you were meant to evaluate in his evaluation and also the fact that he hadn’t really researched football hooliganism on the FA website and done the search for it which I had done and we was having a bit of a debate between each other about whether it was a good website or not.*”

A3 “*I suppose somebody commenting on your evaluation could possibly highlight things you’d overlooked. Obviously you always think your own work is perfect,*”

*sometimes it's a bit of an eye opener when somebody says you should have done this, gets you thinking about it."*

These statements above also appear to indicate that the OCL process has enabled students to identify gaps in their own information seeking or in IL terms recognise a need to find more information which provide the moments within the iterative process (Walton et al, 2007) and the motivation to continue (Belkin, 2005) enabling further opportunities for discussion and hence learning.

Analysis of assessment data from Groups A (experimental group), B (intermediate group) and C (control group) allowed direct comparisons regarding higher order cognitive functions (*application, analysis, synthesis and evaluation*) to be made. Group A appeared to differ from Groups B and C regarding their level of *application* (as defined by Bloom et al, 1956). Typically students in Groups B and C tended to apply a very narrow range of evaluation criteria, in fact the majority tended to use the relevance criterion and no other for example:

*C1 "This site goes into depth about football hooliganism, it explains some of the history and how and when it happens and so forth."*

However, Group A applied either a broader range of IL evaluation criteria (authority, presence of a bibliography, related web links, date, contact details, and other information cited correctly) or used the relevance criterion more often:

*A1 "It is produced by the University of Leicester and gives a comprehensive background to football violence and its causes with many facts backed up by properly cited figures. It has a substantial bibliography with links to other information related to football. It has a date mark with contact details including an email address."*

In IB terms the statement above also shows that the student has noted nine aspects of *source character* such as “*cited figures*” and “*a date mark*” etc indicating that OCL may have promoted this higher cognitive function. This noting of aspects of *source character* is also evidence that the students have engaged in the *application* of the IL evaluation of information criteria they learnt via OCL activities.

It can also be seen from the above that when analysing resources for the OCL activity (web pages) and for the assessment (books, journal articles and web pages) students in Group A used a greater range of criteria such as authority, currency, relevance and reliability: whereas, students in Groups B and C tended to use only one or two relevance criteria.

The example above also shows that Group A students have not only applied their new knowledge and analysed a web page but have also synthesised their new *knowledge* into a statement. This higher cognitive level of *synthesis*, regarding the evaluation of information, was greater than that of Groups B and C. In particular students appeared to be able to distinguish between the quality of individual items used and relate them to the topic in a more specific fashion. The module leader’s observations support this assertion:

ML1 “*Also as well, noticeably on this particular module in the assessment, the quality of the resources they were using was far better than the other students in other groups, for example, they were beginning to appreciate that the first website that they came to wasn’t necessarily good in terms of quality, good in terms of content etc, they were beginning to tease out some of the subtle differences, use the information about the URL, who it was written by where it had come from and so forth which was interesting and also pleasing to see.*”

Lastly, the examples above also show that Group A students were not only able to engage in a more detailed evaluation of information sources but were also able to evaluate what they had learnt in more detail and in some instances engage in making a greater number of judgements about that learning when applying it in a given situation. This is also

demonstrated by responses given in students assessed reflective practice statements and in Focus Group interviews as discussed below.

The ways in which students reported their learning in the assessed reflective practice statements show marked differences between groups. Firstly, students in Group A (as a whole) presented the greatest number of reflective practice statements (12 out of 16 or 75%) which contained one or more reflections on how to evaluate an information source. Group B did less well with 5 out of 13 respondents (39%) making at least one comment. Group C did least well with only 3 out of 12 students (25%) making one or more comments. Furthermore, the variety of terms used to describe the evaluation process appears greater in Group A than in Groups B or C. The comparison between groups shown in Table 8 below clearly reveals this difference:

**Table 8** Relative variety of evaluation words used in assessed reflective practice statements by group.

<b>Group A</b>	<b>Group B</b>	<b>Group C</b>
Relevant	Reliable	Suitable
Relevance	Trustworthy (2)	Breadth
Recent	Topic related	Intended audience
Judge	Up-to-date	Published
Criterion	Unreliable	Trustworthy
Scope	Relevant	Relevant
Audience	Evaluate	Evaluating
Timeliness		
Scholarly		
Popular		
Authority		
Documentation		
Objectivity		
Published date		
Reliable (3)		
Evaluate		
Evaluating		
Critically evaluate		
Deciding		
Valid (2)		
Reputable		

Secondly, of those students who did reflect on the importance of evaluating sources in each group, it is Group A who made the most detailed comments. Here the three most detailed assessed reflective statements from each group are presented for comparison and differences discussed. Firstly, the three statements for each group are presented in their entirety. Secondly, a narrative analysis is presented which seeks to identify, through these statements, the significant differences between groups.

## Group A

A1. *"I have acquired new knowledge on the Library Catalogue, Swetswise, e-journals and the Web. I now know how to look for E-journals and E-books on Swetswise and E-brary, something I did not know how to do before. I had been taught how to use all these different services in class but going over it again in this task has really helped me to understand how to use it. I have learnt a lot of new knowledge from the Berkeley website regarding evaluating information. I know about scope, audience, timeliness, scholarly vs. popular, authority documentation and objectivity. I have learnt how to judge how good a book or a journal is against this criterion. I will incorporate this new knowledge in future by making sure I use E-brary to look up journals and books on sports related topics. This material has taught me a whole host of new things about the university internet."*

A7. *"After visiting the Thompson Library and Online Library, I have acquired a vast amount of knowledge of the wealth of information available both on the shelves in the library and online. This section of work has taught me how to reach all this information – something I had no idea how to do before – and what to look for when deciding if the book/journal is a useful and relevant resource. I would say that the most important thing I have learnt for sure is that the online library is the best starting point when researching an assignment in the future. A final and key factor I learnt from this work is that I need to look at the relevance*



*of information on web pages, and evaluate them before diving in straight away and using the information.”*

*A8. “Now I have completed this task I understand how to use the Thompson library more effectively. Also I have learnt how to use the online library. I have learnt how to use Swetswise as well. The last skill I have learnt from this exercise is how I can use a search engine like “Google” to find websites. Then I can then critically evaluate by using the information on the Berkeley web site to see how reliable the website is, or not. I will incorporate this new knowledge and skills in the future by using these skills when completing a new task e.g. I can use the online library to search for e-books and books. I can also use Swetswise to find e-journals to use for assignments. This material has reinforced some of my existing knowledge e.g. how to use the Thompson library effectively but I have acquired new knowledge as well e.g. I can now critically evaluate websites by using information from the Berkley website to see how reliable the website (sic).”*

## **Group B**

*B1. “I found using and finding my way around the Thompson Library very simple. I didn't realise the extensive amount of resources available from journals, books to the online resources. I have learnt to vary my research methods and not just rely on web pages as these may not be the most reliable of resources. In future when starting my assignments I think the online library will be my first point of call as it will show me what books/journals area available on a selected topic to help me further my research. I learnt how to ensure the source in which I am using is trustworthy and reliable therefore my work will be of a higher standard. The more varied and topic related my sources the better it also looks when my work is being assessed.”*

*B2. “Using the electronic resources has made me realise how much information there is on the internet and in the Thompson Library. While doing the first*

*activity the internet and the library gave great information about football violence, there is also good information about other violence in sport which is good for a comparison in sport violence. The books were easy to access and understand, there were so many books it was hard to choose the right ones that is a credit to the library as the wealth of knowledge that their books contain. The problem is with the internet is that I need to make sure that the websites are trustworthy; the information may not be relevant and could be unreliable.”*

*B3. “Having used the E library catalogue and searching journals online I acquired a great deal of new knowledge. I now have the understanding to search and evaluate text from books and journals and use them to my benefit when supporting ideas with my work. Searching for information through the library catalogue I now can search for the book for example, I now have the knowledge of being able to search key words to find the relevant information from a text book or journal using the library catalogue. I can take (sic) this information and use it with the future and be able to be more effective when I search for information on the E library. I have acquired new knowledge by completing this ILA as I now feel that the Thompson and online library will be a vital ingredient in the future when searching for information at university for my assignments.”*

## **Group C**

*C1. “Having visited the online library I now realise how much information was held on there which added to the information already found out from the off the shelf library. I would now consider the on-line library as a starting point for research for my assignments, but by doing this I would also make myself aware that these sources may not be trustworthy and the information held in them may not be relevant to the work I need to complete. I have acquired new knowledge and believe that by using this it will make my essays stronger and allow me to obtain information I may not have found by just visiting the local library.”*

C2. *“Through using both the Online library and the Thompson library I have learned a lot about how to get references. Through using the library catalogue, Swetswise e-journals and the web I have further knowledge of where I can retrieve important information from the library for my research without even leaving my room. I need to keep returning to these resources and familiarise myself with the contents in order to sustain a first-class quantity of knowledge. Through the Berkeley website I have learnt that you need to make sure that your chosen book is suitable for the task at hand. ie, You must know the breadth of an article, who the intended audience is and when the source was published. I will incorporate this new knowledge into my research and will have plenty of sources to reference from in future assignments. Through these exercises I have acquired lots of new knowledge on electronic resources and will be more efficient throughout my research.”*

C3. *“The new knowledge I have learnt from the Berkley web site regarding evaluating information is that again I have know learnt to go into more detail within my work. I think I will incorporate this new knowledge when I come to look for information on sport related topics in the future because it gives you an overall better understanding within certain topic areas that again can only better individual understanding and better overall work. This material has given me new knowledge and will help me through out my time here at Staffordshire university. I feel this module has helped me a great amount and has changed my out look to the way I research and the material I will be using!!!”*

Whilst it can be seen that Group A students describe the process of evaluating information in more detail as shown above, the most striking difference between Group A statements compared to the remaining two groups is the open-minded, balanced way in which students describe how they have or intend to evaluate sources by using the words “judge”, “deciding” or “critically evaluating” for example, student A1 reports that they *‘[...] have learnt how to judge how good a book or a journal is [...].*

This is echoed in the statement made by A2 who reports that they have learnt “[...] *what to look for when deciding if the book/journal is useful and relevant [...]*”. Student A8 also takes this balanced approach by reporting that they will “[...] *critically evaluate by using the information on the Berkeley web site to see how reliable the website is, or not [...]*.” All these statements show a desire to evaluate sources in a mature balanced fashion by weighing-up their worth against a set of criteria.

This is in sharp contrast to statements in Groups B and C where the notion of a balanced judgement is implied rather than stated explicitly for example, student B2 states that “[...] *I need to make sure that the websites are trustworthy [...]*” or the process is stated negatively for example student B1 states that sources “[...] *may not be the most reliable [...]*”.

Group C students show least awareness of the process of evaluating information and are not as positive in their reports, for example student C1 again states the process negatively in that “[...] *these sources may not be trustworthy [...]*”, whilst student C3 regards the process as a matter of degree of detail rather than a matter of judgement because “*I have now learnt to go into more detail within my work*”.

Student C2 furnishes the most articulated statement for this group and is positive in remarks given but again the need for balance is implied rather than explicitly stated for example “[...] *you need to make sure your book is suitable for the task [...]*”. Hence, Group A students appear to have internalised the process for evaluating information whereas Groups B and C tend to report on certain mechanical details regarding the evaluation of information.

The assertion that Group A students may be operating at the highest cognitive level is corroborated by dialogue recorded during the whole group Focus Group interview, held after the programme had ended, here two student participants discussed the relative importance of particular criteria for evaluating information:

A2: *"Some of them initially are important like reliability and relevance, obviously if you are going to reference something in an essay etc you need to know that the source is reliable otherwise you could be quoting anything, relevance as well, you've got to stick to the question or what ever you need to do needs to be relevant to the point you are making."*

A3: *"Currency as well, to be honest, it needs to be up-to-date, opinions and things change. People thought the earth was flat but things get updated."*

A2: *"Authority, I don't find as important. It could be written by the government or the FA or something and they could make a pretty stand up point, but you could have a 3<sup>rd</sup> year student from a university make just as good a point and just as relevant. [...] some government source could make a point which was totally irrelevant yet a student could make a totally relevant point, the authority don't make a difference I don't think. If it is a reliable source, if that ones covered, I don't think authority matters, as long as it's a reliable source."*

Thirdly, notwithstanding their greater understanding in evaluating information, there is a greater confidence evident in Group A statements regarding this learning. In other words participants in Group A are not only more successful at evaluating information (deploying the cognitive states identified by Bloom et al, 1956, of *application, analysis* and *synthesis*) but also at evaluating their own learning.

This greater confidence in learning is exemplified in Group A by the way in which they reported their learning as *"how to"* do something for example, *"I now know how to look for E-journals and E-books on Swetswise and E-brary, something I did not know how to do before"*, *"I have learnt how to use the online library"* and *"I understand how to use the Thompson library more effectively"* rather than simply in terms of the quantity of information at their disposal as reported by Groups B and C for example, *"I didn't realise the extensive amount of resources available"*, *"Using the electronic resources has made me realise how much information there is on the internet and in the Thompson Library"*,

*“I will [...] have plenty of sources to reference from in future assignments” and “I now realise how much information was held on there”.*

In addition this confidence is further exemplified in how Group A express their intention to transfer their learning in the future in very definite terms and in so doing put the search process at the centre of their future (*changed*) *behaviour* for example, *“I will incorporate this new knowledge”*, and *“I have learnt for sure [...] that the online library is the best starting point”* as opposed to statements made by Groups B and C which are couched in less certain terms for example, *“I think the online library will be my first point of call”*, *“I now feel that the [...] online library will be a vital ingredient”*, *“I need to keep returning to these resources”*, *“I would now consider the online library as a starting point”* and *“I think I will incorporate this new knowledge”*. This perhaps implies that Group A students are more motivated to transfer their learning than Groups B and C and, as a consequence, further contributes to a *positive style state*.

In terms of evaluating information, this evidence seems to imply that Group A were operating at the highest level of discernment, followed by Group B at a slightly lower level, in turn followed by Group C at the lowest level. In effect three levels of awareness of how to evaluate information appear to be present. In section 8.3.2.1 it is evident that prior to the OCL activities students reported a distinct lack of awareness of how to evaluate information. Putting these two strands together implies that four distinct levels of evaluation of information are present in the evidence.

### **8.3.2.3 Style state**

Almost all student interview comments and questionnaire responses can be categorised as indicating a *positive style state*. It emerges very clearly that students regarded the pedagogic intervention positively, which in turn appears to have engendered a *positive affective state* and motivated them to learn either at the time or in the future:

A1 *"You feel that you've done something productive afterwards when you post your reply on the forum, so that you feel that you've done something productive."*

A4 *"I will read through my notes in my own time to help me in future and attempt to use the activities to help me research."*

Specifically students clearly found the tutor summary a valuable artefact and it seemed to enhance motivation further by creating a sense of ownership of the output from the OCL activities:

A3 *"Yeah, it's a good idea I think, it gets people quite motivated to do things because they can see next week they get involved, its more hands-on and they can actually see that what they did is actually being used for the good really."*

The statement above also relates to a notion of producing something of value, not just to the student as learner, but also to the student as a nascent member of a community of practice.

The tutor summary also appeared to promote the notion of reflection and demonstrates how this acted as a means of continuity between each activity week by week for example:

A3 *"[...] reflected back, I suppose it gets your brain engaged and starting to think about it again, so you've got more chance of remembering what you did the week before, so I suppose it, like acted as a refresher."*

However, students did, at times, exhibit a negative style state and was particularly evident towards the IRPAs which received a great deal of criticism and weren't regarded as a positive learning experience:

A3 *"That was the one where you got A, B, C...Not really for that one. The workshop was useful to me, but I think, like, that one was more of a getting my*

*views on, on things and stuff, so not really that useful to me. It questioned my opinion on the workshop I suppose, I was just giving my opinion, it didn't really learn me (sic) anything."*

A2 *"Not really, just helped bullet point the main points of the session."*

The above show a definite *negative style state* perhaps engendered by the student feeling that the exercise was not an appropriate task in this context, *"that one was more of a getting my views on, on things and stuff"*, and *"it questioned my opinion on the workshop I suppose"*. Perhaps the student is indicating that she saw it as of benefit to others, that is, tutors, *"not really that useful to me"* and clearly not a valuable learning experience, *"it didn't really learn me (sic) anything"*.

Some students had some difficulty in recalling the IRPA and what they had to do to complete it:

A5 *"Not much really. No I can't remember, I probably wasn't here."*

Other students appeared to regard the IRPAs as having no external benefit implying that it didn't contribute to the task, that is, the assessed work and therefore had no value:

A2 *"it was more not so useful because it was for your own benefit really and I guess the lecturer could look if he wanted but it didn't go into any work or anything really it was just for your own knowledge."*

These negative factors appeared to contribute to a sense that the IRPAs were predictable and to be endured rather than actually contribute to their learning:

A2 *"I don't think they were successful [...] I felt that I'd finished the lesson, I wanted to leave, I knew which one's I had to tick to get the good answers. If it is*



*at the end of a lesson you want to get it done [...] the last place you want to be unfortunately is in a lecture.”*

A3 *“First one sounds right, picked that there, I didn’t bother reading the others.”*

#### **8.3.2.4 Affective state**

The OCL appeared to engender a *positive affective state* in a number of ways and is closely linked to *style state* as discussed in section 8.3.2.3 above. These statements are typical themes:

A2 *“It was really good, you got to see what other people thought of their web site and you could have a look at different web sites and different people’s opinions, which was really good.”*

A1 *“You feel that you’ve done something productive afterwards when you post your reply on the forum, so that you feel that you’ve done something productive.”*

A3 *“I think it was quite interesting gets you involved as well and that side of it was quite fun - as opposed to being lectured to [...].”*

Clearly being able to view other students’ efforts was felt, by respondents, to be a very positive factor. It also indicates how the discourse from the OCL activity is itself a source and that it may be functioning as a means for students to identify gaps in their own knowledge through facilitating the opportunity to compare oneself in relation to others. In addition, having something to show for one’s efforts at the end of the *task* for example, *“you feel that you’ve done something productive afterwards when you post your reply”* appears to be regarded as part of a worthwhile learning experience.

Finally, it emerges very strongly that this form of pedagogic intervention is much preferred to the lecture because it “*gets you involved*” and appears to promote a sense of “*fun*” and makes the learning context “*interesting*”.

The tutor summary appeared to be instrumental in enhancing the already positive atmosphere leading to a *positive affective state* as detailed above. These examples indicate how students felt it added to their learning experience by deepening their new knowledge, enhanced their motivation through joining the community of practice by seeing their work being published albeit in a limited online setting and how the tutor summary is itself a source with its own *source behaviour*:

A2 “*Just a nice way of being recognised, basically it was really nice knowing it wasn't just being done for you to write up and to be left, it was nice knowing it was going to be read through, all the reflective stuff was and actually being given a report on it. [...] I thought it was really good, obviously, it gave the whole group a bit of recognition you could see individuals what they'd done what they'd said, but it also helped you read through what other people thought of URLs and took advice from other people not just the lecturer's, it worked really well, it is a good way of reflecting what you've done.*”

A3 “*It's quite good to be honest, it's informative, it sums up, it gets views from everybody in there.*”

### **8.3.2.5 Metacognitive state**

This state emerges very strongly when students talked about the process of OCL. Research from learning theory and thinking skills work indicated that this process should be present. OCL discourse appears to commence this process in a number of ways. One clear factor is that students felt they had missed or overlooked something, that is, the

online discourse appears to help students to recognise they have a gap in their *knowledge* and realise there is something else to know:

A2 *"You got to see what you was (sic) missing out or something you hadn't looked at, so they could bring up the points saying may be look at this, look at this."*

A2 *"You got to see what other people thought about obviously your evaluation, get new points in case you missed anything."*

A3 *"Somebody commenting on your evaluation and you could possibly highlight things that you overlooked [...]"*

The following statement indicates the process of knowing about knowing and the realisation or recognition that new *knowledge* has been acquired.

A3 *"Quite informative, something I weren't aware of. I was aware that there was a lot of pages but I was under the impression they were all .co.uk, you actually realise there is quite a lot of organisations that put web pages online."*

The statement below not only provides further evidence of the *metacognitive state* and related processes but also gives us a metaphor for the learning process itself:

A1 *"[...] obviously you feel something productive like you've done some work and you've done something useful like you've learnt stuff and then you've like soaked up the information then you've managed to like extract it in the reply for other people to see in the forum that was pretty good."*

The *metacognitive state* here appears to function in an inter-related fashion with or may even be dependent on a *positive style state* for example, "you feel something productive", the *knowledge state*, for example, "you've learnt stuff" and the *cognitive state* of analysis

for example, *“you’ve managed to like extract it in the reply”* and shared *behaviour* for example, *“for other people to see in the forum”*.

The IRPA did appear to offer closure to the *metacognitive state* after each OCL activity:

A2 *“I remember it, basically asking you how you felt or what you learnt doing the workshop, you can reflect yourself then its not just reflecting for a lecturer its, like, you can understand yourself what you have learnt and gone through.”*

However, the negative way in which the IRPAs were viewed weakens the value of this particular assertion. Students felt that the IRPA prepared statements limited people’s responses because they couldn’t pick from more than one statement at a time for example, *“[...] you are just limiting them to one answer they can’t pick from 2A and 2B together”*. This negative feeling caused some students to give habitual responses for example, *“After the first week I knew that A was the right answer so I just picked that basically”* and didn’t fully engage with the task for example, *“First one sounds right, picked that there, didn’t bother reading the others”*. Hence students felt restricted and their preference was for an open ended reflection for example, *“It would have been a little bit better if you had actually had to write something yourself for the question”*.

As mentioned above the written assessed reflective statements appeared far more successful in this regard which is demonstrated in the high level cognitive evidence shown above.

### **8.3.3 Behavioural data**

Various categories above have indicated that a change in *behaviour* has taken place. Focus Group interview data further details what these changes were.

Firstly in terms of applying the evaluation criteria (that were a product of the OCL activities) to determine *source character*:

A3 *"I have used (the evaluation criteria) actually, since we did it for essays and stuff, since we did these things in Effective learning it actually alerted me to what to look for when looking for a good web site and what to steer clear of."*

Secondly, because students can apply these criteria their *analysis* was more detailed and hence their judgements or evaluations regarding web pages were more thorough:

A2 *"Yeah, I look for where it comes from now. I look at other universities pages they are always good to look at obviously people like (sic) the BBC, then if you look at one from a really random place I tend to look again."*

Thirdly, the module leader felt that at the end of the programme students exhibited changed behaviour in a number of ways:

ML1 *"we have clearly seen behavioural changes, we've seen students becoming more engaged, students becoming more informed, we've seen students acquiring better knowledge, developing skills [...]."*

The OCL setting also appeared to engender a sense of a shared behaviour through notions of a common purpose and sense of cohort, that is, a nascent community of practice which converged with a *positive affective state*:

A2 *"You obviously want to help your fellow colleagues, points they had missed or give them a bit of support and backup."*

The module leader corroborates this view:

ML1 *"[...] they were working as a team so they were working in a collaborative environment with one-another, they were learning from one-another, it was also very interactive, less of us more of them."*

ML1 *"[...] the way they interacted, developing certain friendships and relationships amongst the group, the cohesion with the group certainly developed, certainly noticed that since the project has come to an end those relationships are deeply manifest and continued. I think in terms of a group interaction thing it has been productive, it's been good."*

Furthermore the corollary of this is that because students were no longer engaged in OCL the group appeared to be:

ML1 *"[...] lacklustre in some sessions and appear to be de-motivated, it's fairly subjective, but just looking at their behaviour they seem to be, oh you know, not as engaged in the material as they were when we were doing the online collaborative stuff, so yes there has been a shift I would suggest in terms of how they've approached the session, how they've tackled them and the effort and interest they have shown."*

This appeared to be a strong emergent factor in student responses to the OCL experience. They tended to observe their experiences in a collective fashion. It appears that they viewed their normative behaviour in this context very differently, for example in talking about the OCL activities they put more emphasis on social aspects and used the words "we", "us", "other people", "different people", "your pair's", "group", "others", "everyone", "another student", "they've", "them", "their", "he", "his", "fellow colleagues", "they", "somebody", "everybody", "other person", "not just myself", and "whole group". It also re-affirms the assertion of fellow students as information source. Whereas in recalling the face-to-face session students tended to use the words "me" and

“I” when recalling what they did. Occasionally they did use some group words: “we”, “us”, “ourselves” to describe their experiences. It is argued this is further indication that a nascent community of practice was engendered by the students’ participation in the OCL activities.

### **8.3.4 Source data**

In the OCL intervention it can be said that there were five sources present, web pages, student participants in the form of their OCL discourse, tutors, tutor summaries, OCL tasks. The *source character* and *source behaviour* of these sources are examined in more detail below<sup>71</sup>.

#### **8.3.4.1 Source character**

Comments from student respondents confirmed that they felt that the OCL task was framed at the right level in order to complete the task:

*A3 “Easy to follow because obviously I did the activity so it didn’t go over my head, explained what I needed to do and went about doing it.”*

Evidence suggests that student respondents found that the learning context that is, the *source character* which in this case is the OCL tasks, engendered a *positive style state*:

*A4 “The way that everything was selected on the computer, read about the hooliganism, the way it was set out was ok, it was clear, understandable [...] so after I got shown how to do it, I noted it all down and I went through it myself, but I think if I was to go through it now I would be alright without reading my notes.”*

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<sup>71</sup> IRPAs are examined in more detail in section 8.3.2.3.

A1 *"I thought they (the OCL activity instructions) was (sic) pretty well put and allowed me to know what I was doing pretty easily".*

A5 (The OCL activity instructions were ) *"[...] straightforward, knew what you were doing [...] they basically stated what you had to do, what you had to find and I just got on with it"*

It appears that this *positive style state* shown above creates the necessary *metacognitive state* where the student has realised the usefulness of the work done, that is, by seeing that the information found on the web is in more detail than a news item on television:

A4 *"[...] I found it really useful because it was a few of the things about hooliganism, interesting as well because you don't realise until you read it, in your face really, because when it is in the news it's just a quick news bulletin, flash,...gone, but it goes into more depth and it's more understandable."*

This realisation appears to promote a feeling that the OCL *task* has contributed to and enabled the completion of a *task*, that is, an assessed piece of work:

A4 *"[...] 'cos (sic) it was part of the task, what we have to do for the assessment, it was useful work for us to study really."*

A3 *"[...] It's good I suppose when you are researching, you don't want to put lies in your assignment and stuff, you want to put truth in there and stuff."*

These comments below indicate that the way in which the OCL activities were structured or scaffolded, in effect their *source character*, became less obtrusive enabling students to become progressively more focussed on the *task*:

A2 *"Really easy to follow, simpler as the weeks go on [...] they all seem to be following a certain pattern over the weeks, I'm getting used to using them [...] I*



*knew that I could sit down the next week and I'd know exactly what we were doing, it was just a different subject."*

*A1 "I'm finding it a bit easier every week."*

*A4 "It's basically the same as we have done everything else in the past couple of weeks, log on to Blackboard, group discussion then finding what part we need to go to."*

*A3 "Quite straightforward, on Blackboard, I'm getting used to following things on there now."*

#### **8.3.4.2 Source behaviour**

The striking difference between the face-to-face session and the OCL activities is in the in which student participants find their fellow student colleagues online postings (OCL discourse) of benefit to their own learning:

*A2 "you get to see other people's opinions, see what they thought of it."*

*A3 "it helps you out dunnit (sic) like, was that the evaluation? You get to see other people's, whether the web sites they are looking at are the right sort of web sites."*

*A1 "because it's giving you a broader view of other people's opinions and if you are not ignorant then you can take things from their opinions and see if it makes sense, and if it does then you can add it to your opinions, it gives you deeper knowledge don't (sic) it."*

Hence, in the OCL settings fellow students and tutors, as well as the standard range of resources such as, books and journal articles, become an important source of information, knowledge, learning and lead to *shared behaviour*.

In addition student participants identified the tutor summary (see Appendices 26 and 27) as an integral part of the OCL process, not just as a way of enhancing their *positive style state*, but in providing new *knowledge* and also acting as a means of facilitating the process of reflection:

A2 “[...] *having the handout which had the lecturers opinion and your own opinions, well yeah, these are right, actually this is good backed it up.*”

A3 “*I think it’s good to have something like this actually because you can look back and say, oh that’s how I evaluated it before whereas as human beings we forget things, there’s something for you to look back at to say, oh that’s what I really need to look at when I’m evaluating web sites.*”

A1 “*I think it’s good reading back and if it’s changed at all to how you write now, I find it interesting looking back on the work that you’ve done and seeing how you have evaluated it.*”

However, students were less positive regarding aspects of the tutor summary’s source character, particularly the way it was presented in hard-copy for example:

A2 “*you look at it and kind of go, I’m not going to read that, ten font, Times New Roman, it doesn’t get your attention.*”

A1 “*nothing to draw you to it.*”

Interestingly, students made a number of some suggestions on how it might be improved for example,

A3 “[...] put the badge of the web site to it.”

A1 “[it would be better if] some of the paragraphs were centred in the middle of the page”.

A4 “[needs] a bit of colour”.

Nevertheless, it appears that the tutor summary provides a contextual and focussed reminder of previous work in order to orientate them towards the next activity leading the student from one activity to the next, in effect a ‘reflective bridge’ between activities.

Furthermore, over time as students became more familiar with the OCL activities and the student-student and student-tutor relationship the need to structure these activities became less necessary. This appears to be corroborated by comments made by the module leader and the evidence for an emergent shared behaviour as shown above in section 8.3.3. This shows that the OCL activity bears the hallmarks of a scaffolded approach in that the need to structure learning activities becomes less manifest over time.

## **8.4 Conclusion**

The evidence shown above suggests a number of concurrent and more dynamic processes present in students’ learning and IB experiences when they participated in the IL blended intervention. All of the states mentioned by Hepworth (2004) are evident plus a new set of knowledge sub-states and cognitive sub-states (application, analysis, synthesis and evaluation) which have been articulated using Bloom et al (1956) and a metacognitive state as articulated by Moseley et al (2004). These imply an overarching framework in which these may be represented. In addition, there is also evidence that four distinct levels of evaluation of information are present which merit further discussion. This overall model and its processes are represented diagrammatically and discussed in detail

in Chapter 9 in tandem with a further articulation of the four levels of evaluating information.

## **9 Discussion: A new theoretically and empirically grounded model for delivering successful IL teaching and learning interventions using a blended approach**

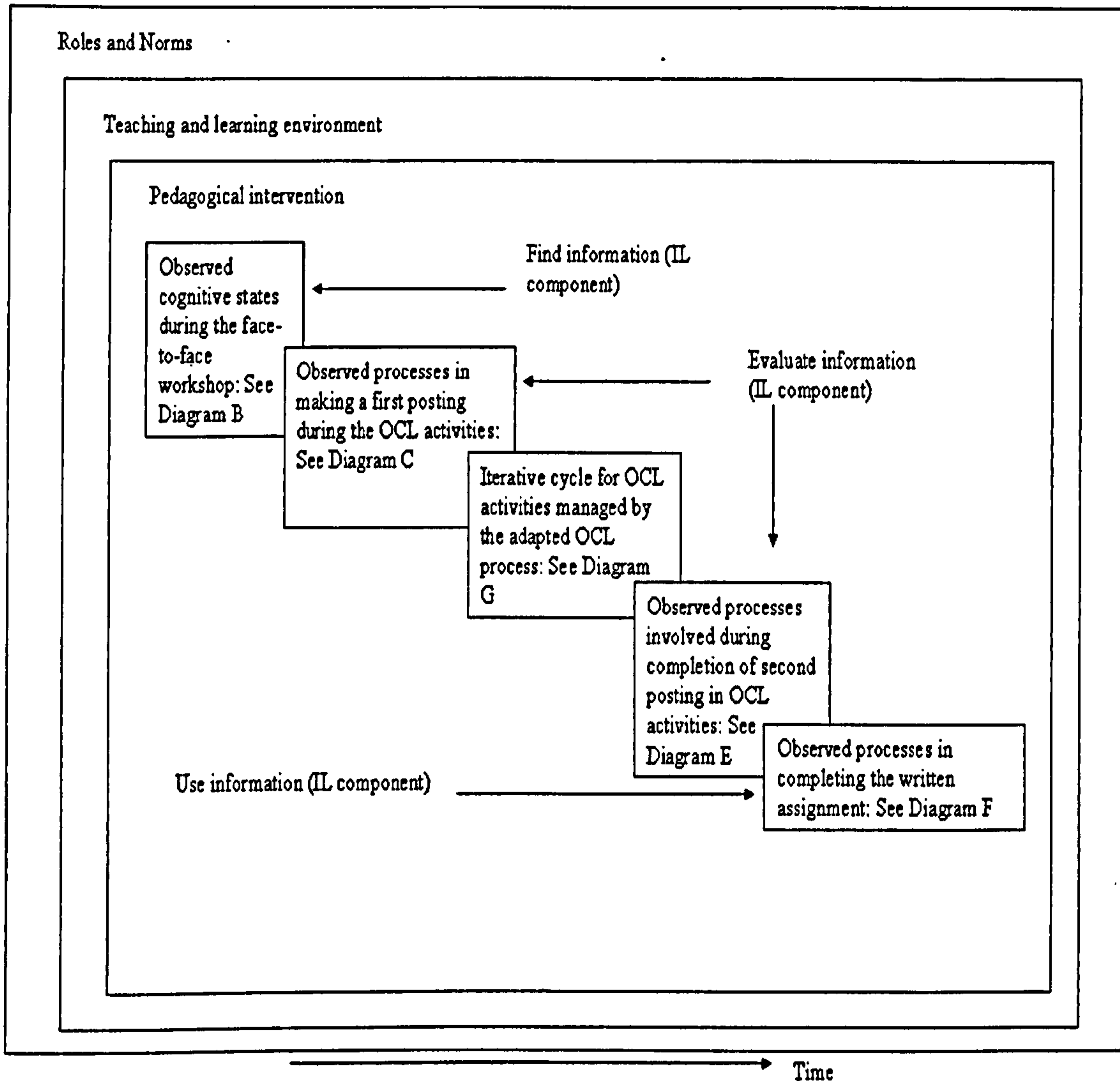
### **9.1 Introduction**

The data examined in the qualitative and quantitative findings chapters indicate the numerous factors which students encounter when experiencing the HE Level 1 Sport & Exercise IL blended learning programme implemented in this study. The arrangement of this chapter reflects the structure of the intervention and its context in order to investigate, through the lens of the data findings, the efficacy of this intervention. This chapter, by incorporating the literature from IL, IB, teaching and learning and e-learning highlighted in Chapter 2, seeks to demonstrate the significance of what has been carried out, how it relates to and how it builds upon previous research and practice.

Through this discussion a new model for delivering IL in a blended fashion emerges. This new model is represented diagrammatically and has three levels:

1. An overall model showing how an IL intervention should take place and this is represented in Diagram A;
2. A framework for modelling the learning process involved in the pedagogical interventions shown in Diagrams B (face-to-face workshop), C, E (OCL activities) and F (written assignment).
3. A model for managing the OCL activities (Diagrams C and E) is illustrated in Diagram D and its amended form Diagram G.

Diagram A: Overall IL intervention model



Firstly, the overall model shown in Diagram A above sets the IL blended intervention within its wider context. It also shows each element of the IL intervention and how they reside together. Here the *roles*<sup>72</sup> and *norms*<sup>73</sup> which appear to have a bearing on the programme as a whole, its affect on the *teaching and learning environment* and how it appears to shape the *pedagogical intervention* are discussed. Secondly, the discussion

<sup>72</sup> The notion of role is defined in section 2.3.1.3.1

<sup>73</sup> The notion of norms is also defined in section 2.3.1.3.1

moves to a finer granularity to consider in detail the sequence of specific interventions which embody the *pedagogical intervention* itself namely the *face-to-face workshop*, the *OCL activities* and the *written assignment*. Here the detailed learning process with its various *cognitive*<sup>74</sup> (*knowledge, comprehension, application, analysis, synthesis and evaluation*<sup>75</sup>), *affective*<sup>76</sup> (positive and negative), *style*<sup>77</sup> (positive and negative) *states*, *behaviour*<sup>78</sup> (new and changed) and aspects of *source*<sup>79</sup> (*character and behaviour*) are illustrated through diagrams B, C, E and F. In essence this is the most complex level. Thirdly, the process for managing the *OCL activities* described in Diagrams C and E is illustrated in Diagram D. This details the components and how they were deployed during the research. Given that the findings indicated that the IRPA did not work an adapted OCL process is presented in Diagram G.

Together these suggest the factors that deliverers of IL teaching and learning (pedagogical) interventions and IL researchers should take into account in order to foster the conditions in which learning can take place. The summary to this discussion (section 9.3) offers a synthesis of the most significant aspects of these considerations, why they are important and how this contributes to the body of knowledge in the fields of IL, IB, learning, e-learning and pedagogy. It also highlights the major emergent themes for all the significant processes identified within the research and notes on how these may transfer to different settings.

## 9.2 Overall IL intervention model

Diagram A above illustrates how the *pedagogical intervention* is nested within a wider context that of the *teaching and learning environment* which in turn is nested within a wider set of *roles and norms*. It also shows how the *pedagogical interventions* were

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<sup>74</sup> Cognitive state is defined in section 2.3.1.3.2

<sup>75</sup> All of these terms are defined in section 2.4.5

<sup>76</sup> Affective state is defined in section 2.3.1.3.2

<sup>77</sup> Style state is defined in section 2.3.1.3.2

<sup>78</sup> Behaviour is defined in section 2.3.1.3.3

<sup>79</sup> Source character and behaviour are defined in section 2.3.1.3.4

sequenced and which IL activities each component addressed. Hence, the *pedagogical intervention* commences with the *face-to-face workshop* and ends with the *written assignment*.

### 9.2.1 Roles and norms

The findings appear to support the assertion that the notion of the *person-in-context* (Wilson, 1999; Hepworth, 2004) is significant to the IB of students in this learning situation. This notion appears to have two distinct dimensions a broader *role of student-at-university* and a narrower *role of student-in-Sport-&-Exercise*.

Firstly, the narrower *role of student-in-Sport-&-Exercise* in which students attempt to learn the *norms* associated with the *role* of being a student within a specific subject discipline are revealed in a number of statements. These are exemplified by specific reference to what they have to do such as, “*having to find out which books were in the library*” (A2) to complete a defined *task*<sup>80</sup>, for example “*a couple of my essays and a lab report*” (A3), in short an assignment. In this sense the *written assignment* itself is a *task*. In addition, to this the actual requirement for students to complete a *written assignment* is itself part of the *norms* associated with, and nested in, the *teaching and learning context* as illustrated in Diagram A above.

Secondly, there is a broader *person-in-context* (described here as *student-at-university*) at work that of the *role* of the new student in relation to “*getting used*” (A1) to the new *norms* of being at university because, “*it was a bit new*” (A1), “*everyone is settling in*” (A2) and “*you’ve just been there two weeks*” (A2) and that they have “*just moved into halls*” (A2) with whom they want to be, “*you’ve got thirteen friends waiting*” (A2) demonstrating their broader role, rather than be in a seminar (their narrower role).

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<sup>80</sup> Task is defined in section 2.3.1.3.1



Both of these factors appear to show that the narrower *person-in-context* (*student-in-Sport-&-Exercise*) seeks normative boundaries during information seeking as put forward by Hepworth (2004) but that this is further tempered by their broader social identity (*student-at-university*). These appear to be examples of the 'presage factors' (the social factors which shape a student's learning experience) as identified by Biggs & Moore (1993) as important to the learning context. Race (2001a) explicitly recommends that this broader role identified here as *student-at-university* should be recognised by teaching staff, in that students often have things on their minds other than the direct content of a particular learning intervention and that this can temper students' motivation to complete the tasks they are allocated. Hence, there is a tension evident between these two roles.

Findings indicate that when a *task* is engaging the *role of student-in-Sport-&-Exercise* appears to over-ride the *role of student-at-university*. The *face-to face workshop* achieved this in a number of ways for example students reported in terms of what they had learnt, "*I now know how to look for e-journals and e-books on Swetswise and e-brary*" (A1) and in terms of the intervention itself, "*we actually went off and tried it ourselves, you learn it better then*" (A3), "*it was active*" (A3) and "*it gets you involved*" (A3).

The *OCL activities* also provided an engaging *pedagogical intervention* in terms of learning, "*you're finding out more about what the web site is about, than just not knowing anything at all*" (A5), through the discourse itself, "*you feel that you've done something productive*" (A1) and "*it was really good, you got to see what other people thought of their web site and you could have a look at different web sites and different people's opinions*" (A2) and the tutor summaries, "*just a nice way of being recognized*" (A2), "*it's quite good to be honest*" (A3) and "*I thought it was really good, obviously, it gave the whole group a bit of recognition*" (A2).

In contrast, when the *task* is not engaging then the *student-in-university role* comes sharply into focus. In effect this created a negative *affective* and *style state*. Student responses regarding their thoughts about the IRPA illustrated this very well where

students “*just wanted to get back*” (A2) to see their friends rather than properly finish an activity because “*if it’s at the end of a lesson you want to get it done*”, (A2) “*the last place you want to be unfortunately is in a lecture*” (A2). This was exacerbated by the fact that the preferred answer was too obvious<sup>81</sup>, a description of the perfunctory way this task was completed by the student participant further exemplifies this, “*first one sounds right, picked that there, I didn’t bother reading the others*” (A3) and “*it didn’t really learn me (sic) anything*” (A3) and demonstrably illustrates the lack of engagement or commitment to the task. Squires (1994) draws attention to this in that he describes the learning context as a market place of competing stimuli (echoing Race, 2001a) and it is only when the learning intervention is sufficiently engaging to hold students’ attention will it foster learning. In addition, it should be noted that these specific factors are not explicitly recognised in any IL model and therefore it is felt that these are important dimensions to add to the notion of IL. It appears that the evidence illustrates *norms* at work shaping the *role* of being a new student which can affect their IB and learning as they engage, or otherwise, with the *tasks* associated with IL related activities in a university setting. This upholds Hepworth’s (2004) model of IB. In effect the OCL component of the intervention resolved the tensions of person-in-context causing the *student-in-Sport-&-Exercise* role to override the *student-at-university* role.

The detailed processes which contributed to the *role of student-in-Sport-&-Exercise* are unpacked in the *face-to-face workshop*, *OCL activities* and *written assignment* sections below.

### 9.2.2 Teaching and Learning Environment

The *teaching and learning environment* contributes to and provides the educational dimension to the ‘presage stage’ or the learning context (Biggs & Moore, 1993) in which the *pedagogical intervention* takes place and is, it is argued, a subset of *norms* subsumed within the broader set put forward above. Diagram A illustrates this relation. The

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<sup>81</sup> The tutors placed the preferred answer under choice A, a less preferred answer under B and the least preferred under C (see Appendix 7). Students became aware fairly quickly that A was the ‘right’ answer.

portfolio assessment, in which the IL problem-based *written assignment* resides, is defined by the ELICS module learning outcomes which are in turn governed by, and aligned with, the award structure (Appendix 15). This alignment is essential to teaching and learning good practice (Biggs, 1999; D'Andrea, 1999).

*Norms* surrounding the *written assignment* are unpacked above. What is evident in the *teaching and learning environment* in particular is that participants readily demonstrated their normative behaviour in this context in that they articulated ideas of what students need to do, that is, work to complete tasks set in the seminar time, either individually, “*you can get involved in the sessions yourselves*” (A3) or, as noted by the module leader, in their OCL work, “*they were working as a team*” (ML1) and “*they were learning from one another*” (ML1).

As noted above the *face-to-face workshop* and *OCL activities* are themselves aligned with the learning outcomes and *written assignment*. It can be seen that the instructions to do the activities and appeared to be written in an intelligible fashion for example, “*easy to follow because obviously I did the activity so it didn't go over my head [...]*” (A3) and how they believed the skills they had learnt contributed to their assessed work for example, “*[...] the most important thing I have learnt for sure is that the online library is the best starting point when researching [...]*” (A7). In addition, because of the effectiveness of the design students indicated, in their *written assignment*, that the skills they had learnt extended beyond this in two particular instances.

Firstly, transferability of skills to other modules for example, the module leader noted that, “*[...] they had transferred what they had learnt [...] not just in this module but in other modules which some of them were participating in*” (ML1). Students also noted an intention to transfer their learning in the future for example, “*[...] I will incorporate this new knowledge and skills in the future by using these skills when completing a new task*” (A8). Given that students displayed the ability to transfer their skills to other modules is a key part of IL and this intervention appears to enable this to happen. This is an exciting positive result because a central claim of IL proponents (Bruce, 1995 and Andretta, 2007

in particular) is that IL is a set of transferable skills and this study appears to uphold this view. It also suggests that these could be further transferred out by becoming part of the employability skills set for application in the post-university setting. This is a key finding given that the Leitch Review (Great Britain: HM Treasury, 2006) puts great emphasis on the necessity for skilled graduates.

Secondly, it is argued, it introduced students to the Sport & Exercise community of practice by recognising their contributions via the *tutor summary* for example students realised that, “*it gave the whole group a bit of recognition you could see [individually] what they’d done what they’d said*” (A2), and appeared to value the fact that it also contained “*the lecturer’s and your own opinions*” (A2) which generated a genuine positive *affective state*, “*it worked really well, it was a good way of reflecting what you’ve done*” (A2). Hence, this recognition served to realise the process of ‘reification’, the act of treating an abstraction as a concrete entity, which Wenger (1999, p57) regards as an essential part of the community of practice. In this instance students’ abstract thoughts were made concrete by the act of students typing out their thoughts and then posting them to the discussion board. These thoughts were then validated by the nascent community of practice when tutors included some of their contributions in the tutor summary. This exemplifies the notion of ‘reification’ (Wenger, 1999, p57) and also that of peer collaboration (Jonassen et al, 1995) both regarded as essential in the learning process.

This notion of the community of practice is important because it illustrates the move from purely tutor centred to a student centred (or scaffolded) approach which is advocated by many of the writings on e-learning such as, Goodyear (2001), Hung & Chen (2001), Mayes & de Freitas (2004) and JISC (2004). It is this approach which brings about the higher order thinking which is described in diagrams C, E and F. It is argued that recognising student output engenders a positive *affective state* which predisposes students to a motivation to learn, identified by Race (2001a) as an essential ingredient to successful learning. Hence, this theoretically grounded and empirically tested model,

which employed a *face-to-face workshop*, *OCL activities* and a *written assignment*, has assisted students in their learning.

In order to understand, in much greater detail how, the various processes assisted student learning it is necessary to examine each of these learning and teaching interventions in turn. The processes for each are illustrated in Diagrams B, C, D, E, F and G. These diagrams are accompanied by detailed discussion of the processes and their inter-relation.

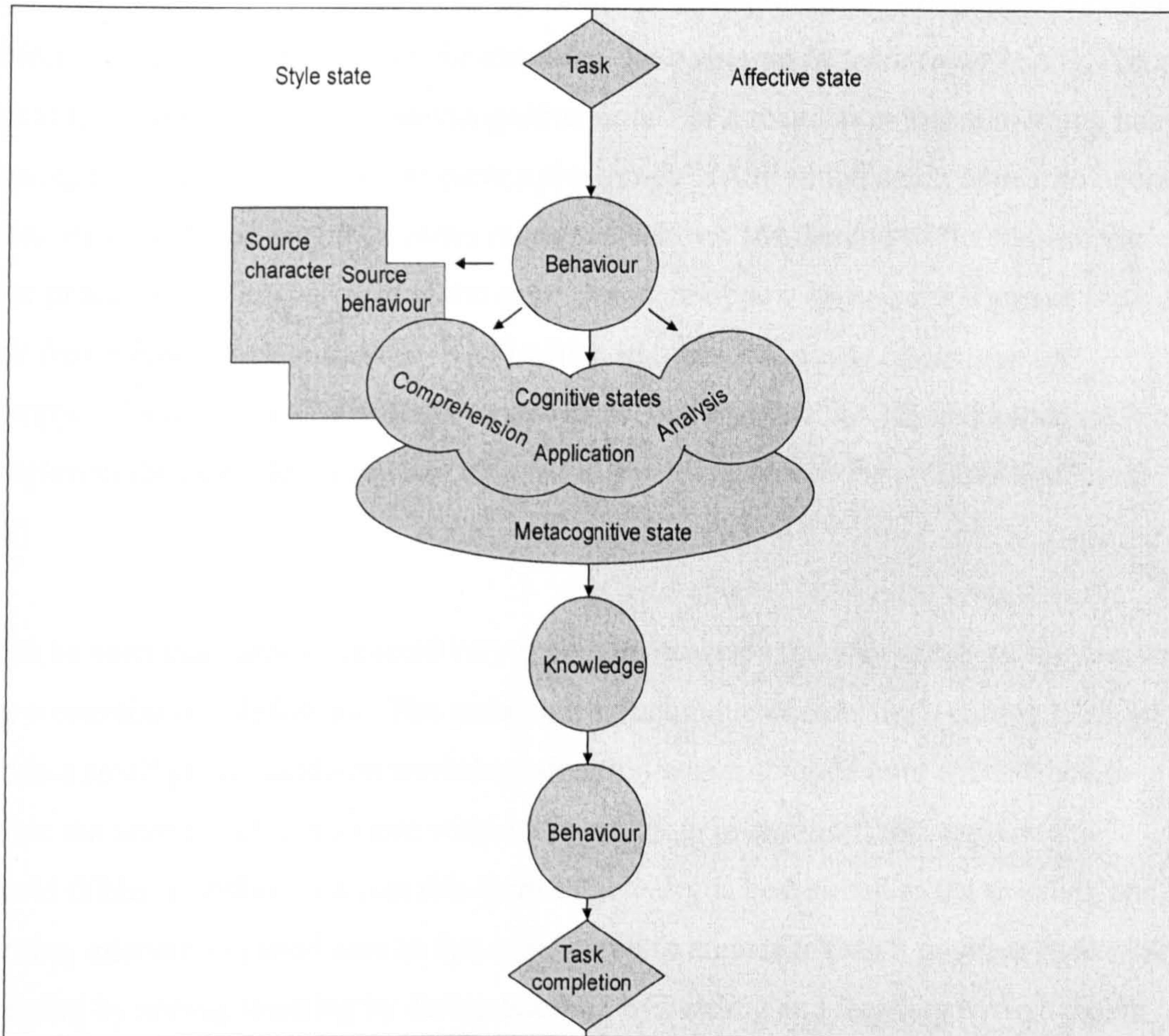
### **9.2.3 Pedagogical intervention**

The framework was informed from the findings noted in Chapter 2 and attempted to bring together best practice for each stage. The *face-to-face workshop* was constructed using notions of 'pedagogical sophistication' or an 'eclectic approach' which were in turn based upon learning theory especially that of constructivism described by Mayes & de Freitas (2004). A detailed description of the *face-to-face workshop* follows in section 9.4.1. This *face-to-face workshop* intervention was accompanied by *OCL activities*, in effect rendering this framework a blended learning approach. The *OCL activities* were based on emerging e-learning scholarship in particular upon notions of online discourse put forward by Teles (1993) Jonassen et al (1995), Goodyear, 2001, JISC (2004) and Salmon, (2004). A detailed description of the *OCL activities* follows in section 9.4.2. The learning outcomes for this intervention were shaped using knowledge of IL and IB models gleaned in Chapter 2. Learning theory and IB was used to construct the *written assignment* which forms the final part of the intervention and is described and analysed in section 9.4.3. In effect these areas of scholarship and research were brought together in a unique way to deliver the teaching and learning interventions described here. Processes identified via IB as well as e-learning and learning theory are used in a new way to identify and analyse the IB and cognitive processes evident during the intervention.

#### 9.2.4 Face-to-face workshop

The *face-to-face workshop* was in effect a fifty minute opportunity for small groups of students to learn about information sources that they have not experienced hitherto, realised via a *task* facilitated by the subject librarian and supported by written guides, in order to gain the relevant IL skills to complete an assignment. These skills, in turn, were intended to be transferred to other modules so that students could find good quality information during the rest of their undergraduate career. In essence, students learned how to find information of academic quality via mini-lecture, hands-on and discussion. Students had the opportunity to see, listen, learn by doing, discuss and in so doing apply their new knowledge of information systems such as the Library Catalogue and e-journals services to find relevant information for a *written assignment*. Diagram B below illustrates, in a schematic form, the various observed states that students experienced as they attended the *face-to-face workshop* as they engaged in a *task* set by the tutor.

Diagram B: Observed cognitive states during the face-to-face workshop



In IB terms the whole activity was defined by the *task*. In this instance, the *task* was the problem-based scenario which is itself a constructivist approach recommended by Kolb et al (1991) and Goodyear (2001). This was designed to enable students to use a range of e-resources to find and evaluate books, journal articles and other resources. Each student then engaged in some *behaviour* for example, “*search for books*” (A3) which in turn led students to exhibit a number of concurrent cognitive states, that *application* and *comprehension* when they interacted or experienced information sources. *Application* was evidenced in the fact that all students found material for their assignment experienced in tandem with *comprehension* for example, “*the keyword we did the searches for*” (A2). These *cognitive states* were triggered via experiencing source

character both in terms of artifacts for example, "*the library catalogue*" (A12) and people for example, "*library staff*" (A8). Experience of *source character* was also paralleled with experience of *source behaviour* for example, "*you can look for a certain subject*" (A2) and tutor as source for example, "*you showed us what to do*" (A1). These appear to be underpinned by a *metacognitive state*<sup>82</sup> or a realisation that something had been learnt for example, "*I learnt quite a few things*" (A3) which again appear to operate concurrently with the *cognitive states* mentioned above. At the end of the session via these processes students arrived at the *cognitive state of new knowledge* for example, "*I have learnt how to use Swetswise*" (A8) which in turn lead to *new behaviour* for example, "*I have been able to find more in depth information*" (A12) and hence *task completion* for example, "*I can use the online library to search for e-books and books*" (A8).

It can be seen that students reacted very positively towards the way in which the *face-to-face workshop* was delivered. The pedagogical technique of 'touring' (Gibbs, 1998, p15) within a small group hands-on workshop situation was employed here and seemed to enable the tutor to act as a source within this process. In addition, this appeared to uphold Gibbs' (1998a) view that this form of delivery is best suited to the teaching and learning intervention used here in that it appeared to engender both a positive *style state* (learning by seeing, learning by doing, learning by reading and learning by writing) in student attendees in tandem with a positive *affective state*. It is argued that it is only by enabling these states to occur that *new knowledge* was learnt which promoted the *new behaviour* enabling *task completion*.

There are a number of important factors at work here which are significant:

1. A positive *affective state* is an essential ingredient in leading to successful IB (Hepworth, 2004) and learning outcomes (Moseley et al, 2004). However, the *affective state* was not static. During this stage it appeared that students exhibited a transformation from a high degree of *uncertainty* to a lower degree of

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<sup>82</sup> Metacognition is defined in section 2.4.5



*uncertainty*. The following exemplifies this transition from a high degree of *uncertainty*, “we are getting used to everything and me personally, like, it was a bit new” (A1) to a much lower degree of *uncertainty* for example, “[...] now I have completed [...] the workshop and this study skills task I am now fully aware of how to search for online resources” (A3). Kulthau (1991) and Hepworth (2004) have observed this as an integral part of the IB process. This thesis agrees with this view and argues that IL teaching interventions must seek to reduce *uncertainty* during this process, and be observed by students to do so, otherwise it is unlikely that successful learning or IB will occur;

2. Learning theory (Squires, 1994; Mayes & de Freitas, 2004; Moseley et al, 2004) and e-learning scholarship (Teles, 1993; Jonassen et al, 1995; Mayes & de Freitas, 2004) inform us that by creating the conditions observed in this study students should display a greater degree of learning for example, as changed *behaviour* (Squires, 1994) in turn leading to a greater degree of information literacy skills shown as *new knowledge* regarding the use of sources such as a library catalogue or an e-journals service. Furthermore, this is also evidenced in the degree of independence students exhibited towards their learning, “I can also use Swetswise to find e-journals to use for assignments” (A8). Also, it is argued that these observed processes are evidence of this having taken place. This, it is argued, is also seen through the various *cognitive states* evidenced as a result of this intervention;
3. By using a pedagogically sophisticated approach as recommended by Sarayon & Snell (1997), Race & Brown (2001) and Webb & Powis (2005) the data above demonstrates that a range of *style states* have been addressed;
4. The data shows that a number of *cognitive states* are evident at this stage that of *knowledge* (process and factual), *comprehension* and *application* as defined by Bloom et al (1956) and re-iterated by Moseley et al (2004). It should be noted that the higher cognitive states of *analysis*, *synthesis* and *evaluation* do not appear to be evident at this stage. This thesis argues that it is only in the OCL process and assessed work that these states become manifest (discussed below) and this

implies that a hands-on workshops to learn about information resources are insufficient in themselves to engender information literate individuals;

5. *New behaviour* is evident at this stage and indicates that learning is in place but it does not yet constitute *changed behaviour* Squires (1994) or 'transformation' MacKeracher (2004) which embodies real learning;
6. It is only through *task* completion evidenced in the assessed work where *changed behaviour* is fully evident and this supports the view put forward by Walton (2005) that assessment, because it can be used to demonstrate *application* (Bloom et al, 1956), is an essential component in enabling students to become information literate. Furthermore, assessment is regarded by Race (2001) as the single most important external motivator.

It is argued that these factors together demonstrate that this highly student centred and constructivist intervention as recommended by Goodyear (2001) and JISC (2004) can deliver successful learning in the form of new knowledge which is manifest in the *written assignment* data discussed here. This data shows that students exploited the range of resources that they learned about in this *face-to-face workshop* and found appropriate information. This also has significant implications for a more complete understanding of IB. It is argued here that it is essential to disaggregate the *cognitive states* discussed above, by using Bloom et al (1956) and drawing on metacognitive models identified by Moseley et al (2004), in order to properly recognise their significance when examining individuals' IB.

The implications for IL are that little attention is paid to affective or cognitive factors and is particularly the case for UK models which aren't underpinned with a specific cognitive theory for example, SCONUL (1999) and CILIP (Armstrong et al, 2005). An example of an affective factor would be, for instance, making sure that students feel supported whilst they complete a *task*, "*you, like, came around and made sure that we were all at the same stage and all keeping up to date and I appreciated that* (A1). The attention given to cognitive factors is also cursory particularly the importance of comprehending factual or process knowledge. What this implies is that learners need to be able to express learning

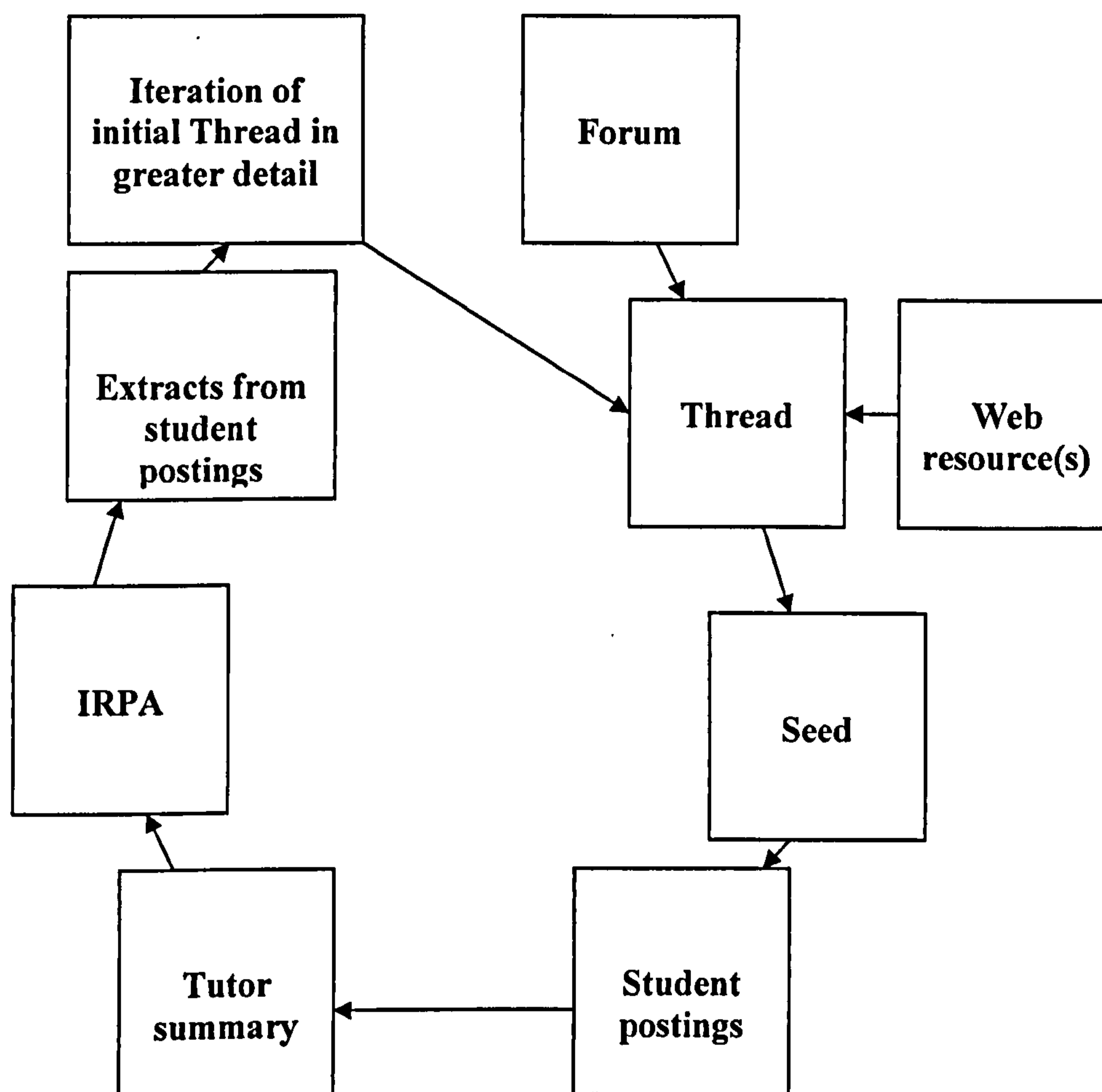
in their own terms, in order to reach understanding of that process or fact, before applying it. For example in the statement, "*we did the exact journal*" (A2) the student indicates, in their own terms, that they knew how to carry out a title search for a specific journal on the Library Catalogue. This illustrates that the intervention deployed upholds the view put forward by the ACRL (2000) model which states that IL teaching and learning should be underpinned with notions derived from Bloom et al (1956). Finally, it is clear that context, manifest in *norms, roles* and *tasks*, shapes the IL process. This is particularly significant in the light of the issue of specific transferable skills for the workplace. This does not appear to be reflected in IL models which tend to be generic in nature.

### 9.2.5 OCL activities

Diagram D reflects how the OCL activities were managed in the Blackboard VLE. The *forum* provided a textual description of the *OCL activity* within Blackboard and also the hyperlinked entry to the relevant discussion board activity. The *thread*, posted by the tutor to the discussion board, was a more detailed description of the activity with a set of instructions on how the activity was to be completed and links to relevant web resources (for the first activity this was the Berkeley web site on how to evaluate information). Within this *thread* was contained the *seed* which was the starting point of the activity and contained a student comment and a question from the tutor. This exemplifies the notion of the 'pedagogy of the question' (Andretta, 2006). Students then completed the activity as instructed which involved writing a reply to the initial *thread* in the form of a *student posting*. The tutor then examined all of the postings, extracted the most relevant and interesting replies, these were then woven together with tutor comments. This also contained instructions for students to complete the *IRPA* and read the new *thread*. The new *thread* was the *iteration of the initial thread in more detail* and contained a relevant comment from a student which was used to explore a more detailed aspect of the subject in question. This technique was also a way of engendering 'differentiation' regarded by

MacKeracher (2004) as an essential ingredient in the learning process. This was then used to *seed* the next round of the discussion.

Diagram D OCL process



What is particularly interesting and worthy of discussion is the role of the *tutor summary* in this process and the positive effect it had not just on student learning for example, "[...] what I really need to look at when I'm evaluating websites" (A3) but also on their *affective state* for example, 'a nice way of being recognised' (A2) and motivation to learn for example, "[...] quite interesting, gets you involved [...]" (A3). Students appeared to like the fact that the *tutor summary* contained their work for example, "it was a good way of reflecting what [we have] done" (A2). What the *tutor summary* also provided was a tangible means of enabling students to properly reflect on their previous work for

example, “[...] interesting looking back on the work you’ve done and seeing how you have evaluated it” (A1) and also it “reflected back, I suppose it gets your brain engaged and starting to think about it again, so you’ve got more chance of remembering what you did the week before, so I suppose it, like acted as a refresher” (A3) demonstrating that this process offers a genuine means of reflection which is essential to the learning process (Race, 2001b) and a part of the *metacognitive state* (Moseley et al, 2004). Therefore, this thesis asserts that the *tutor summary* acts as a ‘reflective bridge’ between activities capturing the most important outputs from students in a previous session and presenting them ‘woven’ (Salmon, 2002) together with tutor comments to remind students of their previous work. In so doing this provides a means of focusing students on what was learned previously before the activity is re-iterated with a more specific task. In effect exemplifying ‘differentiation’, as recommended by MacKeracher (2004), as an essential component in the learning process.

In addition, it introduces a sense of writing or publishing material to a wider audience, in this case fellow students and their tutors, rather than solely for the tutor to see in an assignment. The recognition created here introduces students to the idea of being part of an academic community of practice which serves to take the student beyond the traditional learning experience and become producers as well as consumers of information (Walton et al, 2007; Andretta, 2007). In effect, students not only participate but also become involved in the negotiation of meaning. Participation, negotiation of meaning and reification, mentioned in section 9.2.2 above, are regarded by Wenger (1999) as the central planks for the creation of an emergent community of practice. This thesis argues that because students are ‘publishing’ to a wider audience, albeit a highly structured one, this intervention makes it more difficult for students to behave like surface or strategic learners and therefore they tend to make more considered replies in this online medium than in a face-to-face setting. In effect the *OCL activities* created a ‘cognitive space’ for students to do so, identified by Garrison et al (2003) as a necessary part of the OCL structure.

Students also made number of negative comments relating to the *tutor summary* which related to the presentation of the hard-copy version (see Appendix 22) for example, “*you look at it and kind of go, I’m not going to read that, ten font, Times New Roman, it doesn’t get your attention*” (A2) and “*nothing to draw you to it*” (A1). They also made some suggestions on how it might be improved for example, “*put the badge of the web site to it*” (A3) and it would be better if, “*some of the paragraphs were centred in the middle of the page*” (A1) and if it had, “*a bit of colour*” (A4).

It is also of note that their was clear temporal nature to the intervention in that the scaffold used became less evident after each activity for example, “*they all seem to be following a pattern over the weeks, I’m getting used to them*” (A2). Furthermore, the tutors were very much the ‘guides on the side’ for example, “*they were learning from one-another [...], less of us more of them*” (ML1) which Goodyear (2001) envisaged as the way in which scaffolding should work in an online setting. This statement by the module leader could, in itself, be regarded as describing the very essence of the constructivist approach.

However, it is recognised that certain parts of the OCL process were not successful (see section 9.2.1). On reflection it is the view of this thesis that the IRPA should be removed from the OCL so that the model is adapted as illustrated in Diagram G below:

Diagram G: Adapted OCL process

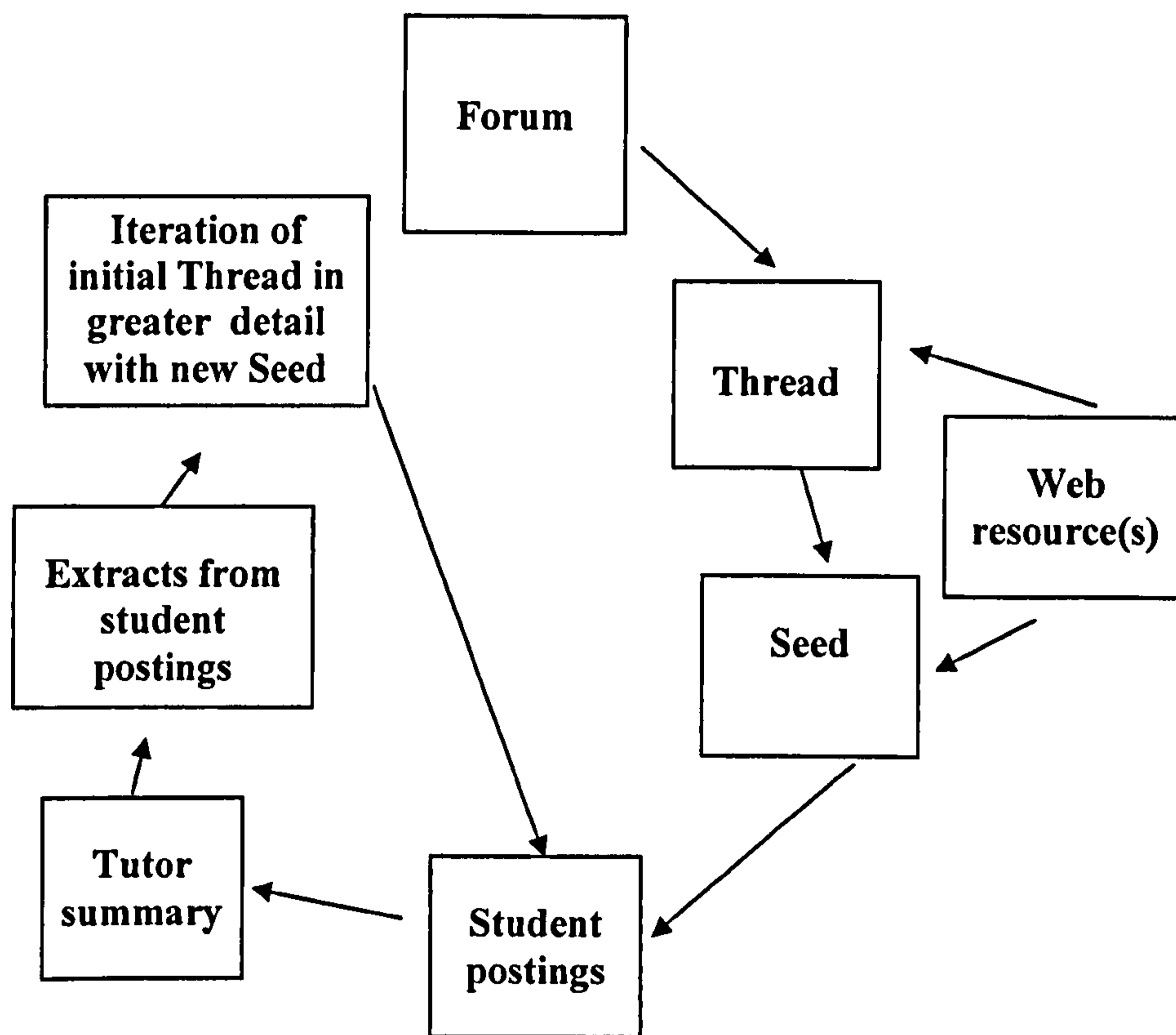
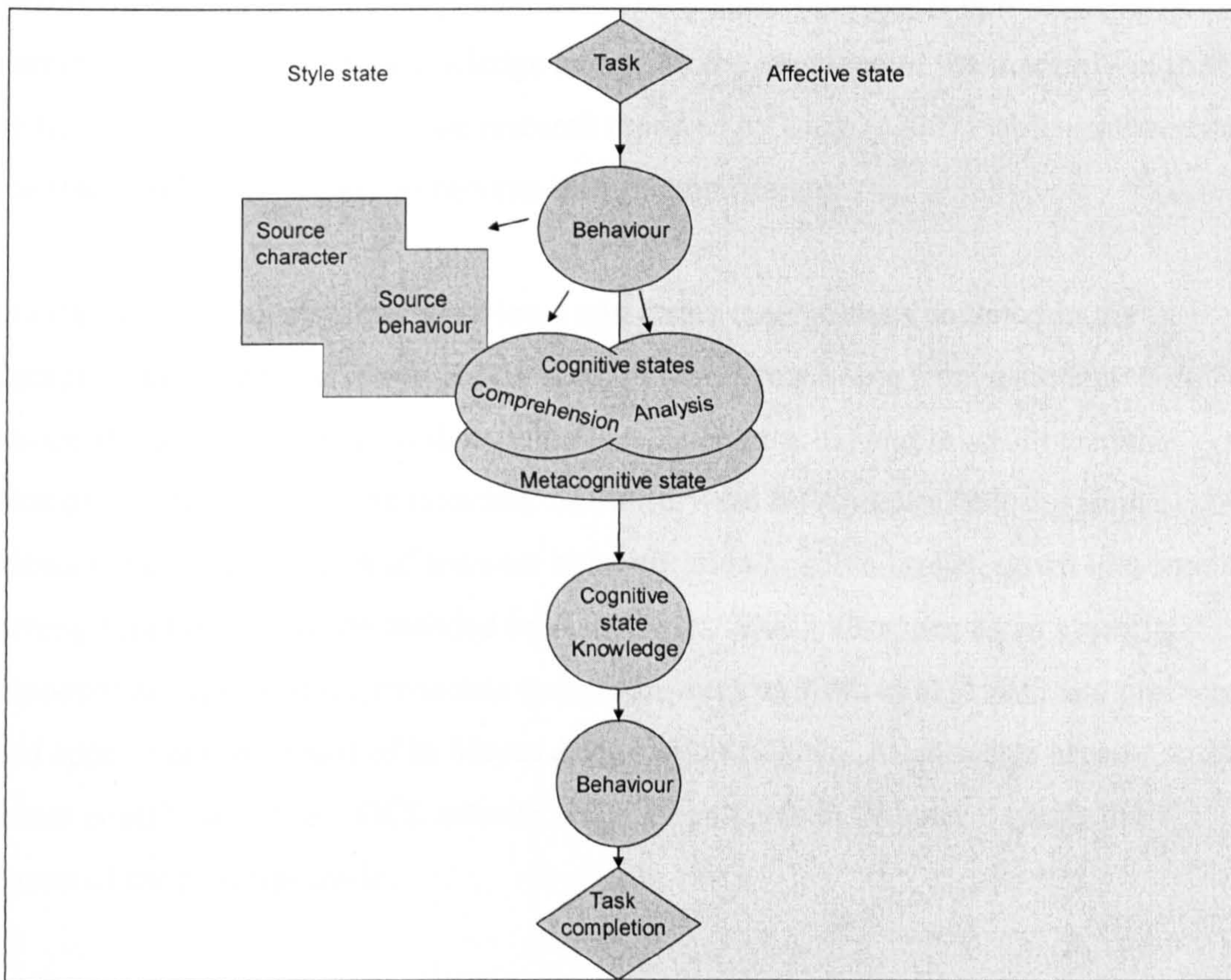


Diagram C below exemplifies, in a schematic form, the observed states that students experienced as they engaged with the OCL activities as they made a first posting.

Diagram C: Observed processes in making a first posting during the OCL activities



The data appears to support the view put forward by Hepworth (2004) that the *task* shaped via the *roles* and *norms* of the learning situation in turn fashioned individual IB in that, in students appeared to readily transfer the *norms* of *face-to-face workshop* group *behaviour* into this online setting where students took up their new *role* as online learner for example, “*made our replies on the forum*” (A1) and “*we had to feedback on each others*” (A1). This indicates that they had begun to exhibit characteristics of becoming part of a nascent ‘community of practice’ as put forward by JISC (2004) particularly evidenced in the way that students described how they showed respect for their fellow students when they engaged in the discussion with their peers, “*you’ve got to respect the other person’s opinion*” (A4) and “*you don’t go full-on*” (A3). This corroborates the assertion made by Salmon (2004) regarding OCL in that meaningful contributions will be made in this environment if students feel respected and show respect to others. This upholds the view held by Mayes & de Freitas (2004) that by moving beyond traditional



teaching even at Level 1 students are capable of becoming part of a nascent community of practice which in itself brings significant benefits to the learner both in terms of constructing context specific knowledge and using the language of the domain - in this case IL. This also corroborates the research reported by Lloyd (2007) which showed how discourse enabled employees to become information literate.

The *task* (from which all these behaviours and states emerge) was couched in the language of the student as much as possible. In fact, a real quote from a student participant was used to seed the discussion (see Appendix 15) and this followed the notion of the 'pedagogy of the question' as put forward by Andretta (2006). Hence, students were not given a set of answers but a question to solve broken down into smaller 'learning functions' as recommended by (Goodyear, 2001), also seen as an essential component in experiential approaches to learning such as Kolb et al (1991) and problem-based approaches as identified in Mayes & de Freitas (2004). All students present at the seminar contributed to this OCL activity and the examples in Chapter 8 typify the richness of the postings made.

From this initial *task* a set of behaviours and states emerged. Students engaged in some *behaviour*, "*log onto Blackboard*" (A4) and "*read the article*" (A1). Once students had done this they then engaged with the two sources the '*article*' (Berkeley web site on evaluating information) and then engaged in the *behaviour* of analysing a web site (one example being the BBC sports section) exemplified in the statements, "*we went through different websites, having a look, how reliable they were, evaluating what you think*" (A2) and comprehended some of the source characteristics. In effect students began to evaluate the web site and mentioned criteria such as "*URL*", "*relevant*", "*reliable date*" and "*check the author*" which enabled them to produce their own evaluation criteria (*new knowledge*) and then engage in some *behaviour* for example, "*writ (sic) paragraphs on what I thought was important*" (A1).

In short via OCL students appeared to become highly focussed on the *task*, began to engage in high level cognitive processes and demonstrate an emerging set of IL skills

associated with evaluating web based information. This outcome supports the view put forward by Teles (1993) and restated by Goodyear (2001) and Mayes & de Freitas (2004) that by scaffolding online learning interventions in this way with clear instructions which set questions to be answered rather than information to be absorbed (traditional didactic approaches) can enable students to create their own meaning regarding a topic and hence engender learning. This was evidenced by the fact that students created postings which were couched in their own words (indicating Bloom et al's cognitive process of *comprehension*) with content which demonstrated that they had made judgements about what to include. This is evidence of the cognitive process of *analysis* (Bloom et al, 1956), and critical thinking identified by Moseley et al (2004), that is, they had analysed the source they were given to use.

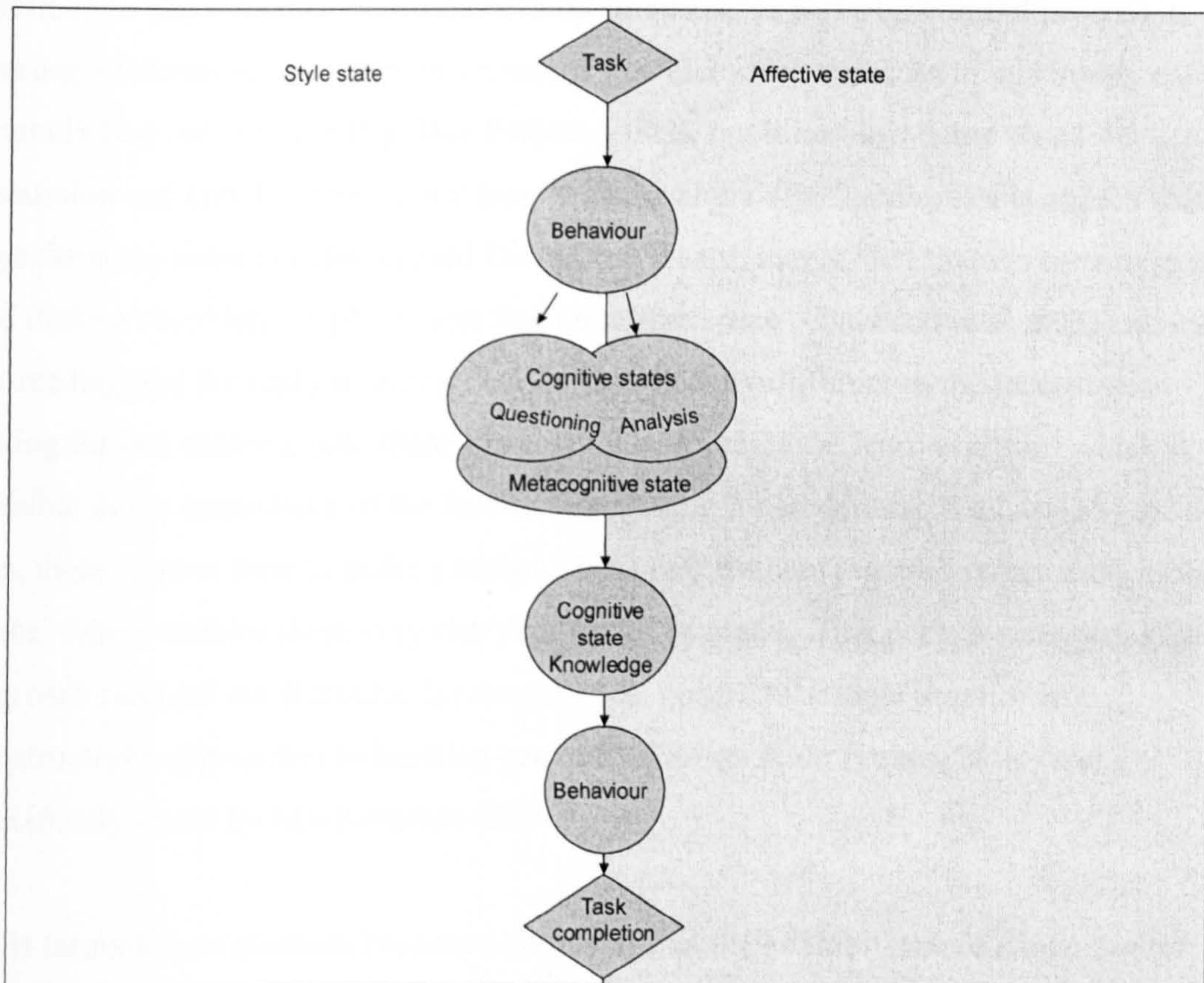
Hence, the e-learning model appeared to enable students not only to read information about evaluating web site but also to begin through posting messages to Blackboard to create, via *analysis*, their own evaluation criteria and in turn begin to create a shared meaning regarding this topic leading to a transformation in students understanding of reality, the central tenant of constructivist pedagogy (Kolb et al, 1991) and dialectical learning (MacKeracher, 2004). In essence the students engaged in an online collaborative conversation which Laurillard (1993), Jonassen et al (1995) and MacKeracher (2004) argue is an essential component in enabling students to negotiate the meaning of phenomena and also defines the nature of 'tertiary courseware' (Mayes, 1995; Goodyear, 2001; JISC, 2004). This corroborates Goodyear (2001) who views that this particular e-learning pedagogical intervention is the most appropriate in fostering this outcome. Whilst some models of IL mention conversing with others at the outset for example ACRL (2000) and ANZIIL (Bundy, 2004), none specifically mention that IL itself can be taught using a conversational model either in a face-to-face or in an online setting. This appears to be a major omission and this thesis asserts that it is only by harnessing the pedagogical intervention described here that the higher order thinking skills necessary for IL will be realised.

In addition, it can be seen that during this stage the students' *affective state* undergoes a transformation from feelings of *uncertainty* in that they feel they don't know anything regarding the task for example, "*at first I didn't get it*" (A4) to a later state of reduced *uncertainty* in that they have a feeling of having done something '*productive*' by making a posting. This positive feeling appears to lead to a sense of motivation for example, "*it gets people quite motivated to do things*" (A3). There is no reference to motivation in IL models and yet it is referred to in IB models (Wilson, 1999) and in learning (Race, 2001), e-learning theory (Mayes & de Freitas, 2004) and pedagogy (Fry et al, 1999). It is argued that this element of the intervention demonstrates that this must be recognised and addressed in any IL teaching and learning event.

In tandem with the transformation in *affective state* the *style state* appears to be positive throughout because students feel that they are doing something and sense making whether it be reading for example, "*I learn by seeing*", (A4) writing for example, "*writ (sic) about the actual points*" (A1) or "*posting a bulletin*" (A2) rather than being a passive recipient for example, "*it was quite fun rather than being lectured to*" (A3) again demonstrating that this intervention bears the hallmark of a constructivist approach as described by Mayes & de Freitas (2004).

Diagram E represents the processes experienced by students as they replied to initial postings and denotes the next stage in the OCL process. It should be noted that the observed IB and cognitive processes involved in this stage differ from that of the initial posting shown in Diagram C.

Diagram E: Observed processes involved during completion of second posting in OCL activities



The student's *behaviour* was defined by the *task* which was to, "*feedback on each others*" (A1) work. The behaviour itself involved reading and replying to another's posting for example, "*I was commenting on his, he was commenting on mine*" (A1) and then a series of concurrent processes appear to have taken place. The student appears to enter a cognitive questioning state for example, "*I was writing about how he hadn't actually writ (sic) about all the actual points you were meant to evaluate*" (A1) which led to an analysis of the fellow students posting for example, "*he hadn't really researched football hooliganism on the FA website*" (A1) which is mediated by the *metacognitive state* where students begin to realise that they may have missed something out or hadn't looked at something when they did their own first posting for example, "*you got to see what you was (sic) missing or something you hadn't looked at*" (A3) and "*obviously you*

*always think your own work is perfect, sometimes it's a bit of an eye opener when somebody says you should have done this, gets you thinking about it"* (A3). This *cognitive questioning state* appears to create in the student's mind a sense of an information gap which is identified both by IB and IL as part of the initial process in seeking information. Not only is it towards the 'end' of the process in this instance contradicting for example Big Blue Project (2002), but it has also come about via discussion and collaboration rather than working alone. Furthermore, it is argued that the asynchronous nature of Blackboard Discussion Board, that is, that there is time to read and make a considered reply creates the 'cognitive space' (Garrison et al, 2003) both for the reading and the reply to occur. This is significantly different to the face-to-face setting for two reasons, one: there is a complete record of the 'conversation' which is not possible in the immediacy of the face-to-face setting for students to read and re-read and two, there is more time to make a reply. These two features together create the 'cognitive space' which enables these very rich postings to be made. This peer-to-peer pedagogical approach realised via discourse is recognised as good educational practice in constructivist approaches to learning generally (Mayes & de Freitas, 2004) and specifically noted by MacKeracher (2004).

In IB terms fellow students become a source in that they exhibit *source character* for example, "*allowed me to see what other people thought*" (A2) and *source behaviour* for example, "*I was writing about how he hadn't actually writ (sic) about all the actual points you were meant to evaluate in his evaluation*" (A1) through their second and subsequent postings. This thesis asserts that this is a unique characteristic of this intervention in that OCL enables students to be an information source for other students to draw upon. This provides a significant addition to the process of IL teaching and learning and upholds the notions of *source character* and *source behaviour* put forward by Hepworth (2004). In addition, this evidence of 'participation' and 'negotiation of meaning', both identified by Wenger (1999) as essential components of a community of practice validates the view that this activity occurred during this intervention.

Through these concurrent processes students move to a *cognitive state of new knowledge* for example, "*before I didn't know what things at the end like .ac, .org meant [...]*" (A3)

beyond that presented in their first posting. Again, as in the first posting, students engaged in the *behaviour* of writing a few paragraphs to post to the Discussion Board so that it, “*helped decide which resources were reliable and useful and why*” (A16). Finally, the *task* was closed off by ‘*posting a reply*’ (A2) to their colleagues. During this *task* the *affective state* appears to remain very positive throughout for example, “*I could see what everybody was getting at*” (A4) and “*helped by reading other people’s statements*” (A4) which shows that students genuinely appear to like the fact that they can see what others have written which appears to add to their own *knowledge* and promotes a reduced sense of *uncertainty*. The *style state* most evident in this process is that of a positive one where students who took part were generally motivated to complete the *task* actively fostered by reading, writing and making postings. Students reported that this was as far more enjoyable, in effect it maintained a concurrent positive *affective state* than, “*being lectured to*” (A3) and stated that it, “*gets people quite motivated to do things*” (A3) showing the interlinked nature of *style* and *affective states*. It is the view of this thesis that these observations corroborate the views of Mayes & de Freitas (2004) and Goodyear (2001) that this is the most effective e-learning intervention to deploy in a HE setting.

In writing replies to postings and the content of initial postings all uphold the view of Goodyear (2001) that OCL can promote high level processes such as *analysis, synthesis* and *evaluation* described by Bloom et al (1956) as the highest cognitive processes and parallel thinking skills processes as described by Moseley et al (2004). It is argued that this intervention has promoted ‘deep learning’ and this is most evident in the assessed work processes evidenced in Diagram F. It further confirms the view put forward by Walton et al (2007) that students can be producers as well as consumers of information.

### **9.2.6 Written assignment**

For the *written assignment* students had to use the Library Catalogue to find two books, an e-journals service to find two journal articles and a search engine to find two web sites

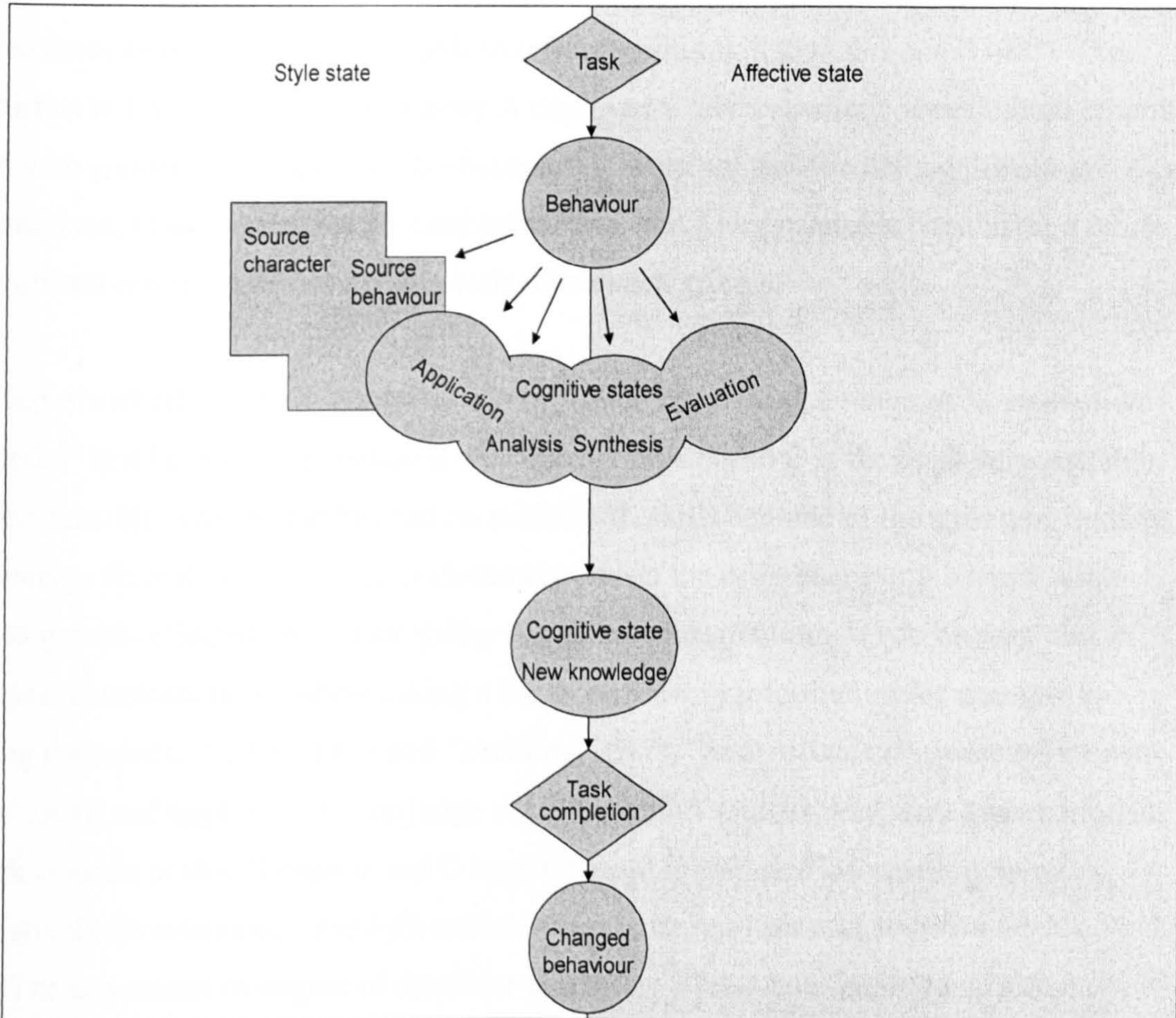
in order to answer the problem-based scenario. For each of the six sources found students had to cite them to APA standard and write a sixty word evaluation for each of the six items found. They were advised to use either the Berkeley evaluation criteria or (as in the case of Group A) the criteria devised in the OCL activities<sup>83</sup>. Students were also expected to write a one hundred and fifty word evaluation of what they had learned in completing this task.

Diagram F illustrates the processes evident at the *written assignment* stage of this intervention. It appears to be in the *written assignment* where the effect of OCL on student learning is most readily demonstrated both via the qualitative data (Chapter 8) and the quantitative data (Chapter 7).

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<sup>83</sup> It should be noted that some argue that it is possible to assess the OCL process itself (McDonald, 2003; Leppa, 2004; Swan, Shen & Hiltz, 2006).

Diagram F: Observed processes in completing the written assignment



It can be seen that the *written assignment task* of finding and evaluating two books, two journal articles and two web pages causes students to engage in evaluating a range of information sources. However, it is those students who engaged in OCL (Group A) who demonstrate the greatest deployment of the *cognitive states* of *application*, *analysis*, *synthesis* and *evaluation* in interacting with the sources they have found. These states all appear to work concurrently in engaging with information sources. Examining the *cognitive state* of *application* first the module leader commented that for Group A (experimental group) students, “*the quality of resources they were using was far better than the other students in other groups*” (ML1) implying that they had applied their skills to far greater effect than Groups B (intermediate group) and C (control group). Table 8 corroborates this view as it shows students who engaged in OCL (Group A) are far more



sensitised to a range of evaluation criteria which are applied more often in their assessed work than Groups B and C. In fact most of Group A (75%) referred to the importance of evaluating information (compared to 39% for Group B and 25% for Group C) and used three times as many evaluation words to reflect on this skill than Groups B or C. The statistics in Chapter 7 show that Group A deployed a greater variety of evaluation criteria and with greater frequency. Whilst these results were not statistically significant in themselves, effect size measures established that, had a larger sample been used, a more significant result would have been obtained between groups.

Group A's ability to analyse information sources by deploying a range of IL evaluation criteria<sup>84</sup> in a far more sophisticated way than Groups B and C is the most demonstrable effect that this intervention has had on students IL skills and one of the strongest findings to emerge from this study. The evidence centres on the differences in the ways in which these groups reflected upon their ability to evaluate information. It can be seen that Group A students talked about taking a balanced view to information for example by using the words, "*judge*" (A1) and "*deciding*" (A7), "*how reliable the website is, or not*" (A8), and appear not to pre-judge the information sources they were evaluating. In stark contrast to this Groups B and C state the need to evaluate information rather negatively for example, "*the information may not be relevant and could be unreliable*" (B2) or as a matter of degree of detail for example, "*I have now learnt to go into more detail*" (C3). This thesis argues that this is significant because it demonstrates that the intervention has enabled to reach a high degree of cognitive (Bloom et al, 1956) or critical thinking (Moseley et al, 2004) or indeed 'deep learning' (Marton & Saljo, 1997) and begin to deploy the skills which define the information literate individual (ALA, 1989; Bruce, 1995; Bundy, 2004; Andretta; 2005, 2006, 2007). Some members of the experimental group, in their assessed work, showed a balanced approach to their judgements regarding information which Squires (1994, p17) defines as an 'open-mind' and argues is an essential part of learning. This also echoes the 'extended abstract thinking' identified by Biggs (1999, p39) as a necessary ingredient in high order thinking skills. In addition, this clearly demonstrates that with an appropriate theoretically and

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<sup>84</sup> This thesis places this skill within the cognitive state of *analysis* (as defined by Bloom et al, 1956).

empirically grounded intervention students' IB can be changed. This assertion strongly refutes the claim made by the 'CIBER Report' (UCL, 2008) that once learners have left compulsory education their 'bad' searching habits are impossible to alter. Finally, it is argued that this data reveals the assertion made in the 'Seven pillars model' (SCONUL, 1999) that *synthesis* and *evaluation* are solely post-graduate attributes or skills as dangerously inaccurate. Hence, this thesis concurs with and upholds Andretta's (2005) critical view of the SCONUL (1999) model as mentioned in Chapter 2.

In parallel with the factors above it also appears that during this stage students' *affective state* was transformed from a greater to a lesser degree of *uncertainty*. For example, at first students reported that they, "*did not know how*" (A1) to look for e-journals before the intervention to lesser degree of *uncertainty* after the intervention, "*I can also use Swetswise*" (A8) again corroborating Kulthau (1991) and Hepworth (2004) that when IB is successful this transition is evident.

It appears that the *style state* reported at this stage is couched in positive terms throughout for example a typical response was, "*this task has really helped me understand how to use it*" (A1), this adds weight to the view that learning by doing is an essential part of the learning process (Kolb et al, 1991) and corroborates the view that this should be realised via an assessment (Race, 2001a).

Clearly students completed the task by handing in their *written assignment*. The *written assignment*, in effect, allows students to synthesise all of their skills, searching and evaluating, with a view to using the information (in this case to provide information for a fictitious presentation). Indeed, those students who engaged in OCL demonstrated changed behaviour, "*we've seen students becoming more engaged, students becoming more informed, we've seen students acquiring better knowledge*" (ML1), and the greatest potential to change their behaviour in the future, "*I have learnt for sure [...] that the online library is the best starting point*" (A7) – defined by Squires (1994) as the single most important indicator of learning having taken place. The observation that students in Group A have become better informed is illustrated by the statistics in Chapter 7

particularly in relation to Group C (control group). This is an essential point for practitioners of IL to note because this corroborates the view of Biggs (1999) and D'Andrea (1999) that learning interventions must be properly aligned with assessment in order for learning to take place. In the light of this evidence this thesis asserts that IL models should no longer contain arguments for non-assessed programmes. Furthermore, IL practitioners should desist from thinking that their un-assessed interventions will bring about successful learning and, as a consequence, an information literate student population.

Students in Group A also differed from Groups B and C in their *cognitive state of evaluation* (Bloom et al, 1956), that is, the ways in which they reflected on their own learning. This is exemplified by the differences in statements such that Group A show a greater degree of confidence in their *new knowledge* expressed as, '*I now know how*' (A1), and "*how to*" (A6) do certain tasks and "*how to use*" (A8) a resource whereas where as Groups B and C merely described their new knowledge in terms of quantity, "*how much*" (B2) and "*plenty of sources*" (C2) to use. Group A appear to have internalised their *new knowledge*, whereas Groups B and C appear to characterise it in an external fashion and perhaps in a surface way. Finally, and most importantly, Group A demonstrated real signs of beginning to think about evaluating the components of their learning, this is most evident in the conversation held in the focus group where students discussed the relative importance of particular IL evaluation criteria. This together with their reflective statements is the strongest evidence that this intervention enables students to reach the highest cognitive level as defined by Bloom et al (1956) and 'deep learning' (Marton & Saljo, 1997). This thesis argues that this intervention gives a robust mechanism for enabling students to successfully reflect on their learning and a means of articulating this skill within the IL process.

### 9.3 Summary

The analysis of IL models using an IB model in tandem with a detailed examination of teaching and learning theory and e-learning scholarship has provided a unique critique of IL which led to the design of the intervention used in this study which is, in turn, illustrated and analysed in the previous discussion. This summary set out below intends to draw out the main points of this study and their implications. This narrative also indicates how this study has contributed to knowledge in the field of IL, IB, learning and e-learning.

This study has highlighted and upheld the view that ‘the person-in-context’ (Wilson, 1999; Hepworth, 2004) is an essential factor in the IB and learning process. This study has revealed that, for Level 1 undergraduates, there is a tension within this and it is the level of engagement of the learning intervention which determines which *role* dominates in a given situation. It appears to be the case that *OCL activities* and their high level of learning by doing mitigate the *student-at-university* role (their social *role*) in favour of the *student-in-Sport-&-Exercise* (their learning *role*). This perhaps more clearly illustrated when students did the IRPA which evidently did not engage them and so they began to think about and want to be with their peers in a social setting outside the workshop. This *behaviour* is not evident when students completed the *OCL activities*. Indeed the module leader’s comments further confirm this view. This illustrates the critical importance of ‘presage’ factors identified by Biggs & Moore (1993) and the need to take them into account when designing IL pedagogical interventions.

This thesis also contends that the study upholds the views of Kulthau (1991) and Hepworth (2004) that the *affective state* is a crucial factor in the IB process and also views of learning held by Biggs & Moore (1993). It also further demonstrates a link between successful learning, pedagogy, the *affective state* and the *cognitive state* of *uncertainty*. The study appears to indicate that *uncertainty* diminishes as the *task* progresses and students learn more regarding the subject (in this instance information literacy). In addition, it appears to indicate that *style state* is a further critical factor and

the pedagogical sophistication of the intervention appeared to maintain a positive *style state* leading to a successful outcome, that is, *new knowledge* and *task* completion.

What appears to be the overriding factor to the whole process is the focus on the *task*, in this case an assessed piece of work, and how this shapes not only students' *role* but also provides external motivation. This affirms the importance of the *task* and its inter-relation with the learner's *role* as noted by Leckie, Pettigrew & Sylvian (1996). Students in their interviews, questionnaires and reflective practice statements continually refer to assessment and link the skills they have learnt to this. This thesis argues that this assertion confirms Hepworth's IB model (Hepworth, 2004). Hence, this thesis not only re-affirms these factors but also argues that these concepts are essential factors to take into account when designing teaching and learning interventions.

Previous research has observed and described OCL or online discourse as a successful means of enabling higher order learning but have not explained why this is the case. It is posited that this study gives an in-depth theoretically and empirically grounded explanation of the cognitive and affective processes at work in the OCL setting unavailable hitherto. In short, how and why OCL works. It should be noted that these moments within the process of iteration defined as part of the OCL process in the Pilot Study and reported in Walton et al (2007) is a new notion within the field of e-learning. Furthermore, the high levels of cognitive skills deployed by student participants, through their online discourse, demonstrates that students can synthesise their *new knowledge* to become producers as well as consumers of *knowledge*. This not only serves to add weight to the work done on IL in the workplace (Conroy, 2006) which notes the importance of social factors in becoming information literate but also initiates the transferable skills students will need for active participation in a workplace community of practice. It also demonstrates the notion of community of practice (Wenger, 1999; Mayes & de Freitas, 2004) and how it can assist in the learning process. This aspect of IL is understated in IL models and rarely exploited in IL teaching and learning settings. It also serves to refute the assertions made by the SCONUL IL model (1999) that these

high level cognitive skills of *synthesis*, where *new knowledge* is created, are purely postgraduate skills.

It is the view of this thesis that OCL activities appears to, at the very least, mitigate 'surface learning', as illustrated in the content of student online postings and their assessed reflective practice statements, and in some instances prevent this happening at all. It is argued that IL practitioners should not only adopt this form of learning for the IL stage of 'evaluating information' but should also consider assessing the discourse itself.

It is argued that the OCL model is not just for Blackboard Discussion Board but is, in essence, a generic framework for carrying out this type of learning on any platform Walton (2008). This is particularly useful given the changing nature of the student learning environment driven by government policy exemplified in the Leitch Review (HM Treasury, 2006), the increasing plethora of online social networking tools (Beetham & Sharpe, 2007) and other Web 2.0 developments (Godwin & Parker, 2008).

Reflection is put forward as an essential part of the IL process but the existing models do not offer any means of achieving this. This thesis contends that the OCL activities, accompanied by the *written assignment* used in the study provides a new model for enabling the effective realisation of the reflective process within the IL process.

It is argued that the evidence provided by students in their reflective practice statements and interviews indicates distinct levels of awareness of how to evaluate information. These statements of information discernment (Bruce et al, 2007) or scepticism (Breivik & Gee, 2006) identified provide four distinct levels of awareness and provide us with two outcomes:

1. They support the findings of the 'CIBER report' (UCL, 2008) that young people do not initially have the skills to evaluate information effectively. Furthermore, as result of the *pedagogical intervention* three additional and distinct levels of

information discernment have emerged. This initial level plus these three new levels are illustrated below:

**Information discernment level 1:** Unaware or unconcerned regarding the need to evaluate information and may tend to use information without checking its quality and is characterised by statements such as:

*“I didn’t really know about what type of things you should look for when you are looking at web sites to get references.”*

*“When you first go on a web site you don’t read all the information.”*

*“I didn’t know what the things at the end like .ac. org meant.”*

**Information discernment level 2:** Emerging awareness of the need to evaluate information which is expressed weakly through notions of detail, suitability or quantity:

*“I have learnt to go into more detail with my work”.*

*“You need to make sure the book is suitable for the task”.*

*“There were so many books it was hard to choose the right ones.”*

**Information discernment level 3:** Aware of the need to evaluate information for quality but sees the process in black and white, true or false, either/ or terms;

*“when I’m looking at references in the future I’m going to look and see whether it is from a big company where it’s very probably*

*going to be factual or whether it's from someone's own personal website or something that's less formal and I'll be able to tell whether to take information from it or not"*

*"[...] what references will be real and not real [...]"*

*"I would also make myself aware that these resources may not be trustworthy and the information held in them may not be complete."*

**Information discernment level 4:** Aware that evaluation isn't simply a matter of black and white, recognises the need to judge each source on its merits and talks about balance, deciding and using a range of criteria in the evaluation process.

*"[...] have learnt how to judge how good a book or journal is [...]"*

*"Helped decide which resources were reliable and useful and why"*

*"I have learnt a lot of new knowledge from the Berkeley website regarding evaluating information. I know about scope, audience, timeliness, scholarly vs. popular, authority documentation and objectivity."*



Can talk about the nature and relative value of evaluation criteria in a given setting:

*“Some of them initially are important like reliability [...], obviously if you are going to reference something in an essay etc you need to know that the source is reliable [...]”*

*“[...] authority, I don’t find as important. It could be written by the government or the FA or something and they could make a pretty stand up point, but you could have a 3<sup>rd</sup> year student from a university make just as good a point.”*

*“[...] relevance as well, you’ve got to stick to the question or whatever you need to do needs to be relevant to the point you are making.”*

2. It is argued that these levels of information discernment identified here present IL practitioners with a possible rubric for assessing students’ ability to evaluate information or a framework for diagnosing levels of ability.

Hence, it is contended that this study offers a complete model (as illustrated in Diagrams A, B, C, E, F and G) for practitioners to create IL teaching and learning interventions within the HE context.

It should be noted that the findings from this study strongly indicate that students’ behaviour changed as a result of this intervention (as evidenced in participants’ statements which mentioned how they had changed the way they regard web based information and also in their assessed work) which serves to refute the claim made by the ‘CIBER Report’ (UCL, 2008) that students information behaviours cannot be altered once they leave compulsory education. This has important implications for the information profession because the ‘CIBER Report’ (UCL, 2008) is one of the few

documents to enter the consciousness of the popular media (Reisz, 2008) and may be used by the UK Government to inform policy and funding regarding information services in HE.

The findings from the study appear to confirm Hepworth's IB model (Hepworth, 2004) and add to it in a number of significant ways. In particular, the study has served to further articulate the *cognitive state* and has shown that Bloom's taxonomy (Bloom et al, 1956) and Moseley et al's definition of metacognition (Moseley et al, 2004) are especially useful in this respect.

This study indicates that when students are given a *task* to complete together in an online setting they exhibit deeper learning at the end of the process evidenced in their assessed work. It is clear that students learn a great deal from discourse with one another and perhaps learn as much from each other as from an expert such as a tutor. This has significant implications for learning theory in that tutors are better employed as facilitating and guiding the learning process rather than leading it. The findings from student comments on the face-to-face workshop give significant weight to the assertion that in designing IL learning and teaching interventions information practitioners should look to move away from the more traditional hands-on individually focused workshop interventions to those which are group orientated and problem-based where the practitioner guides, rather than leads the process.

## **10 Conclusion and recommendations**

### **10.1 Introduction**

This chapter commences with a summarised list of the key findings. The next section contains a restatement of the research questions and an examination of the extent to which these and, therefore, the aim and objectives have been addressed. A reflection on the study, including a detailed discussion of its limitations, is then undertaken. A set of recommendation specifically for practitioners is included. Suggestions on possible avenues for future research are also put forward. The chapter closes with a set of general concluding remarks on the thesis and its context.

### **10.2 Summary of key findings**

This study made a number of findings and these are grouped together using the headings generated from the model shown in Chapter 9.

#### **10.2.1 Role and Norms**

The concept of person-in-context is strongly evident in students' IB. Furthermore, the study has revealed that this *role*, shaped by the *norms* of this particular setting, has two distinct dimensions and that there is a tension between them. Findings indicate that when a *task*, which is itself shaped by the *norms* of the intervention, is engaging the *role* of *student-in-Sport-&-Exercise* over-rides the *role* of *student-at-university* leading to a set of positive *cognitive states* and *behaviours* enabling successful *task* completion. However, when the *task* is not engaging then the *student-at-university role* comes sharply into focus leading to negative *cognitive states* and *behaviours* towards the *task*.

### **10.2.2 Pedagogical intervention**

The intervention was successful in enabling students to transfer their skills beyond assessment. This transfer occurred in two particular ways: firstly, transferability of skills to other modules and possibly beyond HE and secondly, because tutors recognised students' online contributions by including them in their tutor summaries, which were not only posted online but formalised into a hard-copy handout, and served to introduce students to the idea of publishing online and by-the-same-token the Sport & Exercise community of practice. This study found that this approach appeared to bring about higher order thinking.

The pedagogically sophisticated approach exemplified in the intervention did appear to sufficiently address students' *style states* which led to an increased student motivation and in turn a predisposition to learn.

### **10.2.3 OCL Activities**

The notion of *task* (in this instance, OCL activities) as put forward by Hepworth (2004) was upheld by showing how its embedding within the *role* and *norms* of the learning situation shaped individual IB. In completing these OCL activities it was found that students became highly focussed on the *task*, engaged in high level cognitive processes (*analysis, synthesis and evaluation*) and demonstrated information literacy skills associated with evaluating web-based information. Hence, it was found that by scaffolding online learning interventions with set questions to be answered, rather than information to be absorbed, enabled students to create their own meaning regarding a topic. This finding showed that this e-learning model not only enables students to read information about evaluating web site but also, via online discourse, engage in *analysis*, devise their own evaluation criteria and in turn begin to create a shared meaning regarding this topic. In effect it was found that this intervention enabled the central tenet of constructivist pedagogy to occur. Conversely, it was also clear from this study that the

higher cognitive states of *analysis*, *synthesis* and *evaluation* did not appear to be enabled during the face-to-face stage of this intervention.

The OCL was significantly different to the face-to-face setting for two reasons: one, there was a complete record of the 'conversation', not possible in the immediacy of the face-to-face setting, which enabled students to read and re-read fellow students postings before making a reply – in effect it creates a *cognitive space* in which students can consider their reply before writing it; two, it was a unique characteristic of this intervention in that OCL enabled students to act as an information source for their fellow students to draw upon. This provided a significant addition to the process of IL teaching and learning and upholds the view put forward by Hepworth (2004) regarding the significance of *source character* and *source behaviour* in the IB process.

It is also evident that working with others in an online collaborative fashion where students read and gave feedback on colleagues' work proved to be an effective way of fostering IL. It is argued that this process caused students to become directly aware of gaps in their own IL skills. It is the view of this thesis that this awareness of a gap in their knowledge lead to a *cognitive questioning state*. In turn this led students to realise they may have missed something which then fed directly into the iterative process enabling students not only to become information literate but also to achieve deeper learning. It is argued that this finding indicates a significant new direction for IL teaching and learning to explore.

When students engaged in publishing their thoughts via online postings to a wider audience which in this case was their fellow students in a seminar group militated against any tendencies towards surface or strategic learner behaviour. It also showed that students, even Level 1 undergraduates, can become producers as well as consumers of information.

The tutor summary offers a genuine means of reflection and that it works as a 'reflective bridge'. This mechanism allows tutors to remind students of work completed in a

previous activity before embarking on a new task, in effect maintaining continuity between learning functions.

It was observed that student participants' *affective state* was not static during the intervention. It was found that students exhibited a transformation from a high degree of *uncertainty* to a much lower degree of *uncertainty*. It appears that this reduction in *uncertainty* brought about by the intervention enabled successful learning and IB to be realised.

OCL activities and problem-based assignments allowed tutors to become guides and enablers, in effect changing their role as recommended by Goodyear, (2001), leading to successful learning in the form of new knowledge and changed behaviour.

#### **10.2.4 Assessment**

Students written reflective practice statements, as part of an assessment, provided a rich picture of students' awareness on how to evaluate information. These written reflections coupled with interview data also provide a means for disaggregating levels of awareness of the need to evaluate information and therefore a possible assessment rubric for future research. The data revealed four levels of information discernment which were identified in section 9.3.

Group A (experimental group) demonstrated the greatest deployment of the *cognitive states of application, analysis, synthesis and evaluation* in interacting with the sources they found which showed that they had applied used skills to far greater effect than Groups B and C and that they were far more sensitised to a range of evaluation criteria which they applied more often in their assessed work than Groups B and C. Group A were far more sophisticated and effective deploying their newly learned IL skills, particularly in evaluating information, than Groups B and C.

In summary it is argued that, it is only through task completion via assessed work where changed behaviour that is, learning is fully realised.

### **10.2.5 Findings with wider implications**

The online discourse between peers enabled students to engage in higher order thinking and it follows that its absence from IL models and interventions would appear to be a serious omission.

The data gathered relating to higher order thinking contradicts the views found in the 'Seven Pillars' model (SCONUL, 1999) which argues that higher order thinking are postgraduate skills. The results shown here clearly demonstrate that even year one students can engage in higher order thinking. In addition, the notion of reflection (identified in Chapter 2 as a critical component of learning) and iteration (also noted in Chapter 2 as an essential component in information behaviour) are absent in this model. Finally, the fluid and concurrent nature of the processes found evident in Chapter 9 leads us to suggest that the 'Seven Pillars' classical structure model of IL devised by SCONUL (1999) is the wrong metaphor for this domain because it imposes a false sense of order on the 'messy' process that learning appears to be. This thesis puts forward that for these reasons the SCONUL (1999) model should be discarded.

The implications for e-learning scholarship itself are numerous and this thesis confirms firstly, the arguments put forward by Goodyear (2001) and McConnell (2006) that online discourse promote higher order thinking such as analysis, synthesis and evaluation. Secondly, that OCL, through the online discourse itself and via the tutor summary, promotes reflection which is considered an essential part of the learning process. Thirdly, online discourse (in the guise of OCL) can foster a sense of a community of learners. Fourthly, the research presented here appears to provide an explanation for why online discourse (in the form of OCL) works in that it causes students, through reading other's discourse, to engage in a metacognitive process where they realise they have gaps

in their own knowledge. Finally, these factors together indicate how e-learning interventions should be constructed to create an effective learning experience.

It appears that the findings made here suggest that the intervention deployed can change Level 1 undergraduate students IB and enhance their IL skills. This refutes claims to the contrary made in the 'CIBER Report' (UCL, 2008).

The use of the *cognitive states* identified by Bloom et al (1956) and the metacognitive definition made by Moseley et al (2004) assisted in the disaggregation of the IB process in a meaningful way and assist in understanding individuals' IB. Moreover, this has helped to shape the design of this IL teaching and learning intervention.

A novel and unique coding regime based upon the IB model devised by Hepworth (2004), Bloom's taxonomy (Bloom et al, 1956) and the definition of metacognition offered by Moseley et al (2004) provided a new and useful way of examining the context surrounding IL blended learning and teaching interventions and the behaviours they engender.

### ***10.3 To what extent has this study addressed the research questions posed?***

The following research questions were set out in Chapter 1 above:

1. Does the teaching of information literacy in a blended environment (using face-to-face and OCL IL learning opportunities) structured using a scaffolded approach improve students' learning of IL?
  - a. What kinds of reflective practice questions best aid students in collaborating online?



- b. Are tutor online interventions (specifically summaries of online postings from the group) perceived by students as a useful way of distilling output from the group for later use?

Findings summarised above found that Research Question 1 was answered in that improvements to IL skills exhibited by students were clearly evident. This was brought about by deploying a mixed research strategy using a number of data gathering instruments which enabled a sufficiently rich picture to emerge allowing detailed findings to be made, enabling detailed discussion which has highlighted important effects. This analysis, underpinned by a novel and unique coding regime using a synthesis of Hepworth's IB model (Hepworth, 2004), Bloom's taxonomy (Bloom et al, 1956) and Moseley et al's definition of metacognition (Moseley et al, 2004) facilitated this robust and detailed investigation.

These effects were evident in students' improved ability to evaluate information evidenced in the qualitative analysis of assessed work, interview and questionnaires which was further corroborated by statistical tests on assessed work.

Through interview data the significant impact of the tutor summary on students' *affective state* was clearly revealed and indicates that students perceived these, in tandem with the ability to revisit the content of online discussion via online postings, as one of the most valuable parts of the activity. Hence, it can be concluded that Research Question 1(b) was also met.

It is clear that the written reflective practice assessed work at the end of the module did work very well as evidenced by the rich and sophisticated contributions made by Group A. Perhaps the key difference to be noted is that both the online reflections were not assessed whilst the written reflections were, indicating the motivating power of the assessment process in causing students to complete activities. It should be noted, however, that for student participants, as reported in their interview responses, active reflection was brought about in another way by reading the tutor summaries before

starting a subsequent task and in effect created a 'reflective bridge' between OCL activities. This appeared to trigger, in a new way, the reflective process during the OCL part of the intervention. In effect the research strategy not only revealed that this intervention improved students' ability to evaluate information but also their ability to evaluate their own learning. These findings appear to answer Research Question 1(a) albeit in an unexpected way. Whilst students' markedly negative comments made it palpably clear that the online reflections in both Pilot and Main studies did not work, it has emerged from the study that this research has unearthed two alternative ways of fostering reflection, one via assessed reflective practice statements, the other in the process of completing the OCL activity.

2. How do psychological states associated with information behaviour and thinking help explain the learning processes in an information literacy blended learning and teaching intervention?

It is argued that Research Question 2 was also successfully addressed. Diagrams A – G, drawn up as a result of the detailed picture gained through students' interview, questionnaire and assessment data, analysed through the lens of the coding described above, gave a detailed insight into the many inter-related processes involved when students experienced the intervention. The model presented here provides additional detail to existing IB models, Hepworth (2004) in particular, and indicates what extra factors should be taken into account in IL models if they are to enable students to become information literate in the ways in which IL advocates envisage.

### 3. Hypothesis A

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater degree of knowledge in information literacy at the end of a module than at the outset than students who have not been exposed to OCL (that is,

students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001).

Numerical data analysed via various statistical means revealed that students in Group A (experimental group) did exhibit a greater degree of knowledge after the intervention than before and that this knowledge is statistically significantly greater than that of Group C. Whilst the case for comparisons between groups is robust and findings do indicate an effect between Groups A and C this assertion is weakened by the fact that sufficiently transparent procedures were not in place to enable a direct statistical comparison between pre and post data to occur. In effect the only comparison between pre and post test data that can be made is descriptive rather than analytical. However, it is important to consider these data and findings in the overall context of the methodology employed are such that sufficient corroborating evidence exists to uphold Hypothesis A.

#### 4. Hypothesis B

Students who participate in OCL (via tertiary courseware as defined by Goodyear, 2001) in order to enhance their subject based information literacy skills will demonstrate a greater ability to apply evaluation criteria in their assessed work than students who have not been exposed to online collaborative learning (that is, students who have only been exposed to primary or secondary courseware as defined by Goodyear, 2001). This will be manifest in two ways:

- (i) students who participate in OCL will tend use a greater variety of evaluation criteria in their assessed work and
- (ii) will tend, on average, to use these criteria more frequently.

Regarding Hypothesis B the descriptive statistics make a case for the assertion that students in Group A (experimental group), evidenced in their assessed work, are more sophisticated in the use of evaluation criteria and do tend to deploy them more often. Effect size calculations uphold this view. This enables Hypothesis B(i) to be upheld. Though statistically significant results were not found for differences between Groups A

and C regarding the frequency of evaluation criteria, effect size calculations establish a statistical difference, enabling Hypothesis B(ii) to be upheld. Therefore, taken as a whole the descriptive statistics and analytical statistical tests used here indicate that Hypothesis B can be upheld. This assertion is made with the caveat that, as with Hypothesis A these statistics should only be seen in the context of the whole research strategy and in tandem with the qualitative data discussed above.

In relation to the qualitative strategy the trustworthiness of this research has been realised via numerous rich descriptions garnered from interviewees who are real students enrolled on a real award and their module leader in a recognized HE institution in other words the sample is credible and ecologically valid. Support to this quality measure has been gained by allowing data to be examined by a third party<sup>85</sup>. The rich descriptions gained have also enabled this study to make judgments regarding the possibility of transferring findings to other settings. Furthermore, the study is dependable in that records (both digital and hard-copy) exist of all the evidence gathered and analysed. In addition, the researcher has attempted to minimize the effect of any preconceptions and values in order to avoid swaying the research and its conclusions and in so doing address the issue of confirmability.

Regarding the quantitative data objectivity was maintained by gathering data under examination conditions and accurate recording of data enabling findings be viewed as reliable and therefore replicable in other settings. It is believed that the detailed findings and conclusions drawn, with their caveats, are justified and therefore valid.

#### ***10.4 Reflection on the study - including limitations***

This study has covered a great deal of ground both in terms of theory (teaching and learning, e-learning, IB and IL) and practice (delivering IL teaching and learning). The

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<sup>85</sup> The third party asked to verify the data was a PhD student at Loughborough University involved in researching information literacy and as such not connected with this study.

findings have been by turns interesting, revealing and surprising. Interesting, in that they have generated a great deal of analysis and discussion. Revealing, in that they have enabled a detailed picture of the processes and behaviours involved in this intervention to be mapped. Surprising in that a number of unexpected findings occurred:

1. The way in which students expressed their obvious positive feelings towards the tutor summaries.
2. After much work on the reflective practice part of the online intervention in the Pilot and Main Studies it is obvious that students remained largely indifferent to this particular part of the intervention as a separate activity. However, it is clear that students' engaged in the act of reflection as part of the process of participating the OCL activities themselves.
3. Statistical data has contributed to the findings in a less conclusive way than was envisaged. Initially it was disappointing that statistically there was no difference between Groups A and B but there was between Groups A and C in the post-delivery diagnostic test. This leads to: firstly, a questioning of whether a quantitative approach to evaluate the impact of the intervention was necessarily a sound approach; secondly, it led to a realisation that the application of the quantitative tests required a different approach where students' anonymity should be preserved by giving them unique identification code prior to the tests being administered and that, established tests modified to the learning outcomes of the intervention in question should be used. In addition, the problem of guessing, identified in section 5.4.3 may have been more fully addressed by warning students that a negative mark would be gained if they engaged in this activity. Had this technique been deployed as a deterrent to guessing, the test results may have been significantly different.
4. The research has strongly indicated that qualitative data, rather than the quantitative data, provided a more revealing picture of the pertinent processes at work in the pedagogical intervention and the significant differences that appear to exist between the experimental Group A and Groups B and C.

It is felt that sufficient data were gathered to create a multi-dimensional 'triangulated' study where rich qualitative data containing rich descriptions have been counter-balanced by a range of numerical data. These data have provided a valuable source for this study. Whilst it is gratifying that so much useful, important and interesting data were generated by this study there are a number of limitations which should be noted and their implications examined.

Improvements suggested by the Pilot Study were made to the questionnaire and some useful data was gathered. However, students answers, though improved on since the Pilot Study remained largely terse and a little repetitive. This perhaps reflects the slightly repetitive nature of the questions posed. The researcher needs to take this into account when devising questionnaires in future research.

Though the researcher tried out their interview technique on a number of occasions before moving to the Main Study it can be said that the interview technique deployed requires further improvement. On re-listening to audio tapes and re-watching movie footage it is clear that the interviewer was inconsistent in the ability to help interviewees articulate their thoughts and feelings fully. Supplementary questions were successful on some occasions and not on others. A greater number of supplementary questions to draw upon during the interview would have been helpful in this respect. The interviewer did not fully engage with the transcription and coding process until all interviews were completed. It is felt that had the researcher carried this out after each interview not only would interview technique have improved, but a broader list of supplementary questions would have emerged. It is argued that the interviewer needs to keep carrying out interviews, recording them, listening and reflecting on the results in order to continue to improve on existing skills.

It was gratifying that the output generated by student participants in completing the OCL activities was so focussed and on task, given that these activities were effectively an add-on to the existing curriculum and therefore time within seminar sessions for these was limited.

It is perhaps worth noting that in research of this kind where the overarching focus is on the student experiences of a learning and teaching intervention, which is in itself a qualitative-interpretive experience, the use of statistical data in this context may not be the most appropriate way of triangulating findings. It appears that in this case the statistical outcomes have possibly made the findings and conclusions less clear, and have perhaps even confused the issue, rather than added clarity to the rich qualitative data gathered. The opaqueness of the statistical outcome may have been in part due to the instruments not being sufficiently sensitive in gathering the necessary data for analysis or that the student sample was too small or both. However, effect size calculations have helped to create a greater sense of clarity here. It can also be argued that because of the small sample size care must be exercised in making generalisations regarding these findings.

Whilst the researcher attempted to retain an open mind during the analysis of data, and ensured that the qualitative data was externally verified, it remains a minor possibility that the interests of researcher may still have affected the analysis of these results. Interviewer effects may have been evident to some extent, but the robust negative comments made regarding some aspects of the intervention, for example IRPAs, enable the assertion to be made that these were largely absent.

This study is ecologically valid in that the intervention was applied in a real context to a legitimate sample of students attending a Level 1 Sport & Exercise Module at Staffordshire University. Again, care should be taken when extrapolating these results to other students and settings. In addition, it should be noted that the author of this thesis delivered the intervention as well as researched it which, it could be argued, may have set up a possible conflict of interest in that it could have generated another possibility for the interests of the researcher to affect, an unconscious way, the behaviours observed and the results gathered. However, again this was mitigated by making data available to a third party for verification.

Due to time constraints tutors were unable to progress with the weblog or 'blog' which was a recommended action from the Pilot Study and mentioned to students in the Main Study. In addition, the blog was made accessible much later than anticipated which rendered it impossible for students to make their contributions more publicly available during the study.

Whilst it is clear that limitations exist to this study it is the contention of this thesis that the findings put forward remain valid. It is argued, therefore, that this study offers a theoretically grounded and empirically tested intervention which has direct implications for IB, the delivery of IL and the understanding of the learning process both in the face-to-face and online settings. Hence, taking into account all of the findings made above in tandem with the limitations identified it can be said that the aim and objectives for this thesis and the research questions that have arisen from them have been addressed.

### ***10.5 Recommendations for practitioners***

This section furnishes a detailed set of recommendations that practitioners should follow as they go about designing their IL learning and teaching interventions.

Practitioners should use an IL model which is fully articulated and contains recognised notions of learning. It is the view of this thesis that the ANZIIL model may be the most appropriate for this purpose. Conversely the SCONUL model should be ignored.

Given that learning is not a straightforward process and involves many complex activities it is recommended that practitioners familiarise themselves with the learning theories mentioned in Chapter 2 more fully before devising their own learning and teaching interventions.

Practitioners should attempt to recognise the learner as a person-in-context who has much to contribute to the learning situation.



In recognition that IL does not explain behaviour, practitioners should also engage with the research literature on information behaviour in order to understand the processes involved in becoming information literate more fully.

IL learning and teaching interventions should be embedded in subject specific modules and not delivered generically.

IL learning and teaching interventions should be task orientated where practitioners set questions to be answered by their students.

IL teaching and learning interventions should include a mixture of face-to-face and e-learning interventions as described in Chapter 9. In short practitioners should adopt a pedagogically sophisticated approach to their teaching.

It should also be recognised that learning is a social activity and that this can be harnessed within the learning and teaching intervention itself. OCL is recommended as way of fostering this activity.

Specifically, practitioners should use OCL to structure IL interventions which focus on evaluating information in order to foster deep learning.

It is essential that practitioners liaise with faculty in order to create appropriately embedded assessment for IL skills. The fact that the research put forward here shows these IL interventions can foster a set of skills which students transfer to other modules may be a useful finding for practitioners to deploy in their discussions with faculty.

## **10.6 Future research**

At the very least it is argued that this research should be replicated using a larger sample to bring more statistical power to the research and to investigate the question of

scalability, that is, will this intervention work with large student numbers? Effect size calculations uphold this view.

It is also recommended that future studies of this kind should use established diagnostic tests modified to the learning outcome of the intervention in question. In addition, anonymity should be preserved by using a unique identifier for each participant ensuring that pre and post tests can be compared statistically.

It is believed that the OCL process devised here provides a generic transferable structure which can be used as a teaching and learning intervention within a Web 2.0 setting to structure online discourse in for example, in online social networking services such as *supercoolschool.com*, *ning*, *myspace* and other similar tools. It is believed that carrying out research using this process, via the research strategy and coding model used here would be an important next step in the development of this approach. It would also be interesting to use this OCL model as a basis for further examining the nature of online discourse and whether it appears to be forming a new type of discourse which sits between the formal academic and informal social.

The OCL model developed here has been adopted and used in two different settings. It has been used as a means of facilitating peer assessment in the ELICS module at Staffordshire University and at the City of Sunderland FE College in their 'A' Level Sociology programme. In addition, the face-to-face model has also been used with Level 1 students, within the core module of Exploring Psychology at Staffordshire University. These three examples suggest that future avenues for empirical research may be open in order to explore the transferability of this intervention to other settings. It also indicates that professionals in other areas have selected and used this model.

The four levels of information sceptic identified here provide the basis for designing a rubric for assessing students' ability to evaluate information within an IL intervention in a subject based module. In addition, these also provide a means of coding students' reported skills in evaluating information. Both are worthy of further investigation.

## **10.7 Final remarks<sup>86</sup>**

It can be seen that online discourse in the form of OCL engages students in successful learning in the form of new knowledge and changed behaviour. It is because student participants proved remarkably articulate and honest in both Pilot and Main Studies that such a rich picture of online discourse and its implications could be revealed. The outcome of Main Study was far more positive than the Pilot, however, it is clear that some aspects of the programme require further work particularly in the area of reflective practice and tutor summary. Whilst it is recognised that the findings from this study may not be generalisable to other situations and levels, developments at Staffordshire University (within the modules ELICS in Sport & Exercise and Exploring Psychology) and the City of Sunderland FE College ('A' Level Sociology) regarding the use of the new OCL model developed in this study provide avenues for future empirical research to answer this question.

The blended learning approach appeared to foster a number of positive outcomes and the face-to-face activity usefully commenced this process. However, it is in completing the OCL activities described here students readily demonstrated an ability to take control of the process and become active producers of their own knowledge rather than passive information consumers. This begs the question, is this unsurprising given that OCL replicates, albeit in an educational context through the deployment of sound pedagogy, some of Web 2.0 technology's social networking aspects, an environment with which new students are becoming increasingly familiar? This is an important question worthy of further thorough investigation. By the same token tutors, whilst structuring and guiding discourse, became guides in facilitating the process rather than governing it. This is an important change of role and implies that this role may require additional

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<sup>86</sup> An edited version of Chapters 8, 9 and 10 can be found in Walton, G. (2009 in press). *From online discourse to online social networking, the e-learning Holy Grail?*. In Parkes, D. and Hart, E. (eds.). *Web 2.0 and libraries: impacts, technologies and trends*. Oxford: Chandos.

training particularly in managing discourse, constructing tutor summaries and in the handouts produced from those summaries. From the student perspective it is apparent that students developed a set of robust critical thinking skills and became information sceptics enabling them to engage effectively with the information landscape which, it is contended, is a baseline requirement for those who participate in the information revolution which is Web 2.0. Hence, it is proposed that OCL facilitates some important processes such as analysis, synthesis, evaluation, reflection and ultimately changed behaviour which enables deep learning to take place. It would appear that online social networked learning in the form of the new OCL model devised here may be the e-learning 'holy grail' enabling students to achieve the higher order cognitive and critical thinking skills recommended in learning theory, e-learning scholarship, IB and IL alike. However, in the ever changing technological world, it must be asked is it really possible to resolve the tension between the theoretical ideals discussed above and the practicalities of developing workable learning and teaching interventions? Probably not, any approach to resolution is only provisional in the context of an ever changing learning environment and information landscape.

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# Appendix 1

**TEXT BOUND INTO  
THE SPINE**



# Appendix 2



**Consent form for use of interview data**

Researcher: ...G. L. Walton.....

Interviewee: .....

Contact details:

Tel:

e-mail:

Interview date: .....

I agree to the use of my recorded interview data for the following purposes (please circle the appropriate answer):

To be transcribed (in full or in part) and included in the content of PhD thesis written up by the named researcher. YES/ NO

To be transcribed (in full or in part) and included in the content of article(s) authored by the named researcher. YES/ NO

To be transcribed (in full or in part) and included in the content of book chapters authored by the named researcher. YES/ NO

To be transcribed (in full or in part) and included in the content of book(s) authored by the named researcher. YES/ NO

To be edited and used as part of presentations at conferences (or other similar events). YES/ NO

To be edited and uploaded onto web sites as part of presentations at conferences (or other similar events). YES/ NO

I understand that the named researcher (to the best of his ability) will ensure that my anonymity is preserved.

I understand that I can withdraw consent (in writing) for the use of interview data at any time.

Signed: .....

Date: .....

**Consent form for use of interview data**

Researcher: .....

Interviewee: .....

Contact details .....

Tel: .....

Interview date: .....

I agree to the use of my recorded interview data for the following purposes (please circle the appropriate answer):

To be transcribed (in full or part) and included in the content of the PhD thesis written up by the named researcher. YES\NO

To be transcribed (in full or part) and included in the content of article(s) authored by the named researcher. YES\NO

To be transcribed (in full or part) and included in the content of book chapters authored by the named researcher. YES\NO

To be transcribed (in full or part) and included in the content of books authored by the named researcher. YES\NO

To be edited and used as part of presentations at conferences. YES\NO

To be edited and uploaded onto websites as part of presentations at conferences. YES\NO

I understand that the named researcher (to the best of his ability) will ensure that my anonymity is preserved.

I understand that I can withdraw my consent (in writing) for the use of interview data at any time.

Signed: .....

Date: .....

**Consent form for use of questionnaire & interview data**

Researchers: ...G. L. Walton.....J. B. Barker.....

Respondent: .....

Contact details:

Tel:

e-mail:

I agree to the use of my questionnaire and recorded interview data for the following purposes (please circle the appropriate answer):

To be transcribed (in full or in part) and included in the content of PhD thesis written up by the named researchers. YES/ NO

To be transcribed (in full or in part) and included in the content of article(s) authored by the named researchers. YES/ NO

To be transcribed (in full or in part) and included in the content of book chapters authored by the named researchers. YES/ NO

To be transcribed (in full or in part) and included in the content of book(s) authored by the named researchers. YES/ NO

To be edited and used as part of presentations at conferences (or other similar events). YES/ NO

To be edited and uploaded onto web sites as part of presentations at conferences (or other similar events). YES/ NO

I understand that the named researchers (to the best of their ability) will ensure that my anonymity is preserved.

I understand that I can withdraw consent (in writing) for the use of any data gathered from questionnaire or interview responses at any time.

Signed: .....

Date: .....

**Consent form for use of Portfolio Section E, Essay & Blackboard Discussion Board data**

Researchers: ...G. L. Walton.....J. B. Barker.....

Respondent: .....

Contact details:

Tel:

e-mail:

I agree to the use of my Portfolio Section E, Essay and Blackboard Discussion Board output for the purposes of the Research Informed Teaching Project, PhD theses and any other legitimate dissemination activity or activities in which the named researchers are involved.

I understand that the named researchers (to the best of their ability) will ensure that my anonymity is preserved.

I understand that I can withdraw consent (in writing) for the use of any data gathered from questionnaire or interview responses at any time.

Signed: .....

Date: .....

Please note that the named researchers will undertake to share the results from this study with all stakeholders at the end of the project.

# Appendix 3

### Questionnaire for Effective Learning, Information & Communication Skills

Please answer the following questions as honestly as you can. It should take no more than 5 minutes.

Please return your completed form to Shaun.

---

In your view are the following statements TRUE or FALSE? (Please circle your answer). If you don't know then please circle DON'T KNOW

- Library Catalogue

1. You can search for books on the Library Catalogue by title only.  
TRUE FALSE  
DON'T KNOW
2. When doing an author search it is best to put the surname first.  
TRUE FALSE  
DON'T KNOW
3. You can search for books on the Library Catalogue by using one or more keywords.  
TRUE FALSE  
DON'T KNOW

- Swetswise

4. Swetswise is a full-text e-books service.  
TRUE FALSE  
DON'T KNOW
5. Swetswise is only available on-campus  
TRUE FALSE  
DON'T KNOW
6. You can search for the singular and plural of a word at the same time by using 'truncation'.  
TRUE FALSE  
DON'T KNOW
7. The term AND is used to combine two keywords together so that Swetswise retrieves articles containing both keywords.  
TRUE FALSE  
DON'T KNOW

## Appendix 3

- Evaluating sources of information

8. All the information published on the Internet is sound.

TRUE FALSE

DON'T KNOW

9. Websites are always more up to date than periodicals.

TRUE FALSE

DON'T KNOW

10. Articles published in academic journals (including e-journals) are not as reliable as books.

TRUE FALSE

DON'T KNOW

11. To evaluate a source (book, journal, web page etc) you only need to check the date.

TRUE FALSE

DON'T KNOW

END

Thank you for completing this questionnaire.

Geoff Walton and Jamie Barker 18/10/05

# Appendix 4



### Questionnaire for Effective Learning, Information & Communication Skills

Please answer the following questions as honestly as you can. It should take no more than 5 minutes.

Please return your completed form to Geoff.

---

In your view are the following statements TRUE or FALSE? (Please circle your answer). If you don't know then please circle DON'T KNOW

- Library Catalogue

1. You can search for books on the Library Catalogue by title only.  
TRUE FALSE  
DON'T KNOW
2. When doing an author search it is best to put the surname first.  
TRUE FALSE  
DON'T KNOW
3. You can search for books on the Library Catalogue by using one or more keywords.  
TRUE FALSE  
DON'T KNOW

- Swetswise

4. Swetswise is a full-text e-books service.  
TRUE FALSE  
DON'T KNOW
5. Swetswise is only available on-campus  
TRUE FALSE  
DON'T KNOW
6. You can search for the singular and plural of a word at the same time by using 'truncation'.  
TRUE FALSE  
DON'T KNOW
7. The term AND is used to combine two keywords together so that Swetswise retrieves articles containing both keywords.  
TRUE FALSE  
DON'T KNOW

## Appendix 4

- Evaluating sources of information

8. All the information published on the Internet is sound.

TRUE FALSE

DON'T KNOW

9. Websites are always more up to date than periodicals.

TRUE FALSE

DON'T KNOW

10. Articles published in academic journals (including e-journals) are not as reliable as books.

TRUE FALSE

DON'T KNOW

11. To evaluate a source (book, journal, web page etc) you only need to check the date.

TRUE FALSE

DON'T KNOW

END

Thank you for completing this questionnaire.

Geoff Walton and Jamie Barker 6/12/05

# Appendix 5

**Organisation of Groups**

	Week 1 & 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<b>Group A Programme delivery</b>	No IL Delivery	Face-to-face Workshop delivery	Collaborative working delivery (Primary, Secondary & Tertiary Courseware)	Collaborative working delivery (Primary, Secondary & Tertiary Courseware)	Collaborative working delivery (Primary, Secondary & Tertiary Courseware)	Collaborative working delivery (Primary, Secondary & Tertiary Courseware)	Collaborative working delivery (Primary, Secondary & Tertiary Courseware)	Collaborative working delivery (Primary, Secondary & Tertiary Courseware)	Collaborative working delivery (Primary, Secondary & Tertiary Courseware)		No Seminar
<b>Research Activity</b>		Administer Pre-Delivery Test (Quantitative Study)	Qualitative Study	Qualitative Study	Qualitative Study					Administer Post-Delivery Test (Quantitative)	
<b>Group B Programme Delivery</b>	No IL Delivery	Face-to-face Workshop delivery	Primary & Secondary Courseware delivery	Primary & Secondary Courseware delivery	Primary & Secondary Courseware delivery						No Seminar
<b>Research Activity</b>		Administer Pre-Delivery Test (Quantitative Study)	Qualitative Study	Qualitative Study	Qualitative Study					Administer Post-Delivery Test (Quantitative)	

**Appendix 5**

# Appendix 6

## Appendix 6

### Learning Outcomes for the Information Literacy component of the Effective Learning Information and Communication Skills Module.

#### Learning Outcomes (LO) taken from the module handbook.

1. Demonstrate knowledge of a range of skills required for effective learning, including [...] use of library learning resources to identify suitable information sources [...].
2. Communication Skills: Be able to prepare, write and present a written piece of work in an appropriate format, reference written material.
3. Information Technology Skills: Be able to use a windows environment to manipulate information [...].

#### Intended Learning Outcomes to address LO 1 and 3.

The face-to-face session is designed to enable students to address their information need in order to retrieve appropriate information for their assignment.

At the end of the session students will be able to:

- Recognise their information need by identifying appropriate keywords;
- Use common Boolean terms 'and' 'or', 'not' to construct a simple search strategy;
- Identify appropriate electronic resources such as the Library Catalogue, e-journals and e-books and use them appropriately by:
  - Exploiting the Library Catalogue through:
    - Locating it on the web;
    - Using the **Alphabetical** facility to find book, e-book and journal resources;
    - Using the Advanced search facility to find resources on a particular topic,
    - Locating books and journals on the shelves.
  - Exploiting E-journal resources through:
    - Locating it on the web;
    - Using the search facility to find appropriate journal articles including:
      - Simple keyword searches;
      - Phrase searching;
      - Using truncation and wildcards;
      - A combination of the above search tools to create a search strategy;
    - Using navigation tools to read and/ or print journal articles;
- Transfer e-journal searching skills to other appropriate e-resources.

The Online Collaborative Learning Activities are designed to enable students to evaluate information sources for inclusion in their assignment.

In completing OCL Activities 1 to 6 students will be able to systematically evaluate web sites by using an agreed set of criteria identified via discussion.

#### Intended Learning Outcomes to address LO 2

In completing OCL Activity 7 students will be able to use the APA referencing style to create a bibliography for common information sources (books, journals and web sites).

# Appendix 7

## Appendix 7

Effective learning, information & communication skills (Level 1) Session (1 hour available)

### INTRODUCTION

This session is to help students get to grips with the information sources available and answer the scenario questions in Section E of the study skills portfolio

Students should have Section E of the study skills portfolio with them.

Hand out the worksheet which mirrors the tasks they have to do to complete Section E.

CATALOGUE	10 mins	Demo Library Catalogue Suggested Author Search : <b>COTTRELL, STELLA</b> Suggested Title Search : <b>RESEARCH METHODS FOR SPORT STUDIES</b>  Hands on using the worksheet
KEYWORDS FROM SCENARIO	5mins	Give students 5 mins to write down possible keywords for their scenario.
	5mins	Guide BA students to the following keywords: <b>FOOTBALL, HOOLIGANISM, STADIUM, SPECTATOR, CROWD, SOCCER, VIOLENCE</b>  Guide BSc students to following Keywords <b>BODY, FLUID, ELECTROLYTE</b>  Guide students to Advanced Search Demo that they have to have <b>General Keyword</b> selected before they do the search.
KEYWORD SEARCH	5mins	Guide students to do the following searches BA: <b>FOOTBALL AND HOOLIGANISM</b> (21 hits) BSc: <b>BODY AND FLUID</b> (6 hits)  Hands on using worksheet Ask for answers to worksheet questions
E-BOOKS	2mins	Not to be covered in the session (Mention briefly that Section E of the portfolio includes instructions on how to locate and read e-books)
E-JOURNALS	15 mins	Demo: Swetswise via Online Library page  Re-iterate the need to use keywords and how they may be combined and truncated.  Use the BA scenario (the one on soccer violence) – steer them towards finding an alternative way of expressing this ie., football hooliganism and build search in the following way (so that they can see the effect of additional keyword and truncation:  <b>FOOTBALL</b> <b>FOOTBALL AND HOOLIGANISM</b> <b>FOOTBALL AND HOOLIGAN*</b>  Hands on using worksheet Ask for answers to worksheet questions
ROUND-UP & ANY QUESTIONS REFLECTIVE PRACTICE	5mins	Remind students that they have to evaluate their sources – a Guide on how to do this is provided (see p1 of handbook).



# Appendix 8

**SCHOOL OF HEALTH  
Sport, Health & Exercise**

**Study Skills Portfolio 2005-2006  
Section E**

**Introduction**

You are required to respond to one of the following scenarios (depending on you award, i.e. BA/ BSc) in no more than 250 words (Activity1). Completing this task you will enable you to evaluate your ability to search and select materials (books, periodicals/ journals, web pages) using a variety of methods.

You are also required to write 150 word reflective statement on what you have learned (**Independent Learning:Activity 2**).

**Activity 1**

**BA students:**

A local PE teacher asks you to do a talk about soccer violence (also known as football hooliganism, or stadium violence) to class of 'A' level sports students. How would you go about gathering and selecting appropriate information for this? Please provide a selection of web sites for your audience along with a reading list to allow them to conduct further reading on the topic.

**BSc Students:**

A fellow athletics team member asks you about the best way to hydrate (i.e., maintain body fluid or electrolyte balance) them prior, during and post performance. How would you go about gathering information to present them with a resource that contained informed information? Please provide a selection of web sites for your audience along with a reading list to allow them to conduct further reading on the topic.

Your list should include full references to the following: 2 web sites, 2 books (or e-books), 2 journal articles (at least one from an e-journal).

**To complete this task you will need to do the following:**

1. find information by searching the library catalogue to find books and hard copy journals/ periodicals;
2. You will also need to become familiar with how to find and use full-text e-books, e-journals and offprints, As well as by using this handbook you can find information regarding library & IT facilities, opening times and borrowing rights by using the InfoZone webpage;
3. Use a search engine (e.g., Google) to find your web sites:

Use the evaluation criteria which can be found at:

<http://www.lib.berkeley.edu/TeachingLib/Guides/Evaluation.html>

to judge the suitability of the 6 sources you have included in your reading list.

### What is the Library Catalogue?

The Library Catalogue enables you to search through library stock at all libraries from your desktop. It not only tells you which books we stock, where to find them and whether they are on loan, but also which journals, videos, audio cassettes, E-books and equipment we have too. To find these items, the Library Catalogue has a variety of search facilities including searches for titles, authors, subjects, ISBNs, Collections and much more. You can even access your own library record from the My Account section to check which books you have on loan, including any outstanding fines or reservations.

### Getting started – Getting onto the Library Web page

Once you are online and connected to the internet, open your internet web browser. E.g. Internet Explorer.

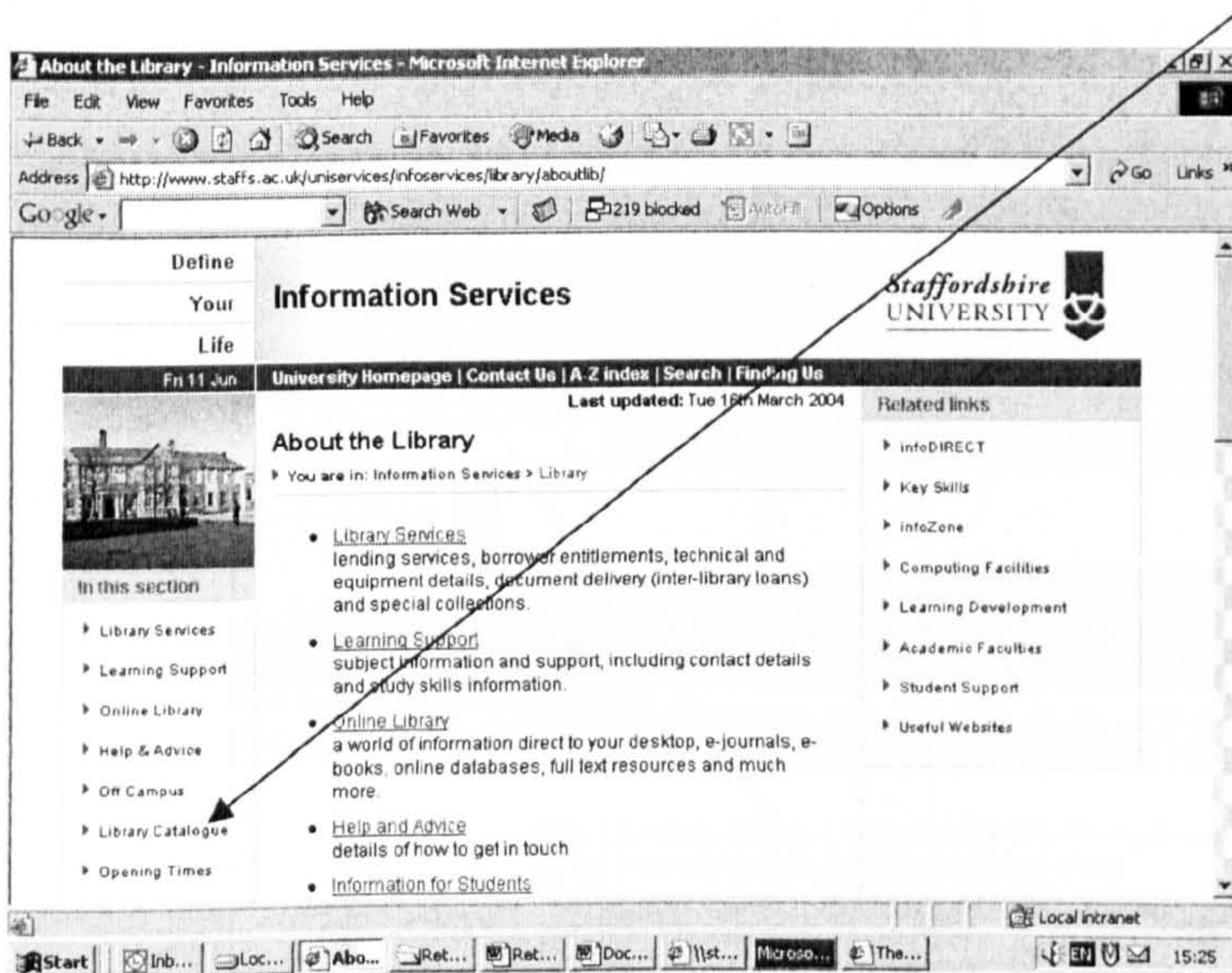
Type **www.staffs.ac.uk** in the URL address box (white strip at the top of the screen). This will open the Staffordshire University web page.

From here select **University Services**

Move the next page down and select **Libraries** and this will open the Library web page (see diagram below)

### Getting onto the Library Catalogue

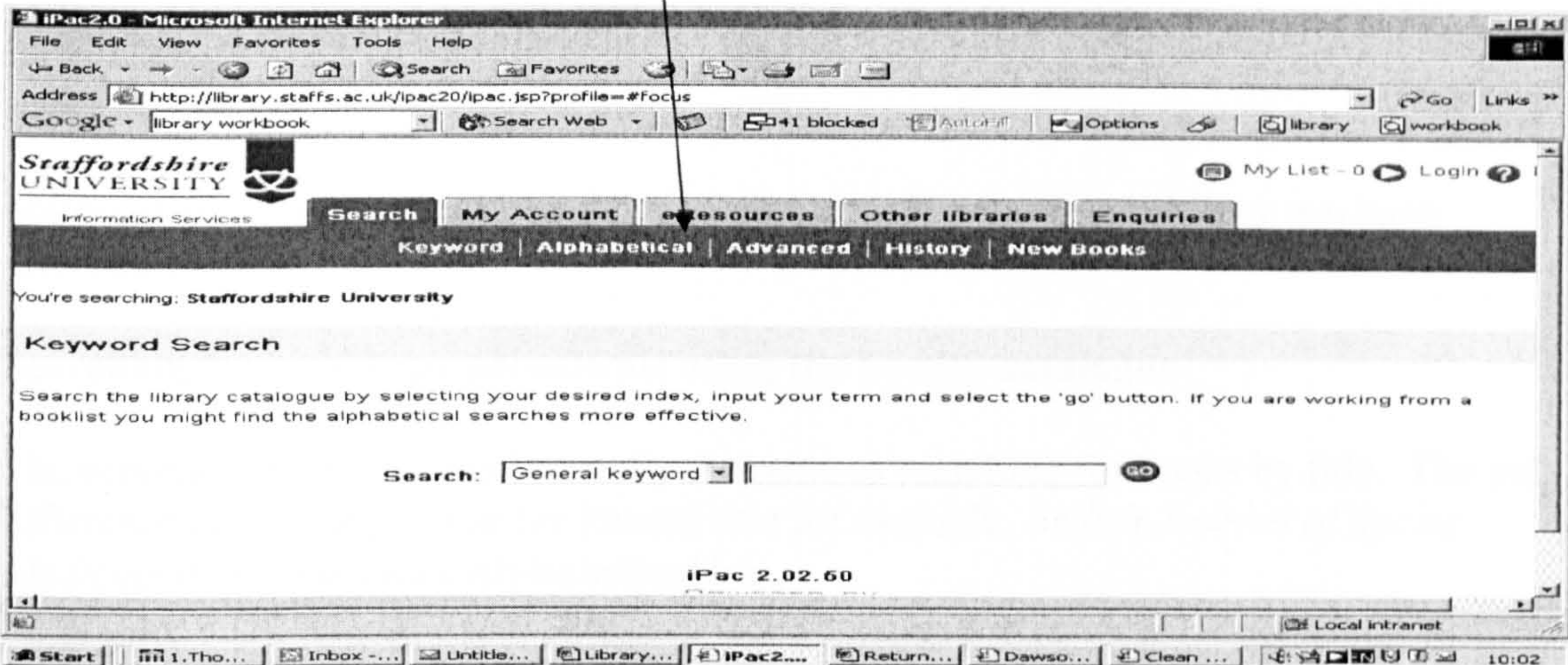
Once you have the library webpage displayed, select **Library Catalogue** from the left-hand menu



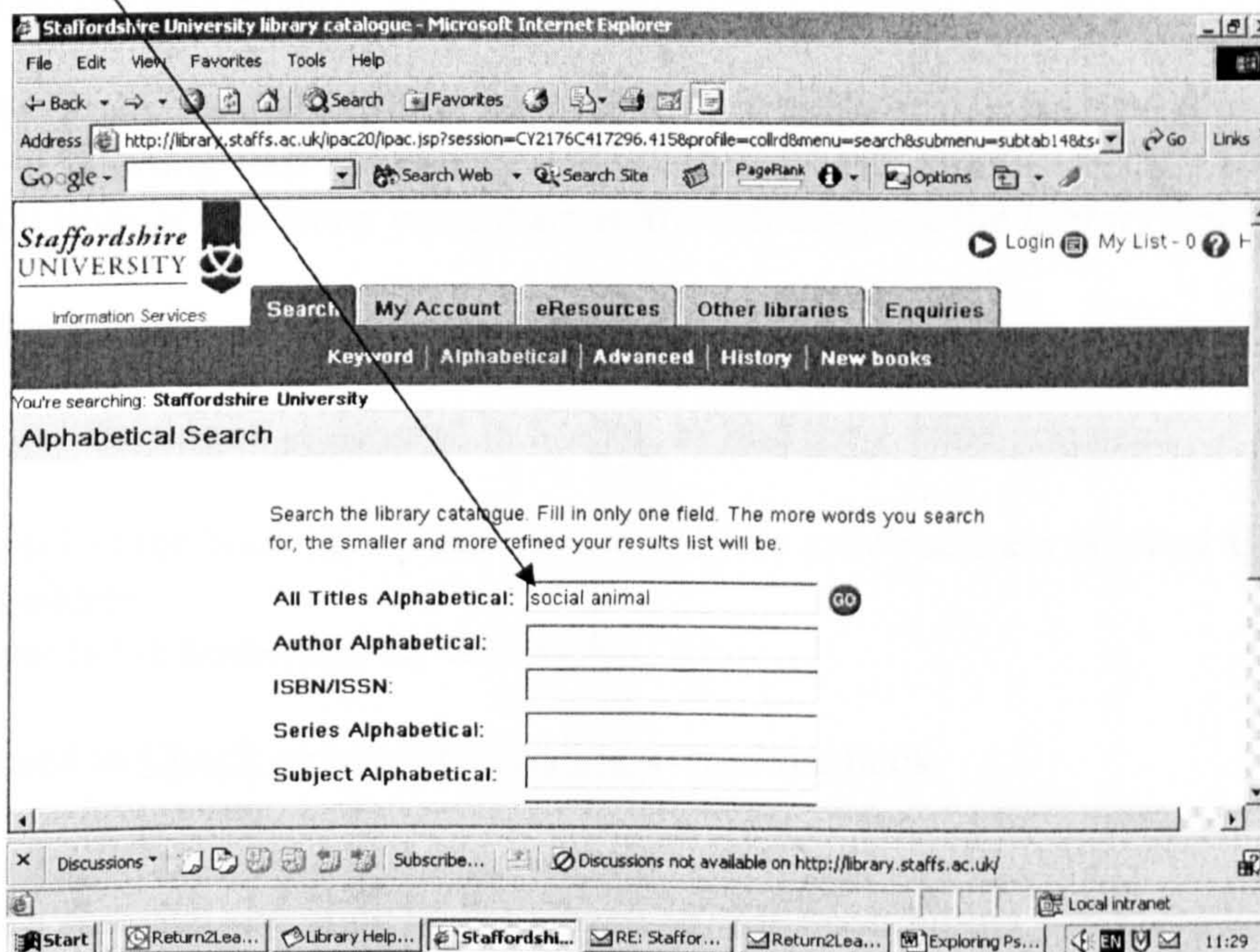
## Searching for a Book by its Title

One of the ways you can find out whether the library has a particular book is to search the library catalogue for an item by using its title.

**Step 1:** To do this select the **Alphabetical** search option from the top of the library catalogue screen



**Step 2:** From the next screen type in the title of the book you wish to find into the **All Titles Alphabetical** search box and press the **GO** button




**Step 3:** On the next screen you will be given a list of books that will match the title that you have searched for. From this list, select the title that matches the search you have performed.

## Appendix 8

**Step 4:** The next screen will present you with information about the book itself for example, bibliographic information such as title, author, publisher etc, the number of copies held by the library, which copies are on the shelves and which are on loan.

### Searching for a Book by its Author

#### Step 1: Select Alphabetical

**Step 2:** In the **Author Alphabetical** box type in the authors name (SURNAME first) and select the  button.

Follow steps 3 and 4 as outlines above to view details regarding the item you have searched for.

### Searching for hard copy periodicals using the library catalogue

The procedure for doing this is exactly the same as searching for books by title. The only difference being that you use the journal title for example, *British Journal of Sports Medicine* in the **All Titles Alphabetical** box.

## 2. Finding & using e-books

e-books are FULL-TEXT electronic versions of academic works.

You can find e-books either:

through the library catalogue (these are **netLibrary** books which have been specifically requested by teaching staff OR by using the **ebrary** e-book service (this is a collection of over 15,000 titles across many subject areas not available via the Library Catalogue).

### Looking for e-books on the library catalogue.

Go to Library Catalogue as detailed in **Step 1.** to find the e-book you need

When you select the book title in the list you will see a web address labelled **URL 856.** Select this address.

You are now in the homepage for this book

You will need to **Check out and read online** to read the book.

(NB, this system only permits one student at a time to use this text online for up to 24 hours. Make sure that you click on the **Check in this book** button when you have finished using it).

Select the hyperlinked contents page (left hand side) to see full text (right hand screen).

## Appendix 8

Use the navigation buttons (white on red) to 'turn' the pages.

### Finding e-books via e-brary

E-brary books do not appear on the catalogue. They can be found using the following instructions:

From the **Online Library** page

<http://www.staffs.ac.uk/uniservices/infoservices/library/online/index.php>

Select the **E-books** link.

Select the **Ebrary** link

Depending on your location select either **ON** or **OFF CAMPUS** access

A password is required for off campus access, see **Geoff Walton** OR go to the **Thompson Library Help Desk** for more details.

In the **LEFT HAND** window carry out the following:

Select the **Advanced** tab.

To search by author use the first **for** dialogue box and enter the Author surname.

Ensure **in** box displays **Author** (use drop down menu to select if necessary).

Select the **Search** button

In the **RIGHT HAND** screen you will receive a list of results:

You can now click on the title of any book to view its full text.

You can do keyword searches and title searches (use drop down menus to select keyword or title as appropriate).

### 3. Finding full text e-journals using SwetsWise

#### What is SwetsWise?

SwetsWise is a full-text database of a large number of journals to which we subscribe in print from different publishers. The database includes all material from the print journals with the exception of adverts and editorial board lists. It covers all subject areas including sport and exercise.

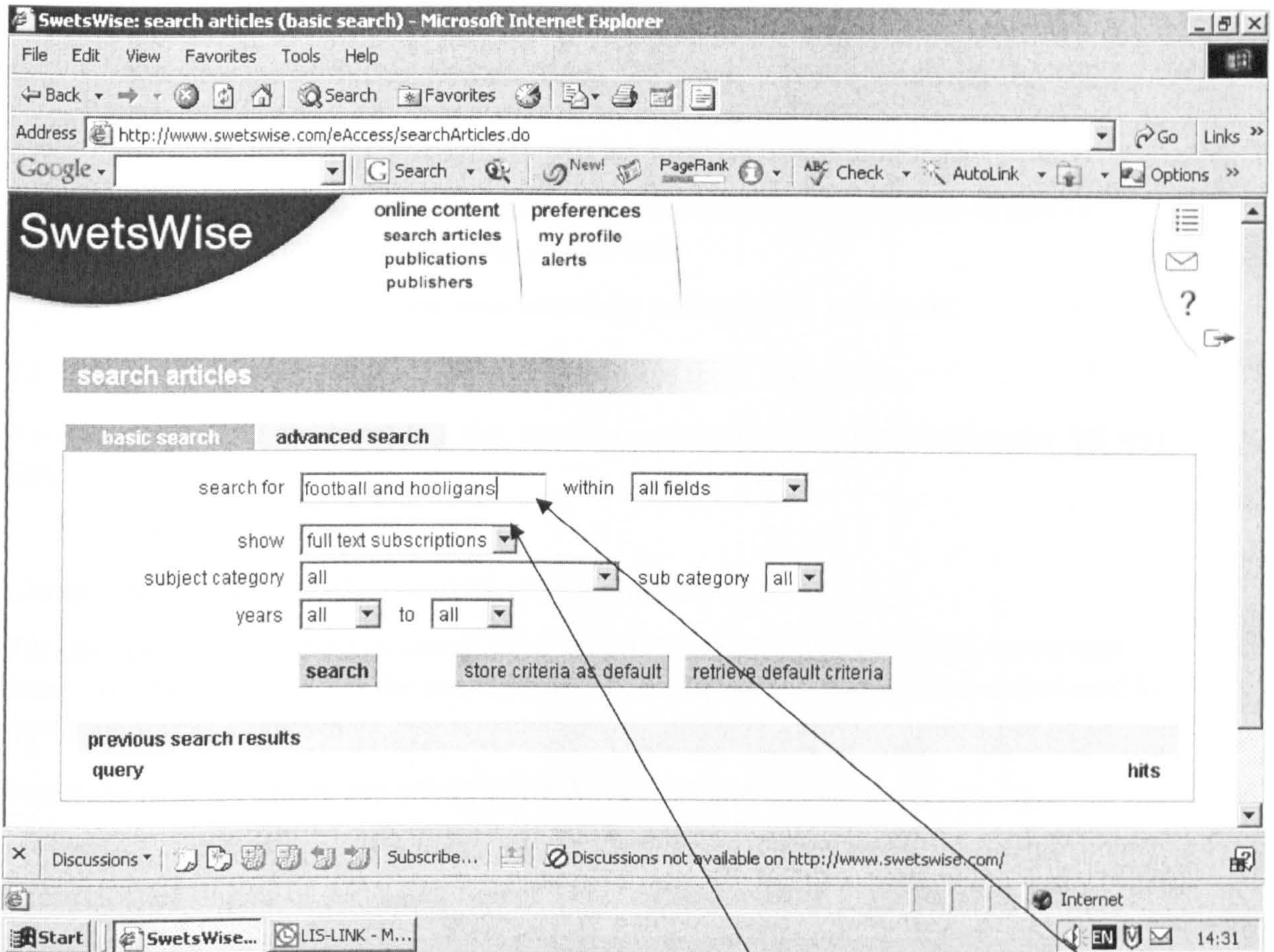
#### How do I access it?

From the **University homepage** visit the following links, **University Services> Library> Online Library> Access e-resources > S > SwetsWise>**

(NB for off-campus access you will need to enter your student login when prompted)

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You now have a number of search options (for more detailed help regarding SwetsWise use the ? (Help) link (top right of the search page)



Articles in e-journals can be found in a number of ways for example by using the **search for:** dialogue box to search by single keyword, combine keywords, phrase search or by combining all these into a sophisticated search as shown below:

To Ensure that FULL TEXT ONLY links are found select **full text subscriptions** from the drop down menu

### 1. Simple keyword search:

For example, say you wanted to find some information on *hooligans*.

To do this type *hooligans* in the **search for:** box.

Select **Search** or press Return

A single keyword will retrieve many results. You need to narrow your search!

You can narrow your search (ie, retrieve more relevant results by adding another keyword).

## 2. Combining keywords

To do this you need to think of a keyword that will narrow your subject/ topic area down a little - perhaps you want information on *football* in groups.

To combine keywords in **Swetswise** you need to use a special term called a search connector the most common are 'and', 'or', 'not'.. When you want BOTH keywords to appear in your retrieved records you use 'and'

Therefore, the search you type in will be: *football and hooligans*

Adding a keyword using the and operator REDUCES the number of results you retrieve (known as refining your search).

If you wish you can further refine your search by adding more keywords.

To find out more about other search connectors use the **? Help** links.

Your results will be displayed in a list, you can read each article by selecting the full text link.

## 3. Using a phrase search

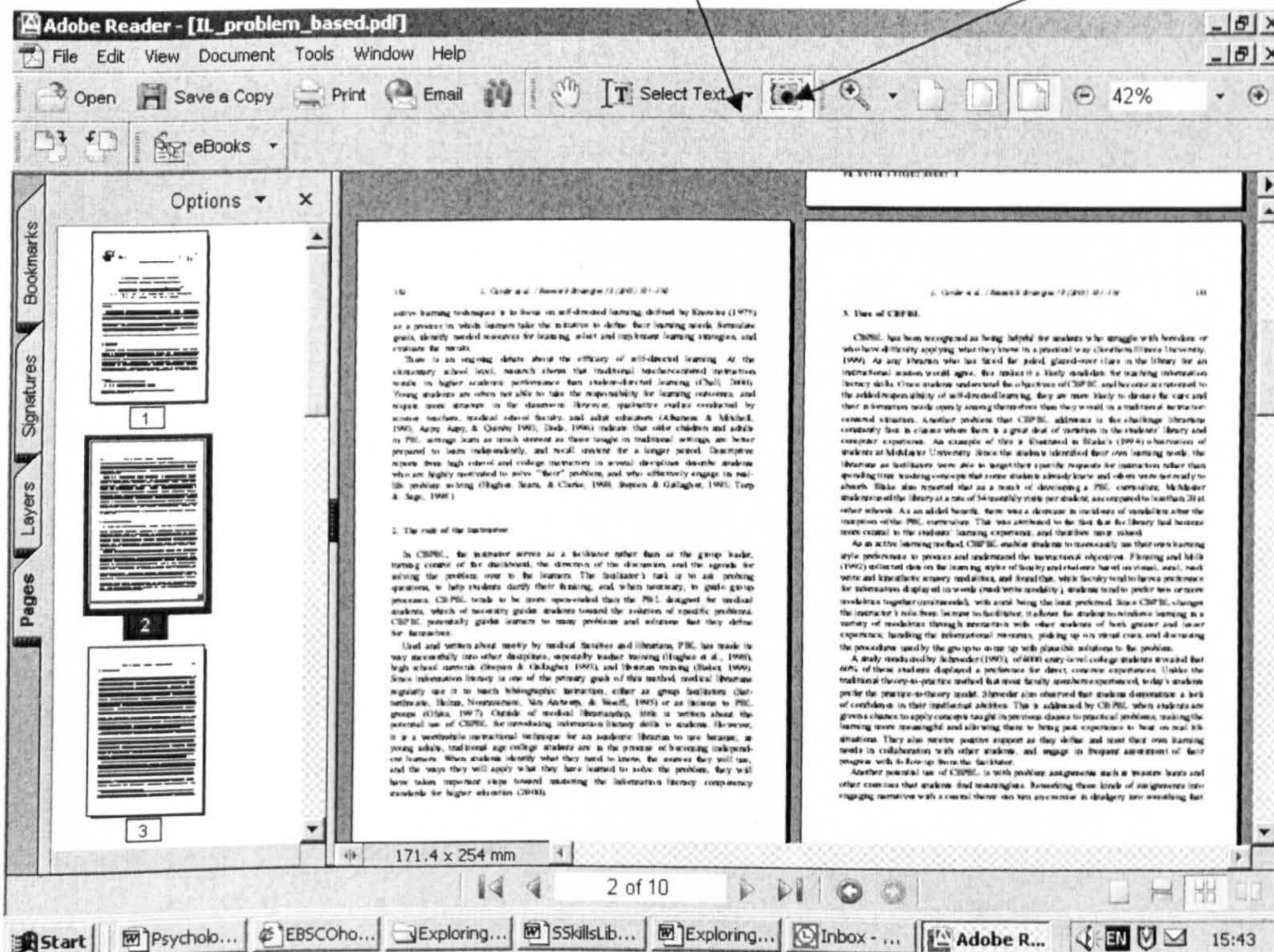
Use quotation marks "" when searching for a phrase.

For example if you wanted to search for a technical term such as rapid eye movement enter "*stadium violence*" in the **search for:** box ensuring that your phrase is enclosed in quotation marks as shown.

Select the full text link to see article using Adobe Acrobat

Copying and pasting using Adobe Acrobat

You can copy blocks of text using **Select Text** or images using the **Snapshot Tool**.





## Appendix 8

Use the **Text Select Tool** on the **Acrobat** toolbar  
Highlight the text you wish to copy (up to one full page)  
In **Menu** select **Edit** and then **Copy**  
Open a **Word** document (or use existing document)  
Paste text into document

You can copy images (graphs, diagrams, pictures, charts etc.) by using the **Snapshot Tool** which can be found on the **Acrobat** toolbar

Select **Snapshot** Toolbar  
Select the diagram you wish to copy  
Select **OK**  
Open a **Word** document (or use existing document)  
Paste text into document

### **(E) Offprints**

Offprints are photocopies of journal articles which are kept in filing cabinets in the **Short Loans** collection Level 1. The Offprints collection has been set up to provide you with access to important and relevant articles (often appearing in more obscure journals) that are not held within the library stock.

They can be found by searching the **library catalogue**, by using **Author alphabetical**, **All Titles alphabetical** or **Dewey Class Numbers** searches. All Sport, Health & Exercise offprints have the class number **SR** with a number, e.g., **SR 108**.

## Appendix 8

### Activity 1

You need to fill in all the details for each resource you have found and state your reasons for the choice you have made (based on the evaluation criteria provided).

<b>Resources</b>
<b>Book 1 details:</b> This is an excellent resource because:
<b>Book 2 details:</b> This is an excellent resource because:
<b>Journal article 1 details:</b> This is an excellent resource because:
<b>Journal article 2 details:</b> This is an excellent resource because:
<b>Web page or site 1 details:</b> This is an excellent resource because:
<b>Web page or site 2 details:</b> This is an excellent resource because:

## Appendix 8

### Independent Learning: Activity 2 - Using electronic resources: Reflective Practice

#### Background

You have now visited used the Library Catalogue, Swetswise e-journals and the web. We would like you to write a statement that reflects on your reaction to this information that has been provided to you. This extended paragraph (150 word approx.) should cover some of the following types of areas:

What new knowledge have I acquired since using used the Library Catalogue, Swetswise e-journals and the web?

How do I think I will incorporate this new knowledge when I come to look for information on sport related topics in the future?

Has this material simply reinforced existing knowledge or have I acquired new knowledge?

**Reflective practice on using the electronic resources: A personal statement by**

.....

## Appendix 8

Below is a sample statement. This may be helpful in giving you an idea of the type of statement that we are after. Of course your statement will be reflective of your own personal experience.

### Reflective practice on using the electronic resources : A personal statement by Robert Charlton

Having visited the Thompson Library and the InfoZone web site, I consider that whilst I can use libraries and navigate web pages, I didn't realise the wealth of information provided by the library both on the shelves and on the InfoZone web pages nor how to get to it. I need to revisit these resources and familiarise myself with the contents as soon as I can. I would say that the most important thing I have learnt is that InfoZone is an important starting point for researching my assignments!. I'm also looking forward to finding out more about electronic journals and using the online databases – I am beginning to realise that these sources are going to be a key way to access information.

**End of Section E (2)**  
**You have now completed Section E**

# Appendix 9

**OCL1**

**Reflective statement response template**

- 1) Think about what we have covered today.*
- 2) Answer the questions set out below.*
- 3) Send your responses to the discussion board.*
- 4) Read the responses your fellow students have made and make at least one comments on any of the postings.*

*Please be constructive in your comments and undertake this task by Friday 14<sup>th</sup> October 4pm.*

- 1) What did I actually learn in this session today?
- 2) Which were the most difficult parts and why were they difficult for me?
- 3) Which were the most straightforward parts and why did I find these easy?

=====

**OCL2**

*Please consider the Following:*

For the problem based scenario in Section E of the portfolio you need to be able to evaluate the books, articles and web pages you have found and state your reasons (criteria) in the proforma so that you are sure that the information you have is of a good quality.

***We thought it would help if we had a discussion about what good evaluation criteria are.***

*To get you started consider the issue of reference sources and ask the questions: are there any? How are they being used in a particular source (book, article, web page)? What data is being used to back up an argument (easy in books and journal articles, not so easy in web pages)?*

We would argue that a good quality book will contain many reference to other books and academic journals, there will be quite a bit of data e.g., statistics which will indicate where they were taken from (author, sporting or government body etc).

***So...What would you say are good criteria?***

**Please have a think about this and post some reasons (criteria) for others to respond to. Once you have done this have a look at your colleagues' postings and post a response. We will summarise replies and give additional guidance as we proceed.**

=====

### OCL3

**You have raised several important issues regarding the evaluation of sources and identified some excellent criteria.**

**Have a read of the summary to Online Discussion 2**

**Then answer the questions at the end of this message.**

A good book is a book which is not just full of text but with images to explain what is being said.

A valid and effective book, as a resource, needs to be easy to access, straight to the point, should use language that is subject specific and easy to understand, should be (relevant to your studied subject) accurate, reliable (and up to date) for what is needed to further [your own] knowledge.

Many books use terminology that people don't understand. if they were to use everyday 'speak' when explaining specialist topics more people could learn.

The definitions (with background information) from within the resource will allow for wider understanding of the topic at hand.

Someone else's (unbiased) argument to back the original argument (argues the same point).

[Bias is minimised by using]:

Evidence to back up the points (lots of facts and figures) that are made with detailed explanations of the information that is needed.

It should give any statistical information (on previous research) i.e Graphs which help understand the information given. It should also contain definitions of words and principles stated by the author.

I think that a good resource is made up of a wide range of material, such as quotations (from a practitioner or someone within the area) / references (as to where the info has come from and to further look up for information), examples also help to improve the resource.

[A good resource should] consist of many different points of view which allows us to assess it against our own ideology or work.

A book or article by a well known author will seemingly add credibility to the resource.

If a text is recommended on a reading list then this should be important. It may not be useful depending on who has advised you to read it such as a lecturer or a friend.

**Now answer the following questions:**

**1) What do you feel gives an author credibility (or authority) other than how well known he or she is?**

**2) What makes a source reliable or suitable (e.g., scholarly v popular)?**

**3) What criteria would you use to judge a book or article you've found in the library which is relevant to your subject but isn't on a reading list or recommended by a tutor e.g., is it too general or too specific?**

**You may find the following web site useful (also mentioned in Section E page 1 of your portfolio)**

**<http://www.lib.berkeley.edu/TeachingLib/Guides/Evaluation.html>**

### OCL4

One comment from discussion 2 stated that:

'Ensure that the web page is reliable before using any information on it'

But what makes a web page reliable?

Have a look at this web resource - 'The Good the Bad and the Ugly':

<http://lib.nmsu.edu/instruction/evalcrit.html>

List at least 4 web evaluation criteria.

Post these to the Discussion Board

Respond to at least one posting from a fellow student.

---

### OCL5

**Please read the summary below of your contributions.**

**At the end of the summary is a question that you need to answer this week.**

You have identified some excellent criteria - we have added some extra points you should consider when using web pages.

These are the questions we should we have in mind when using web pages as an information source.

General point - There are no guarantees that any web page is unbiased, error free or reputable but if you adhere to the criteria you have out forward - which is summarised below - then you should get a reasonable idea as to how reliable the source is [Geoff & Jamie].

- Is the author identified anywhere on the page? Is he/she reputable - qualified -academically - (and/or an expert)?
  - If there is no signature is there another way to determine its origin?
  - IS there an proof of this?
  - Can you identify the authors 'affiliation' for example the University of Harvard or Joe Bloggs School of Excellence?
- Who is the sponsor? Is there a link to find out more information about the sponsor?
  - Is there a link to find out more information about the sponsor?
  - Is there any advertising - a little or a great deal?
- Is there a bias within the information designed to sway readers one way or the other?
  - Does the information contain errors?
  - Be careful [...] there is a lot of jargon and false information available on the net.
  - It could be a false site, with hoax information.
- Is there a date on the page, if so when was it last updated?
  - It could be out of date information, causing problems to the person using it.
  - Old or wrong information may have been added.
  - Where has the data actually come from? Is it supported by a list of references?
  - Check data by reading and comparing it to a recommended text.

It was mentioned in the previous discussion that you can check the URL of a web page to work out its origin for example, educational, personal, commercial, governmental, sporting organisation etc. What is a URL and how do you work out its origin?

Open this web resource in another window to find out how to do this.

<http://www.hennigweb.com/projects/webclass/urls.html>

Then post your response to the discussion board.



### OCL 6

1.) Use this web resource to find out how to reference sources correctly.

<http://www.uwsp.edu/psych/apa4b.htm#A3>

2.) Now turn these items into the correct format and post them to the discussion board.

a) The book; Statistics in Kinesiology, published by Human Kinetics (Champaign: Illinois) in 1999 and written by W. J Vincent

b) Researching collaborative working in sport & exercise, an article in the Journal of Information literacy (volume 1, number 1, pages 155 - 169) by Walton, G and Barker J.

c) Psychology with style: A hypertext writing guide (Version 5) written by M. Plonsky in 2004. Taken from the Internet

January 10, 2004. It has the following web address; <http://www.uwsp.edu/psych/apa4b.htm>

# Appendix 10

**Online Discussion Board Draft Questionnaire 6/12/05**

The purpose of this questionnaire is to find out what you thought of the online discussions (in which you participated) during the last few weeks.

The online Discussion Board activities included:

1. **Evaluating E-material (Online Discussion 2, 3, 4 and 5):** In this activity you had an in-depth look at evaluating information. You set your own evaluation criteria for books, journals articles and web resources and posted these to the discussion board. You also looked at web addresses (URLs) and how to decode them. For each discussion; you completed the task yourself and then commented on the work of at least one other.
2. **Referencing your sources (Online Discussion 6):** In this activity you looked at citing references to the APA standard. You completed the task yourself and then commented on the work of at least one other.

We value your honest and constructive thoughts – there are no right answers!

Please answer the questions as fully as possible.

---

---

1a. Please state which online activity (or activities) you found useful?

.....  
.....  
.....

1b. In what ways did you find the online activity (or activities) useful.

.....  
.....  
.....

2a. Please state which online activity (or activities) you found NOT so useful?

.....  
.....  
.....

2b. In what ways did you find the online activity (or activities) NOT so useful?

.....  
.....  
.....

3. In general: What did you like about the online activities?

.....  
.....  
.....

4. In general: What did you DISlike about the online activities?

.....  
.....  
.....

## Appendix 10

5. In general: In what ways do you feel the online activities helped you to learn?

.....  
.....  
.....

6. Each online discussion was summarised by the tutors.

Have you looked back at previous summaries?

YES/ NO

Please circle your response

If you circled YES to **question 6** please answer **question 7** (otherwise go to **question 12**)

7. Did you find the summaries useful?

YES/ NO

Please circle your response

If you circled YES to **question 7** please answer **question 8** (otherwise go to **question 12**)

8. In what ways did you find the summaries useful?

.....  
.....  
.....

9. In what ways did you find the summaries NOT so useful?

.....  
.....  
.....

10. Will you be using any of the summaries in your assignment?

YES/ NO

Please circle your response

If you circled YES to **question 10** please answer **question 11** (otherwise go to **question 12**)

11. For which question in particular will you use the summary (or summaries)?

.....  
.....  
.....

## Appendix 10

12. Please describe a key moment (when you were completing one of the online activities ) when your understanding changed. (Please Identify for which activity this was)

.....  
.....  
.....

13. What were the three most important things you learned in doing the online activities?

.....  
.....  
.....

14. What new skill (or skills) did you develop as a result of participating in the online activities?

.....  
.....  
.....

15. What surprised you that you learned from doing the online activities?

.....  
.....  
.....

16. Will you do anything differently as a result of doing the online activities?

.....  
.....  
.....

17. What advice would you give a friend about to start on these online activities?

.....  
.....  
.....

18. How much time would you suggest that it would be worth putting into it?

.....  
.....  
.....

19. What pitfalls would you advise to be well worth not falling into?

.....  
.....  
.....

20. Please make any further comments you have (which aren't covered in the questionnaire) in the space below.

.....  
.....  
.....

END OF QUESTIONNAIRE

Many thanks for participating in this survey.

Geoff Walton & Jamie Barker 5/12/05

# Appendix 11

### ONLINE COLLABORATIVE WORKING FOCUS GROUP 13/3/06

This is an informal Focus Group and will last no longer than one hour.

Anonymity will be observed – your names will not appear anywhere in a final report and or paper.

It is not a test, there are no right or wrong answers, please feel free to criticise, but give your reasons and be constructive.

We would like to record our conversation to help gain as precise a record of your responses as possible.

Does anyone have any objections to this?

We are focussing specifically on the Discussion Board activities: **Evaluation of sources** and **Referencing of sources**.

I've based these questions on the responses taken from the survey that you completed at the end of the last Discussion Board session:

1. Thinking about the online activities, a fellow student said that s/he found and I quote 'all of them' useful - what are your thoughts?

Why?

Could you give more detail?

2. One student not only found the referencing exercise useful now but also wrote 'I think it would be useful in the future' - what do you think?

Why?

Could you give more detail?

3. One student found the activities 'helped' - in what ways did you find them helpful?

Why?

Could you give more detail?

4. Some found them 'easy, quick way to study and learn' yet others said they found them 'time consuming' - what are your thoughts?

Why?

Could you give more detail?

## Appendix 11

5. A fellow students didn't like the online activities especially the discussion board - what do you think?

Why?

Could you give more detail?

6. One student particularly didn't like commenting on the work of others - how do you feel about this?

Why?

Could you give more detail?

7. Some thought that the activities couldn't be applied 'in the rest of the course' - what do you think?

Why?

Could you give more detail?

8. In particular colleagues mentioned learning about referencing and how to judge the reliability of web pages as the most useful - would you add any others?

Why?

Could you give more detail?

9. One comment was that the tasks would have been 'useful in small doses' - how would you respond to that?

Why?

Could you give more detail?

Geoff Walton 13/3/06



# Appendix 12

### IRPA 1

This instant activity is designed to help you think about what you did last week in the workshop. By reflecting on your learning in this way it will help you to remember what you have learned, how you will use your new knowledge now and in the future and what else you may need to do to improve your knowledge.

Below are some questions for you to consider.

You will see that each question has three statements attached to them A, B and C.

What we would like you to do is:

Take a step back in your mind and think about the activity you did in the workshop last week.

Have a look at the questions and answer statements set out below.

Make your choice by selecting the link below the statement which you feel best describes what you have learned so far (bearing in mind that there are no right or wrong answers).

If none match your experience then please write your own statement by clicking on the e-mail address link and e-mail your statement to us.

Once you have submitted your chosen reflective statement you will immediately receive some feedback from us.

If you submit a reflection in your own words we will give you feedback within 24 hours.

To go to **Question 1** select link [here](#)

To go to **Question 2** select link [here](#)

To go to **Question 3** select link [here](#)

---

### IRPA 1: For the face to face workshop

**1. Which of these statements best describes what you learned from last week's activity?**

*1 A. Completing the activity last week has given me a greater overview of what to look for when studying sport related areas and where I need to be looking for relevant books. Plus, I now appreciate the vast amounts of resources the University provides and I am pleased to know how much information you can find relatively easily on varying subjects. I now feel that I have learned a great deal by using these electronic resources.*

If you agree with statement 1 A select the link [here](#)

## Appendix 12

*1 B. I think doing the activity is good because it helps you to find books, journals websites. I have gained new knowledge in using the library catalogue, e-journals and the web. I had never used e-journals or the library catalogue before coming to university so learning how to use them is very useful to me. It has taught me to how to search for information accurately and efficiently.*

If you agree with statement 1 B select the link [here](#)

*1 C. I consider that I have acquired much new knowledge about the library catalogue and how to navigate e-journals, I never knew how much information can be obtained from both on the shelves and on e-brary. I feel that I have familiarised myself with these resources so now feel I can obtain any of the information that I require. I would say that the most important thing I have learnt is that the library catalogue and e-journals are a good place to start when looking for information when writing assignments and reports.*

If you agree with statement 1 C select the link [here](#)

If you want to submit a statement in your own words e-mail [here](#)

### Instant Feedback 1 A

1 A. It's great that you feel that you have a good overview of the services on offer and know where to look to find books. You can use the online library to find full-text e-books (via e-brary) and full-text articles via the e-journals such as Swetswise too. Don't forget, all these resources are gathered together on the **Online Library** web page – think about using this as your starting point for all your information needs.

Make sure you familiarise yourself with all these e-resources so that you know where to start when you are looking for information for your assignment.

### Instant Feedback 1 B

1 B. It's great that you have learned to use the library catalogue, e-journals and the web. You can use the online library to find full-text e-books (via e-brary) too. Don't forget, all these resources are gathered together on the **Online Library** web page – think about using this as your starting point for all your information needs. Make sure you familiarise yourself with all these e-resources so that you know where to start when you are looking for information for your assignment.

### Instant Feedback 1 C

1 C. Well done! You seem to have got to grips with all the e-resources we covered. Don't forget, all these resources are gathered together on the **Online Library** web page – think about using this as your starting point for all your information needs.

---

### 2. Which of these statements best reflects your experience of the searching process?

*2 A. I found that to search for information on the internet was useful but hard at times to find specific information. Upon searching the internet for web pages, it was very easy to find good material, whereas when using the online services to find journal articles on the topic, it was near to impossible to find relevant information.*

If you agree with statement 2 A select the link [here](#)

*2 B. On completing this activity I have learnt how to use the online library. Although this is very useful and will be a big part of my studies I found it very time consuming and reasonably hard to find appropriate material but after playing*

*around with the online resources I eventually figured out how to use them. However, it took a lot of time trying to gather all the information.*

If you agree with statement 2 B select the link [here](#)

*2 C. Initially I found it difficult to understand the online services. I did, however, persist with these and finally found a number of sources by changing the keywords in the search box for example, 'football' and 'hooliganism'. I am now confident in using search connectors like 'and' and 'not' and can find good articles and abstracts that will come in handy. .*

If you agree with statement 2 C select the link [here](#)

If you want to submit a statement in your own words e-mail [here](#)

### Instant Feedback 2B

2 A. Yes it is hard at first to find what you want but as you use these resources more and more you will start to find what you want much quicker. Don't forget to identify your keywords first. If these don't work when you try a search try thinking up some alternatives for example, instead of 'football' try 'soccer', instead of 'hooliganism' try 'violence'. Remember that, unlike Google, Swetswise makes use of search connectors such as 'and ', 'or', 'not'. So you need to type in a search like this 'soccer and violence' rather than 'soccer violence' like you would in Google. We recommend that you revisit the e-resources and have a look at the Help screens, they are really good at explaining how to do a search.

### Instant Feedback 2B

2. B. Well done for persisting! Yes it is hard at first to find what you want but as you use these resources more and more you will start to find what you want much quicker. Don't forget to identify your keywords first. If these don't work when you try a search try thinking up some alternatives for example, instead of 'football' try 'soccer', instead of 'hooliganism' try 'violence'. Remember that, unlike Google, Swetswise makes use of search connectors such as 'and ', 'or', 'not'. So you need to type in a search like this 'soccer and violence' rather than 'soccer violence' like you would in Google. We recommend that you revisit the e-resources and have a look at the Help screens, they are really good at explaining how to do a search.

### Instant Feedback 2C

2 C. Brilliant, your persistence is commendable! You have done the right thing by trying different keywords and using search connectors. Another common search connector is 'or'. You can find out more about searching these resources by using the Help screens.

### 3. Which of these statements best reflects what you will do with your new knowledge in the future?

*3 A. Having learnt new knowledge in looking for sports information I feel this will help me find better resources to get better work and by using the online library on a regular basis this will enable me to find information more quickly and effectively. I was surprised how much you can find out by just searching and looking on e-journals I found a lot of useful information. All the time I have spent on this activity I have learnt a lot and will try to use it in the future.*

If you agree with statement 3 A select the link [here](#)

*3 B. I am confident that I can use these skills in the future when searching for various articles, books and websites for information to help with various assignments. I am now more interested in the online library and I am beginning to realise that these sources are going to be a key way to access information. Overall I feel this task has improved my information skills and given me confidence to achieve well in the year ahead.*

If you agree with statement 3 B select the link [here](#)

*3 C. All this material, especially e-journals, e-books (e-brary) and the library catalogue, will positively reinforce my work and will help so much when looking for specific information, books or articles from past materials. E-journals are new to me and I have a greater understanding of this service and it will help dramatically for assignments in the future. I believe that I need to spend more time using the electronic resources to gain more knowledge and get the full advantage of these programmes.*

If you agree with statement 3 C select the link [here](#)

If you want to submit a statement in your own words e-mail [here](#)

---

### **Instant Feedback 3A**

**3 A. Yes, these resources will help you to find better quality information such as journal articles, books and e-books in your subject area and help you get a better grade! You are right to use the online library regularly to keep up-to-date with these resources and this will also help you to become more expert at using them. Always use these as your first 'port-of-call' to find good quality information for your assignments in the future.**

### **Instant Feedback 3B**

**3 B. It's great to hear that your confidence and interest has grown and that you'll use these resources in your assignments in the future. These resources will help you to find better quality information such as journal articles, books and e-books in your subject area and help you get a better grade! Make sure that you use the online library regularly to keep up-to-date with these resources and this will also help you to become more expert at using them. Always use these as your first 'port-of-call' to find good quality information for your assignments in the future.**

### **Instant Feedback 3C**

**3 C. Yes, these resources will help you to find better quality information such as journal articles, books and e-books in your subject area and help you get a better grade! You are right to use the online library regularly to keep up-to-date with**

## Appendix 12

these resources and this will also help you to become more expert at using them. Always use these as your first 'port-of-call' to find good quality information for your assignments in the future.



# Appendix 13

## Appendix 13

### Questionnaire for Effective Learning, Information & Communication Skills

Please answer the following questions as honestly as you can. It should take no more than 5 minutes.

Please return your completed form to Geoff.

---

In your view are the following statements TRUE or FALSE? (Please circle your answer). If you don't know then please circle DON'T KNOW

- Library Catalogue

1. The only way to search for books on the Library Catalogue is by an 'All Titles Alphabetical' search.

TRUE FALSE

DON'T KNOW

2. You can only search for books and journals on the Library Catalogue.

TRUE FALSE

DON'T KNOW

3. You can use Boolean operators to combine keywords on the Library Catalogue

TRUE FALSE

DON'T KNOW

- Swetswise

4. Swetswise is a full-text e-books service.

TRUE FALSE

DON'T KNOW

5. Swetswise is only available on-campus

TRUE FALSE

DON'T KNOW

6. You can search for the singular and plural of a word at the same time by using 'truncation'.

TRUE FALSE

DON'T KNOW

7. The term AND is used to combine two keywords together so that Swetswise retrieves articles containing both keywords.

TRUE FALSE

DON'T KNOW

## Appendix 13

- Evaluating sources of information

8. The first place to look for quality research is on the Internet.

TRUE FALSE

DON'T KNOW

9. Websites are always more up to date than periodicals.

TRUE FALSE

DON'T KNOW

10. Articles published in academic journals (including e-journals) are not as reliable as books.

TRUE FALSE

DON'T KNOW

11. To evaluate a source (book, journal, web page etc) you only need to check the date.

TRUE FALSE

DON'T KNOW

- Referencing information

12. The Harvard style of referencing should be used for assignments.

TRUE FALSE

DON'T KNOW

13. This is how to reference a book correctly:

John Smith, Sport & Exercise 1999

TRUE FALSE

DON'T KNOW

14. This is how to reference a web page correctly:

BBC Sport Football <http://news.bbc.co.uk/hi/football/default.stm>

TRUE FALSE

DON'T KNOW

END

Thank you for completing this questionnaire.

Geoff Walton and Jamie Barker 10/10/06

Version 2

# Appendix 14

## Questionnaire for Effective Learning, Information & Communication Skills

Please answer the following questions as honestly as you can. It should take no more than 5 minutes.

Please return your completed form to Geoff.

---

In your view are the following statements TRUE or FALSE? (Please circle your answer). If you don't know then please circle DON'T KNOW

- Library Catalogue

1. The only way to search for books on the Library Catalogue is by an 'All Titles Alphabetical' search.

TRUE FALSE

DON'T KNOW

2. You can only search for books and journals on the Library Catalogue.

TRUE FALSE

DON'T KNOW

3. You can use Boolean operators to combine keywords on the Library Catalogue

TRUE FALSE

DON'T KNOW

- Swetswise/ ScienceDirect

4. Swetswise/ ScienceDirect are full-text e-books services.

TRUE FALSE

DON'T KNOW

5. Swetswise/ ScienceDirect are only available on-campus

TRUE FALSE

DON'T KNOW

6. You can search for the singular and plural of a word at the same time by using 'truncation'.

TRUE FALSE

DON'T KNOW

7. The term AND is used to combine two keywords together so that Swetswise/ Science Direct retrieves articles containing both keywords.

TRUE FALSE

DON'T KNOW

## Appendix 14

- Evaluating sources of information

8. The first place to look for quality research is on the Internet.

TRUE FALSE

DON'T KNOW

9. Websites are always more up to date than periodicals.

TRUE FALSE

DON'T KNOW

10. Articles published in academic journals (including e-journals) are not as reliable as books.

TRUE FALSE

DON'T KNOW

11. To evaluate a source (book, journal, web page etc) you only need to check the date.

TRUE FALSE

DON'T KNOW

- Referencing information

12. The Harvard style of referencing should be used for assignments.

TRUE FALSE

DON'T KNOW

13. This is how to reference a book correctly:

John Smith, Sport & Exercise 1999

TRUE FALSE

DON'T KNOW

14. This is how to reference a web page correctly:

BBC Sport Football <http://news.bbc.co.uk/hi/football/default.stm>

TRUE FALSE

DON'T KNOW

END

Thank you for completing this questionnaire.

Geoff Walton and Jamie Barker 21/11/06

Version 2

# Appendix 15

## Appendix 15

### Learning Outcomes for the Information Literacy component of the Effective Learning Information and Communication Skills Module.

#### Learning Outcomes (LO) taken from the module handbook.

1. Demonstrate knowledge of a range of skills required for effective learning, including [...] use of library learning resources to identify suitable information sources [...].
2. Communication Skills: Be able to prepare, write and present a written piece of work in an appropriate format, reference written material.
3. Information Technology Skills: Be able to use a windows environment to manipulate information [...].

#### Intended Learning Outcomes to address LO 1 and 3.

The face-to-face session is designed to enable students to address their information need in order to retrieve appropriate information for their assignment.

At the end of the session students will be able to:

- Recognise their information need by identifying appropriate keywords;
- Use common Boolean terms 'and' 'or', 'not' to construct a simple search strategy;
- Identify appropriate electronic resources such as the Library Catalogue, e-journals and e-books and use them appropriately by:
  - Exploiting the Library Catalogue through:
    - Locating it on the web;
    - Using the **Alphabetical** facility to find book, e-book and journal resources;
    - Using the Advanced search facility to find resources on a particular topic,
    - Locating books and journals on the shelves.
  - Exploiting E-journal resources through:
    - Locating it on the web;
    - Using the search facility to find appropriate journal articles including:
      - Simple keyword searches;
      - Phrase searching;
      - Using truncation and wildcards;
      - A combination of the above search tools to create a search strategy;
    - Using navigation tools to read and/ or print journal articles;
- Transfer e-journal searching skills to other appropriate e-resources.

The Online Collaborative Learning Activities are designed to enable students to evaluate information sources for inclusion in their assignment.

In completing OCL Activities 1 & 2 students will be able to systematically evaluate web sites by using an agreed set of criteria identified via discussion.

#### Intended Learning Outcomes to address LO 2

In completing OCL Activity 3 students will be able to use the APA referencing style to create a bibliography for common information sources (books, journals and web sites).



# Appendix 16

## Appendix 16

Effective learning, information & communication skills (Level 1) Session (1 hour available)

### INTRODUCTION

This session is to help students get to grips with the information sources available and answer the problem-based scenario questions in **Section E** of the **Study Skills Portfolio**.

Students should have **Section E** of the **Study Skills Portfolio** with them.

Hand out the worksheet which mirrors the tasks they have to do to complete **Section E**.

CATALOGUE	10 mins	Demo Library Catalogue Suggested Author Search : <b>COTTRELL, STELLA</b> Suggested Title Search : <b>RESEARCH METHODS FOR SPORT STUDIES</b> Hands on using the worksheet
KEYWORDS FROM SCENARIO	5mins	Give students 5 mins to write down possible keywords for their scenario.
	5mins	Guide BA students to the following keywords: <b>FOOTBALL, HOOLIGANISM, STADIUM, SPECTATOR, CROWD, SOCCER, VIOLENCE</b> Guide BSc students to following Keywords <b>BODY, FLUID, ELECTROLYTE</b> Guide students to <b>Advanced Search</b> Demo that they have to have <b>General Keyword</b> selected before they do the search.
KEYWORD SEARCH	5mins	Guide students to do the following searches BA: <b>FOOTBALL AND HOOLIGANISM</b> (21 hits) BSc: <b>BODY AND FLUID</b> (6 hits) Hands on using worksheet Ask for answers to worksheet questions
E-BOOKS	2mins	Not to be covered in the session (Mention briefly that <b>Section E</b> of the portfolio includes instructions on how to locate and read e-books)
E-JOURNALS	15mins	Demo: Swetswise via Online Library page Re-iterate the need to use keywords and how they may be combined and truncated. Use the BA scenario (the one on soccer violence) – steer them towards finding an alternative way of expressing this ie., football hooliganism and build search in the following way (so that they can see the effect of additional keyword and truncation: <b>FOOTBALL</b> <b>FOOTBALL AND HOOLIGANISM</b> <b>FOOTBALL AND HOOLIGAN*</b> Hands on using worksheet Ask for answers to worksheet questions
ROUND-UP & ANY QUESTIONS	5mins	Remind students that they have to evaluate their sources – a Guide on how to do this is provided (see p1 of handbook).
<b>INSTRUCT STUDENTS TO DO IRPA 1 IN BLACKBOARD</b>		

# Appendix 17

## Sample page from the Berkeley University web site

Evaluating Web Pages: Techniques to Apply & Questions to Ask

UC BERKELEY LIBRARY | HOME | SEARCH

Finding Information on the Internet: A Tutorial  
<http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/Evaluate.html>

**Evaluating Web Pages:  
 Techniques to Apply & Questions to Ask**  
 UC Berkeley - Teaching Library Internet Workshops

[About This Tutorial](#) | [Table of Contents](#) | [Handouts](#) | [Glossary](#)

[Looking for the Web Page Evaluation Checklist PDF form?](#)

Evaluating web pages skillfully requires you to do two things at once:

1. Train your eye and your fingers to employ a series of **techniques** that help you quickly find what you need to know about web pages;
2. Train your mind to think critically, even suspiciously, by **asking a series of questions** that will help you decide how much a web page is to be trusted.

This page is organized to combine the two techniques into a process that begins with looking at your search results from a search engine or other source, follows through by investigating the content of page, and extends beyond the page to what others may say about the page or its author(s).

### 1. What can the URL tell you?

Techniques for Web Evaluation :

1. Before you leave the list of search results -- before you click and get interested in anything written on the page -- glean all you can from the URLs of each page.
2. Then choose pages most likely to be reliable and authentic.

Questions to ask:	What are the implications?
<p><b>Is it somebody's personal page?</b></p> <ul style="list-style-type: none"> <li>• Read the <u>URL</u> carefully:           <ul style="list-style-type: none"> <li>o Look for a personal name (e.g., <i>jbarker</i> or <i>barker</i>) following a tilde ( ~ ), a percent sign ( % ), or the words "users," "members," or "people."</li> <li>o Is the server a commercial <u>ISP</u> or other provider of web page hosting (like aol.com or geocities.com)</li> </ul> </li> </ul> <p><b>What type of domain does it come from ?</b>            (educational, nonprofit, commercial, government, etc.)</p> <ul style="list-style-type: none"> <li>• Is the domain extension appropriate for the content?           <ul style="list-style-type: none"> <li>o Government sites: look for .gov, .mil</li> <li>o Educational sites: look for .edu</li> </ul> </li> </ul>	<p>Personal pages are not necessarily "bad," but you need to investigate the author carefully. For personal pages, there is no publisher or domain owner vouching for the information in the page.</p> <p>Look for appropriateness. What kind of information source do you think is most reliable for your topic?</p>

# Appendix 18

**SCHOOL OF HEALTH  
Sport, Health & Exercise**

**Study Skills Portfolio 2006-2007  
Section E**

**Introduction**

**Independent Learning: Activity 1:** You are required to respond to one of the following scenarios (depending on your award, i.e. BA/ BSc) in no more than 250 words).

Completing this task you will enable you to evaluate your ability to search and select materials (books, periodicals/ journals, web pages) using a variety of methods.

**Independent Learning: Activity 2:** You are also required to write 150 word reflective statement on what you have learned).

**Independent Learning: Activity 1**

**BA students:**

A local PE teacher asks you to do a talk about soccer violence (also known as football hooliganism, or stadium violence) to class of 'A' level sports students. Please provide two web sites for your audience along with a reading list to allow them to conduct further reading on the topic.

**BSc Students:**

A fellow athletics team member asks you about the best way to hydrate (i.e., maintain body fluid or electrolyte balance) them prior, during and post performance. Please provide two web sites for your audience along with a reading list to allow them to conduct further reading on the topic.

Your list should include full references (in the APA style) with evaluations to the following: 2 web sites, 2 books (or e-books), 2 journal articles (at least one from an e-journal). See Appendix 1 for examples on how to reference and what your evaluation should look like.

**To complete this task you will need to do the following:**

1. Find information by searching the **Library Catalogue** to find books and hard copy journals/ periodicals (see page 2 onwards for guidance);
2. Become familiar with finding and using full-text e-books (see page 5), e-journals (see pages 6-8) and offprints (see pages 4).
3. Use a search engine (e.g., Google) to find your web sites.
4. Use the evaluation criteria which can be found at:  
[www.lib.berkeley.edu/TeachingLib/Guides/Evaluation.html](http://www.lib.berkeley.edu/TeachingLib/Guides/Evaluation.html) to judge the suitability of the 6 sources you have included in your reading list.

**NB:** Additional information regarding library & IT facilities, opening times and borrowing rights can be found by using the **InfoZone** ([www.staffs.ac.uk/infozone](http://www.staffs.ac.uk/infozone)) webpage.

## What is the Library Catalogue?

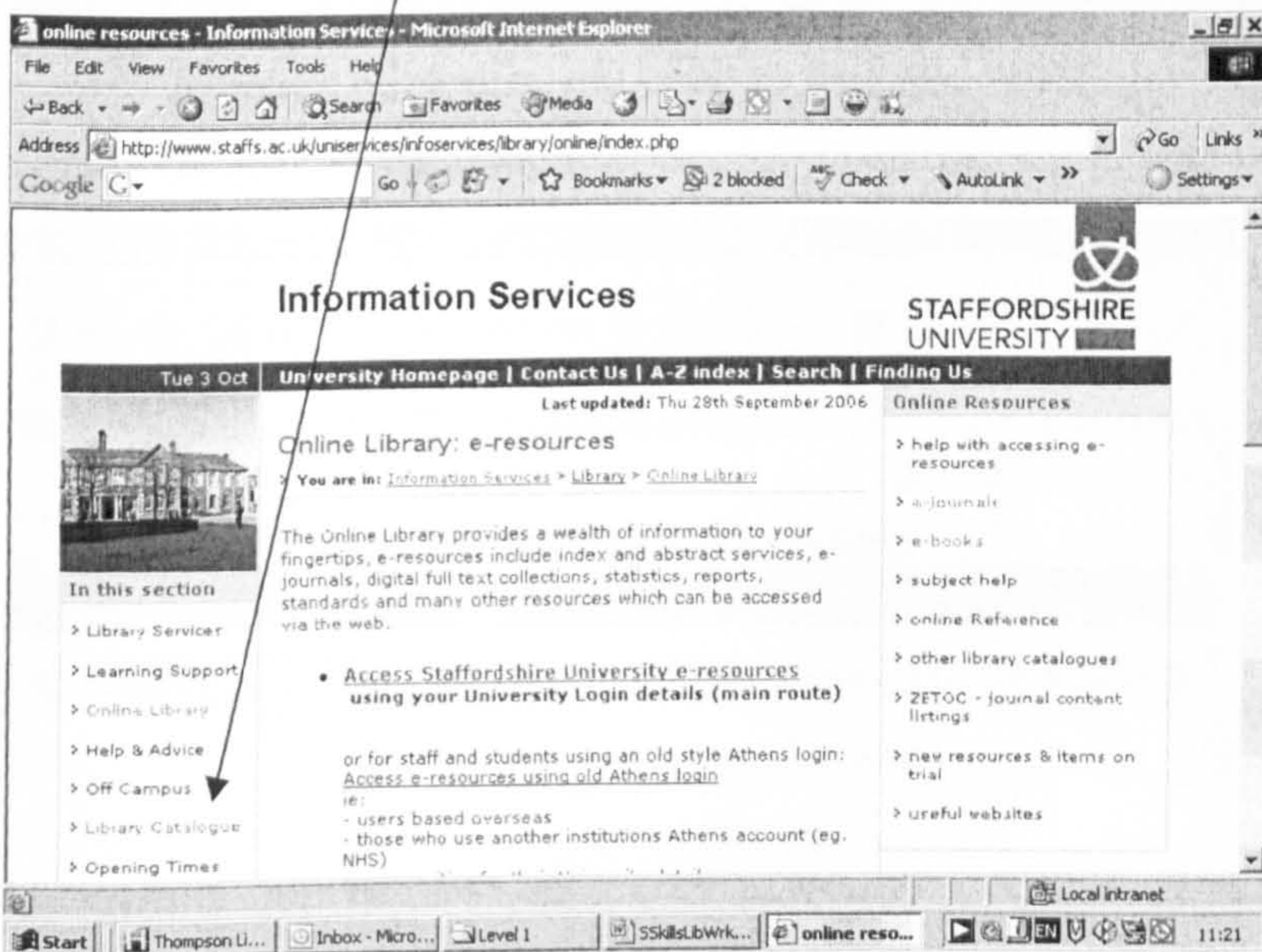
The Library Catalogue enables you to search through library stock at all libraries from your desktop. It not only tells you which books we stock, where to find them and whether they are on loan, but also which journals, videos, audio cassettes, E-books and equipment we have too. To find these items, the Library Catalogue has a variety of search facilities including searches for book titles, authors, subjects, ISBNs, collections and much more. You can even access your own library record from the **MyAccount** section to check which books you have on loan, including any outstanding fines or reservations.

## Getting started – Getting onto the Library Web page

- Open your internet web browser. E.g. Internet Explorer.
- Type **www.staffs.ac.uk** in the URL address box (white strip at the top of the screen).
- Select **University Services**
- Scroll down
- Select **University Libraries**
- Select **Online Library** (all e-resources can be found here)

## Library Catalogue

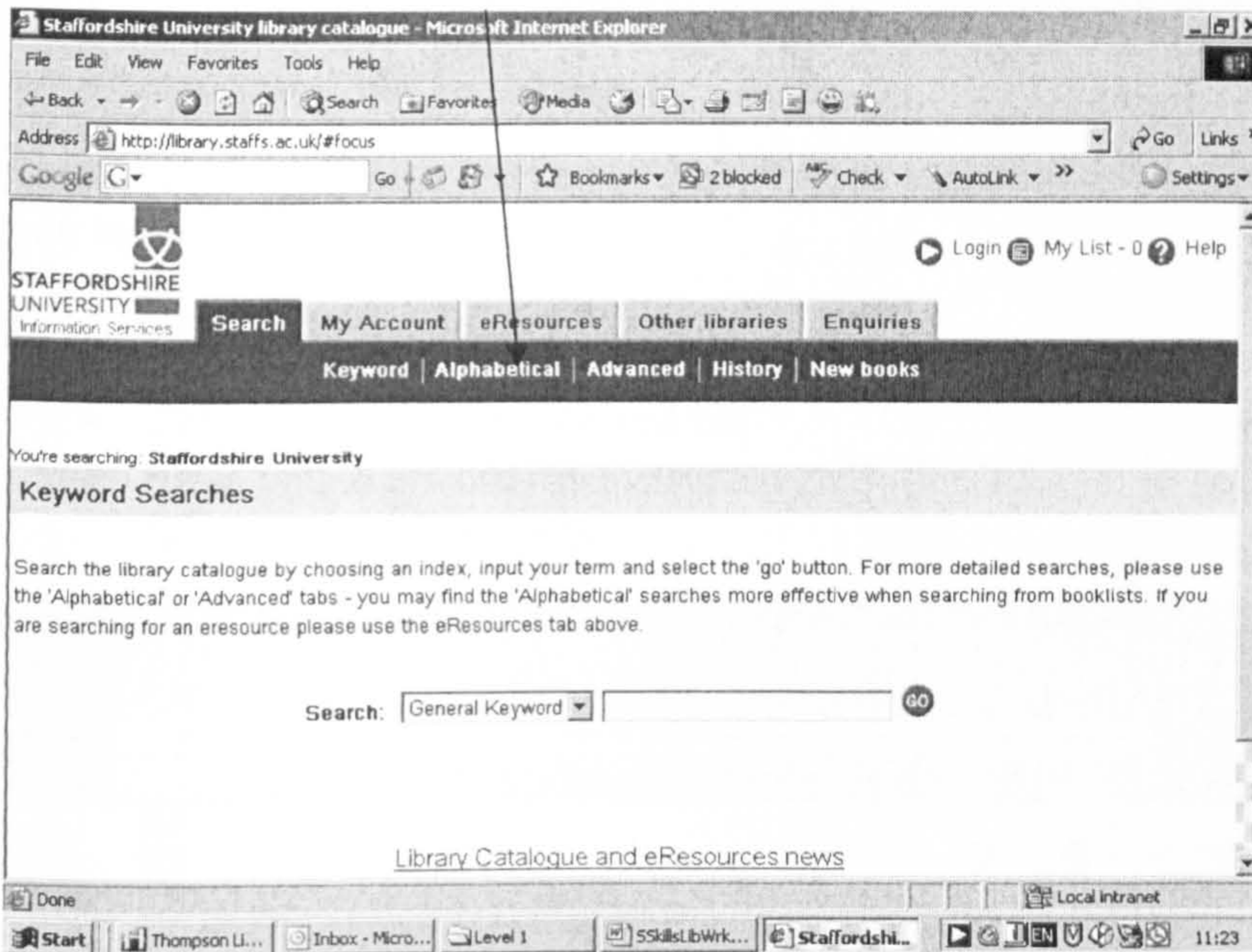
- Select **Library Catalogue** from the left-hand menu



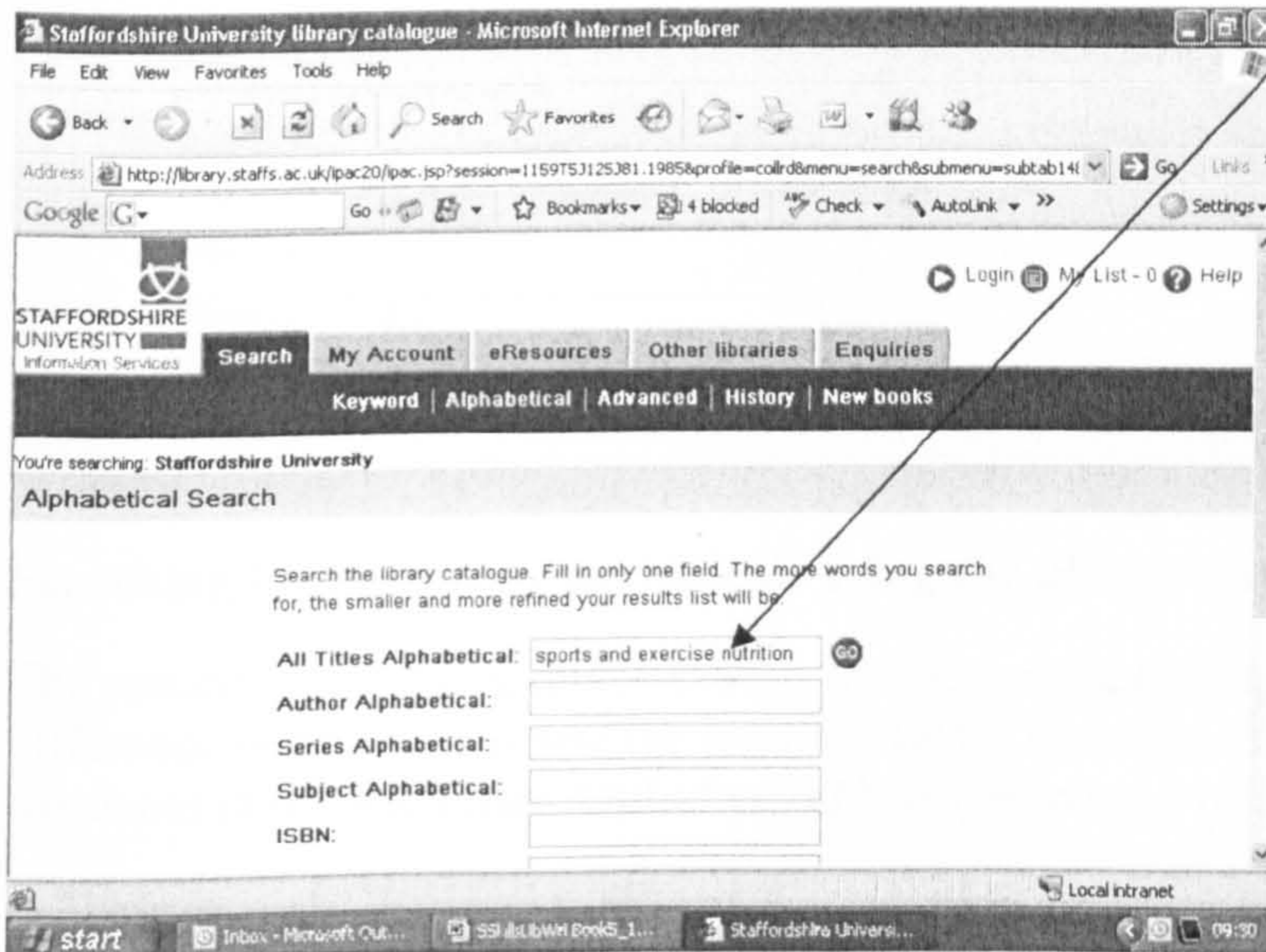
## Searching for a Book by its Title

One of the ways you can find out whether the library has a particular book is to search the library catalogue for an item by using its title.

- Select the **Alphabetical** search option from the top of the library catalogue screen



- Type the book title you want to find into **All Titles Alphabetical** search box
- Select the **GO** button



- Select the book title you need from the list you have obtained.

The next screen shows:

**Item information:** book title, author, class number, publisher, date of publication;



## Appendix 18

- Scroll down for **Copy/Holding information** the number of copies in the library; copies on shelves, on loan, loan periods (2 week or 24 hour loan).

### Searching for a Book by its Author

- Select **Alphabetical** (see page 3 of this guide)
- Type in the authors name (SURNAME first) in **Author Alphabetical**
- and select the **GO** button

Use the skills you have learned in the previous exercise to view details regarding the item you have searched for.

### Searching for books using keywords

- Select **Advanced** on the red bar
- Type your keywords as instructed (NB: don't forget to put the connector **and** between your keywords).

### Searching for hard copy periodicals using the library catalogue

The procedure for doing this is exactly the same as searching for books by title. The only difference being that you use the journal title for example, *British Journal of Sports Medicine* in the **All Titles Alphabetical** box (see page 3 of this guide).

### Offprints

Offprints are photocopies of journal articles which are kept in filing cabinets in the **Short Loans** collection Level 1. The Offprints collection has been set up to provide you with access to important and relevant articles (often appearing in more obscure journals) that are not held within the library stock.

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They can be found by searching the **Library Catalogue**, by using **Author alphabetical**, **All Titles alphabetical** or **Dewey Class Numbers** searches. All Sport, Health & Exercise offprints have the class number **SR** with a number, e.g., **SR 108**.

### 2. Finding & using e-books

e-books are FULL-TEXT electronic versions of academic works.

You can find e-books either:

through the library catalogue (these are **netLibrary** books which have been specifically requested by teaching staff OR by using the **ebrary** e-book service (this is a collection of over 15,000 titles across many subject areas not available via the Library Catalogue).

**Looking for e-books on the Library Catalogue.**

- Use the Library Catalogue either via title or author (as detailed above) to find the e-book you need
- Select the book title in the list
- Select the address **URL 856 An electronic book accessible through the World Wide Web; click for information**
- Select **View this ebook** to access full-text

(NB, this system only permits one student at a time to use this text online for up to 24 hours)

- Select the hyperlinked contents page (left hand side) to see full text (right hand screen)
- Use the navigation buttons **<< previous or next >>** to 'turn' the pages.

**Finding e-books via e-brary**

E-brary books do not appear on the catalogue. They can be found using the following instructions:

- Go to **Online Library** page (see page 2 of this guide)
- Select **e-books** link
- Select **Ebrary** link
- Select **Take me to the Staffordshire University login page**

In the **LEFT HAND** window carry out the following:

- Select the **Advanced** tab
- Search by text keyword by using the first for dialogue box
- Type the keyword *soccer*

Ensure **in** box displays **Text** (use drop down menu to select if necessary).

- Select **and** dialogue box
- Type second keyword *violence*

Ensure **in** box displays **Text** (use drop down menu to select if necessary).

- Select the **Search** button

In the **RIGHT HAND** screen you will receive a list of results:

- Select the title of any book to view its full text

NB: You can do author and title searches (use drop down menus to select keyword or title as appropriate).

### 3. Finding full text e-journals using SwetsWise

#### What is SwetsWise?

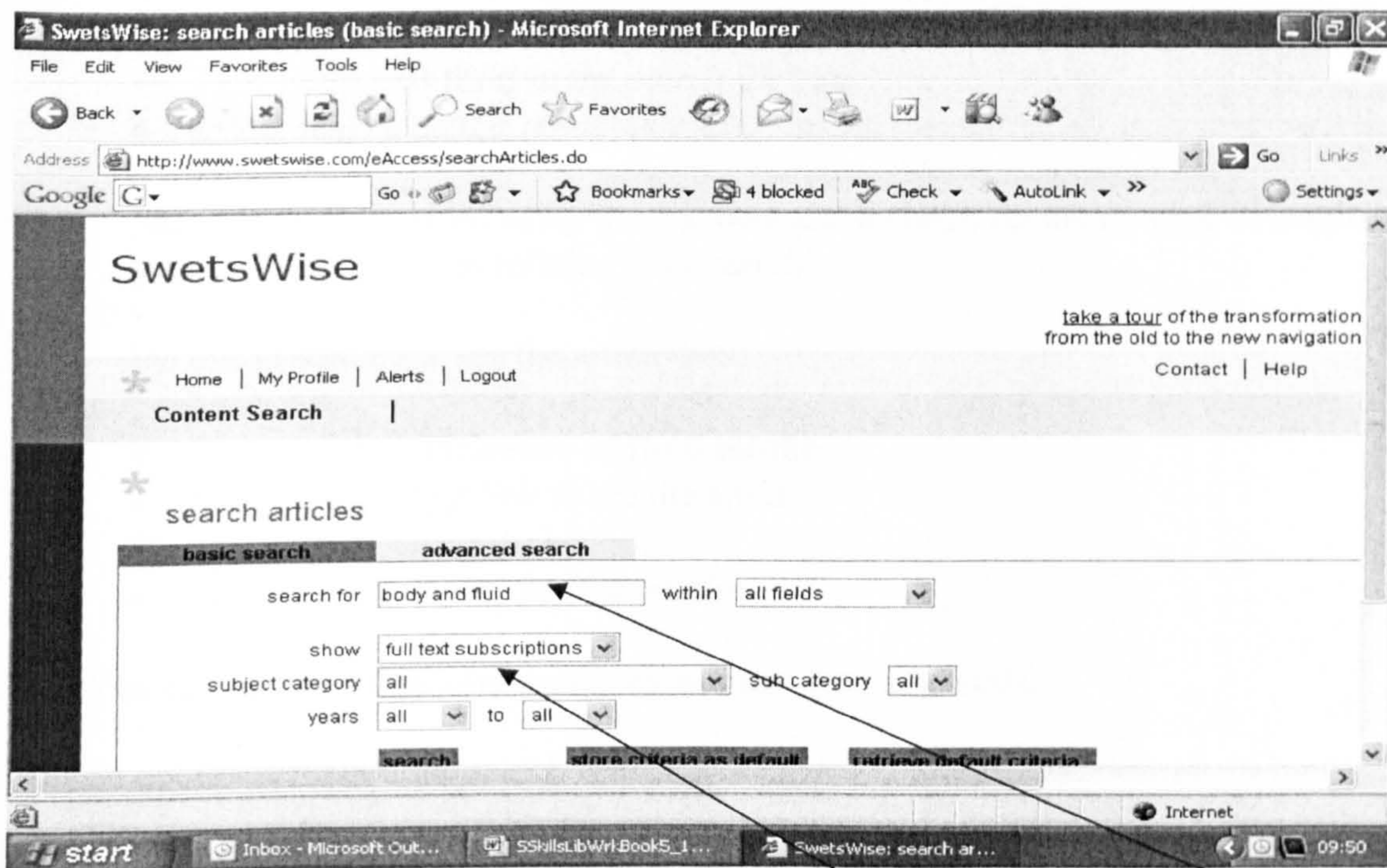
SwetsWise is a full-text database of a large number of journals to which we subscribe in print from different publishers. The database includes all material from the print journals with the exception of adverts and editorial board lists. It covers all subject areas including sport and exercise.

#### How do I access it?

From the **University homepage** visit the following links, **University Services> University Libraries> Online Library> Access Staffordshire University e-resources > S > SwetsWise e-journal service**

(NB for off-campus access you will need to enter your student login when prompted)

You now have a number of search options (for more detailed help regarding **SwetsWise** use the **? (Help)** link (top right of the search page)



Articles in e-journals can be found in a number of ways for example by using the **search for** dialogue box to search by single keyword, combine keywords, phrase search or by combining all these into a sophisticated search as shown below:

To Ensure that FULL TEXT ONLY links are found select **full text subscriptions** from the drop down menu

1. Simple keyword search:

## Appendix 18

For example, say you wanted to find some information on *fluid*.

- Type *fluid* in the search for: box.
- Select Search or press Return

NB: A single keyword will retrieve many results – many will be irrelevant. You need to narrow your search!

- Narrow your search (ie, retrieve more relevant results) by adding - combining - another keyword.

### 2. Combining keywords

To do this you need to think of a keyword that will narrow your subject/ topic area down a little - perhaps you want information on *body fluid*.

To combine keywords in Swetswise you need to use a special term called a search connector the most common are 'and', 'or', 'not'.

To retrieve records which contain BOTH keywords you use 'and'  
Therefore, the search you type in will be: *body and fluid*

- Type **body and fluid** in the search for box
- Select search button

NB: Adding a keyword using the and operator REDUCES the number of results you retrieve (known as refining your search).

Do this procedure to see the article text:

- Go to article 3 **Influence of fluid intake...**
- Select the full text link to see the article.
- Scroll down
- Select PDF button to see the article.

NB: You can further refine your search by adding more keywords.

To find out more about other search connectors use the ? Help links.

### 3. Truncation

- Use \* to search for a word and its variants
- Electrolyt\* will retrieve records which contain the word electrolyte or electrolytes or electrolytic all at once

### 4. Phrase searches

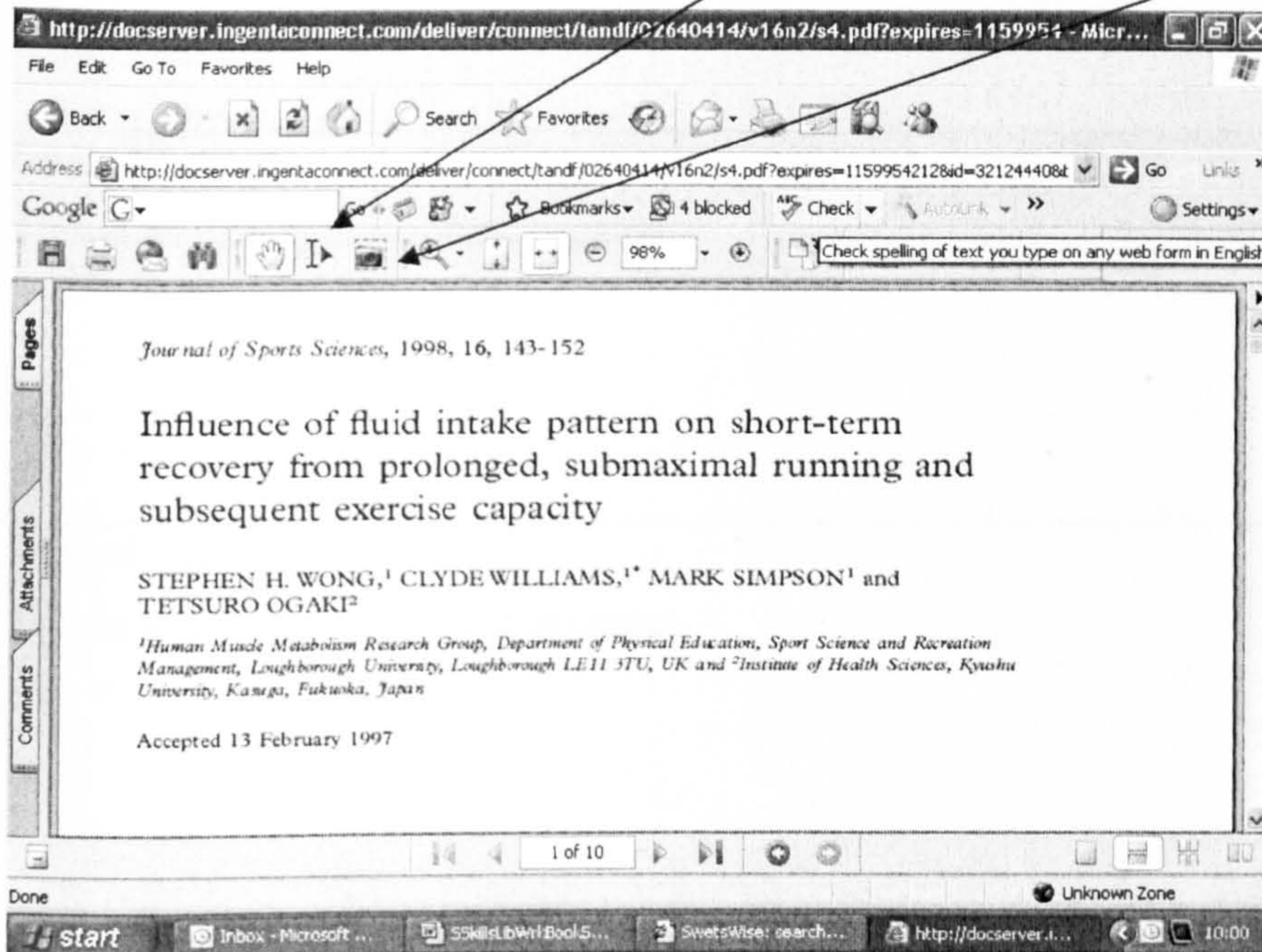
- Use quotation marks "" when searching for a phrase.

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- Type for example, “*stadium violence*” in the **search for:** box ensuring that your phrase is enclosed in quotation marks as shown to retrieve articles containing that phrase.
- Select the full text link to see article using Adobe Acrobat

### Copying and pasting using Adobe Acrobat

You can copy blocks of text using **Select Tool** or images using the **Snapshot Tool**.



### Using the **Select Tool** on the **Acrobat** toolbar

- Highlight the text you wish to copy (up to one full page)
- In **Menu** select **Edit** and then **Copy**
- Open a **Word** document (or use existing document)
- Paste text into document

You can copy images (graphs, diagrams, pictures, charts etc.) by using the **Snapshot Tool** which can be found on the **Acrobat** toolbar

- Select Snapshot Toolbar
- Select the diagram you wish to copy
- Select **OK**
- Open a **Word** document (or use existing document)
- Paste image into document

## Appendix 18

### Independent Learning: Activity 1 – Finding information

You need to fill in all the details for each resource you have found and state your reasons for the choice you have made (based on the Berkley evaluation criteria provided. See Appendix A for examples of references and their evaluations).

<b>Resources</b>
<b>Book 1 details:</b> This is an excellent resource because:
<b>Book 2 details:</b> This is an excellent resource because:
<b>Journal article 1 details:</b> This is an excellent resource because:
<b>Journal article 2 details:</b> This is an excellent resource because:
<b>Web page or site 1 details:</b> This is an excellent resource because:
<b>Web page or site 2 details:</b> This is an excellent resource because:

Appendix A**Example of resources and their evaluations**

Book details: Kerr, J. H. (1994). *Understanding soccer hooliganism*. Buckingham: Open University Press.

This is an excellent resource because: It focuses on many aspects of football (soccer) hooliganism. It is underpinned with a recognised psychological theory and seeks to understand the nature of hooliganism. The author is a university professor with a recognised background in sport psychology. It contains many examples to illustrate points made and has an extensive bibliography for further research. Though now 12 years old it remains a relevant and useful book.

Journal article details: Inthorn, S. (2002). The death of the Hun?: National identity and German press coverage of the 1998 World Cup. *European Journal of Cultural Studies*, 5 (1), 49-68.

This is an excellent resource because: It appears in a peer reviewed journal and the author is based at Cardiff University. The article is scholarly in nature and looks at how the German media reported hooliganism. It is analysed from a sociological perspective. It is highly relevant and contains many citations with a substantial bibliography.

Web page or site details: University of Leicester, Sir Norman Chester Centre for Football Research (2002). *Fact Sheet 1: Football and Football Hooliganism*. Retrieved from the web October 2006.

<http://www.le.ac.uk/footballresearch/resources/factsheets/fs1.html>.

This is an excellent resource because: It is produced by the University of Leicester and gives a comprehensive background to football violence and its causes with many facts backed up by properly cited figures. It has a substantial bibliography with links to other information related to football. It has a date mark with contact details including an e-mail address.

## Appendix 18

### Independent Learning: Activity 2 - Using electronic resources: Reflective Practice

#### Background

You have now visited a number of electronic resources, found information and evaluated it.

We would like you to write a statement that reflects your reaction to what you have learned. For this extended paragraph (150 word approx.) you should cover some of the following types of areas by asking yourself the questions:

What new knowledge have I acquired since using the Library Catalogue, Swetswise e-journals and the web?

What new knowledge I have learnt from the Berkley web site regarding evaluating information.

How do I think I will incorporate this new knowledge when I come to look for information on sport related topics in the future?

Has this material simply reinforced existing knowledge or have I acquired new knowledge? (See Appendix 2 for an example of a reflective practice statement)

**Reflective practice on using the electronic resources: A personal statement by**

.....



**Appendix 2**

**Below is a sample statement. This may be helpful in giving you an idea of the type of statement that we are after. Of course your statement will be reflective of your own personal experience and in YOUR OWN WORDS.**

**Reflective practice on using the electronic resources : A personal statement by Robert Charlton**

Having visited the Thompson Library and the Online Library, I consider that whilst I can use libraries and navigate web pages, I didn't realise the wealth of information provided by the library both on the shelves and on the Online Library web pages nor how to get to it. I need to revisit these resources and familiarise myself with the contents as soon as I can. I would say that the most important thing I have learnt is that the Online Library is an important starting point for researching my assignments!. I'm also looking forward to finding out more about electronic journals and using the online databases. I also appreciate that I need to check information sources (especially web pages) before I use them to make sure that they are relevant and the information can be trusted.

**End of Section E (2)  
You have now completed Section E**

# Appendix 19

## Internet Detective home page

The screenshot shows the Internet Detective website in a Microsoft Internet Explorer browser window. The browser's address bar displays the URL <http://www.vts.intute.ac.uk/detective/>. The website's header includes a navigation menu with links for [HELP](#), [ABOUT US](#), [FEEDBACK](#), [FOR TUTORS](#), and [REFERENCES](#). The main content area features the site's logo, "Internet Detective", with the tagline "Wise up to the Web". A large quote reads: "Sure, you use the Internet all the time, but you need to wise up to the web when you use it for your university or college work." Below this, a call to action states: "USE THIS FREE INTERNET TUTORIAL TO LEARN TO DISCERN THE GOOD, THE BAD AND THE UGLY FOR YOUR ONLINE RESEARCH." A "News" section is visible at the bottom, with a link to a "September 2008: Welsh translation - read the news release (English) or news release". The browser's taskbar at the bottom shows the Start button and several open applications, including Windows Live, Microsoft Office, and the Internet Detective browser window. The system clock indicates the time is 14:15.

# Appendix 20

## OCL Activities

### **Activity 1: Creating evaluation criteria for web sites (week 1)**

For your portfolio assignment (Section E) you need to provide web pages or sites and give reasons (also known as evaluation criteria) why you think they are good.

For this activity last year a student commented that she, '**always ensures that a web page is reliable before using any information on it**'.

**So, how would you decide what makes a reliable, good quality web page?**

**To find out follow the instructions 1 - 9 below:**

1. Have a look at this example:

[http://news.bbc.co.uk/hi/english/static/in\\_depth/programmes/2002/hooligans/](http://news.bbc.co.uk/hi/english/static/in_depth/programmes/2002/hooligans/)

2. Evaluate this web site using a set of detailed criteria – go to this webpage for help:

<http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/Evaluate.html>

3. Read it carefully and make some notes.

4. Once you have read this resource go back to our original message.

5. Select the **reply** button.

6. State briefly what the web page is and paste in the address.

7. Write down how you would evaluate this web page.

8. Write a brief statement about the website under each question as suggested by the Berkeley help site.

9. Select **submit** to post your reply.

**(week 2)**

**Well done to all those who contributed! You have identified some excellent evaluation criteria. Jamie and Geoff have summarised your work below.**

**Have a read of the SUMMARY and then do the next TASK as instructed below.**

### **SUMMARY**

Grant stated that he would evaluate a web site by giving 'a quick overview'.

Jamie and Geoff agree and suggest 5 headings for organising this 'quick overview'. We have also put some of your recommendations under each of these headings.

#### **Authority**

Nathan argued that 'it is important to check the author or who it was created by'. Daniel (Farmer) mentioned that you can do this by finding out 'whether they have a good reliable background'. Kieran pointed out that the author could be 'a major company like Microsoft'. Jamie & Geoff would argue that company or organisation size does not necessarily guarantee information free from bias ask yourself –why is the information there? Finally, Daniel (Calliste) mentioned that when looking at personal pages 'look at their reputation and what they study and research'.

#### **Currency**

Christopher pointed out that we need to be able to work out 'how old the information is' and Daniel recommended that we 'look at the last time the web page was updated especially when stats are involved'.

#### **Relevance**

Carly recommended that when viewing a web page you need to 'look through and see how relevant it is to the information you are after'.

#### **Reliability**

Carly advised that, 'you could evaluate the web page by looking at other pages with the same topic and compare'.

Christopher also identified that valid links are a good indication of reliability. Daniel made the point that you should be able to find 'other sources used' in writing the web page.

#### **URLs**

Carly, Chris, Duane, Stephanie, Kieran and Daniel (Farmer) all mentioned the importance of the URL in working out a web page's origin and reliability.

Daniel mentioned that a good way of judging a web page can be done by 'looking at the URL address and seeing whether it is for example a government source'.

Kieran mentioned that you can get clues from a URL to see whether it is a 'personal website and (therefore) the information may not be a reliable source'.

Jamie and Geoff agree with Daniel and Kieran regarding URLs BUT stress that we need to be more systematic in the way we analyse their structure.

**TASK : To practice analysing a URL follow the instructions 1 – 5 below:**

1. Here is an example web address:

<http://www.le.ac.uk/footballresearch/resources/factsheets/fs1.html>

2. Read the information source BELOW on analysing URLs to break down the sample address into its components.

<http://www.vts.intute.ac.uk/detective/urlclues.html>

3. Do a breakdown and post your answer by replying to this message.

4. If you have time have a look at a fellow students posting.

5. Discuss their answer by posting a reply.

### **Activity 2: Finding and evaluating web sites for your assignment**

(week 1)

You have now created a set of evaluation criteria for judging the suitability of web pages for use in your assignments (we have summarised these and put them into a handout see attached document above [Evaluating web sites criteria\\_handout\\_2006.doc](#)).

Your next task will take place over the next two weeks and helps you complete Section E of your portfolio.

1. This week you need to find two relevant web sites for evaluation.
2. Next week you will be asked to evaluate a fellow student's web sites using the evaluation criteria in the attachment.

#### **Instructions for this week:**

1. Do a Google search for two web pages relevant to football (soccer) and/or football hooliganism
2. Go to this convenient Google link [here](#)
3. Post a reply to this thread with your two chosen web sites.



(week 2)

Thank you for posting your chosen websites which we have listed at the end of this message.

Your task this week is to work with a partner to evaluate one of these web sites using the handout **Evaluating web sites criteria\_handout\_2006.doc** (posted last week) to help you complete Section E of your portfolio. (Note: You will be allocated a partner and web site at the beginning of the task.)

### Instructions (1 – 10) for this week (week 2)

1. Open your allocated web site in a new window
2. Use your handout headings to systematically evaluate the web site
3. Write down a short evaluation
4. Post the evaluation to the Discussion Board
5. Include the web address in your reply
6. Read the evaluation made by your partner
7. What would you add?
8. Do you agree or disagree with your partner evaluation?
9. Make at least one additional comment
10. Post your comment to the Discussion Board

### Your chosen web sites

1. <http://news.bbc.co.uk/sport1/hi/football/default.stm>
2. <http://www.le.ac.uk/footballresearch/resources/factsheets/fs1.html>
3. <http://www.liv.ac.uk/footballindustry/hooligan.html>
4. <http://www.sirc.org/publik/fvhist.html>
5. [www.ex.ac.uk/~waturman/undergrad/rowlands/index.htm](http://www.ex.ac.uk/~waturman/undergrad/rowlands/index.htm)
6. [www.thefa.com/](http://www.thefa.com/)
7. <http://www.hooligansfootball.homestead.com/>
8. <http://news.scotsman.com/topics.cfm?tid=183>
9. <http://www.thefootballfactory.com/>
10. [http://www.sirc.org/publik/football\\_violence.html](http://www.sirc.org/publik/football_violence.html)

We will then summarise your answers and then post these next week.

## Appendix 20

We will also post your web sites with evaluation criteria to the Sport & Exercise blog so that you and your fellow students can use these in the future. We'll tell you more about this in the next two weeks.

### **Activity 3: Using the APA referencing style**

In a previous discussion a student commented that 'a good resource has plenty of references as to where the information is from so that you can follow them up.'

It is good academic practice that, in your assignments, you always reference the sources you have used correctly. The referencing style you must use is from the American Psychological Association (APA).

**To learn how to put references into APA format follow the instructions below:**

1. Here are examples of a book, a journal article and a web page which need converting to the correct format.

A) The book; Depression: Clinical, experimental and theoretical aspects, is published by Hoeber of New York and written by A. T. Beck in 1967.

B) The journal Physiological Psychology, volume 5, pages 355-358 contains the article - On "learned helplessness": The therapeutic effects of electroconvulsive shocks by T. R. Dorworth, & J. B. Overmier which was written in 1977.

C) Psychology with style: A hypertext writing guide (Version 5) written by M. Plonsky in 2004. Taken from the Internet January 10, 2004. It has the following web address; <http://www.uwsp.edu/psych/apa4b.htm>

2. Open this web resource in another window to find out how to reference sources correctly.

<http://www.uwsp.edu/psych/apa4b.htm#A3>

3. Put the three items above A, B and C into the correct format.

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4. Post your answer to the Discussion Board by replying to this message.

3. Have a look at your partner's work.

4. Post a reply to your partner with some constructive criticism.

# Appendix 21

## Fieldwork Timetable

Week 3 (w/b 9<sup>th</sup> October) face to face workshop

Week 4 OCL (online collaborative Learning) evaluation of sources/ critical thinking

Week 5 OCL evaluation of sources/ critical thinking

Week 6 OCL evaluation of sources/ critical thinking

Week 7 OCL (referencing)

Week 8 OCL (referencing)

- **Time allocation**

Ideal scenario

All 6 weeks @ 3.5 days per week = 21 days 2006

Geoff Walton 7/8/06 (updated 19/9/06)

# Appendix 22

### Focus Group Individual prompt sheet

- Show interviewee Loughborough card
- Show interviewee research proposal and give a brief description of the project
- Explain what the first interview is about
- Two areas to look at:
  - Library workshop
  - Online activities
    - IRPA
    - Online Activity 1: Creating evaluation criteria

### Thinking about the Library workshop

1. What do you remember about the Library workshop?
2. What activities did you find useful?
3. In what ways did you find the activities useful?
4. What did you find NOT so useful?
5. In what ways did you find the activities NOT so useful?
6. In general: What did you like about the workshop?
7. In general: What did you DISlike about the workshop?

### Thinking about the Instant Reflective Practice Activity

8. What do you remember about the IRPA?
9. How would you describe the instructions to find the IRPA?



10. How would you describe the instructions to do the IRPA?

11. In what ways did you find the IRPA useful?

12. In what ways did you find the IRPA NOT so useful?

13. In general: What did you like about the IRPA?

14. In general: What did you DISlike about the IRPA?

**Thinking about Online Activity 1: Creating evaluation criteria**

15. What do you remember about the Online Activity?

16. How would you describe the instructions to find the Online Activity?

17. How would you describe the instructions to do the Online Activity?

18. In what ways did you find the Online Activity useful?

19. In what ways did you find the Online Activity NOT so useful?

20. In general: What did you like about the Online Activity?

21. In general: What did you DISlike about the Online Activity?

### Focus Group Individual prompt sheet OCL 1 URLs

- Two areas to look at:
  - Online activities
    - IRPA 2
    - Online Activity 1: URLs

#### Thinking about the Online Activity on URLs last week

1. What are your views on the tutor summary which brought together the group's work on Blackboard for the creating evaluation criteria activity?
2. What aspects of it did you find useful?
3. In what ways did you find it useful?
4. What did you find NOT so useful?
5. In what ways did you find the summary NOT so useful?
6. In general: What did you like about the summary?
7. In general: What did you DISlike about the summary?

#### Thinking about Online Activity 1: URLs

8. What do you remember about the Online Activity (which followed on from the summary)?
9. How would you describe the instructions TO FIND the Online Activity?
10. How would you describe the instructions TO DO the Online Activity?

11. In what ways did you find the Online Activity useful?

12. In what ways did you find the Online Activity NOT so useful?

13. In general: What did you like about the Online Activity?

14. In general: What did you DISlike about the Online Activity?

**Thinking about the Instant Reflective Practice Activity**

15. What do you remember about the IRPA?

16. How would you describe the instructions TO FIND the IRPA?

17. How would you describe the instructions TO DO the IRPA?

18. In what ways did you find the IRPA useful?

19. In what ways did you find the IRPA NOT so useful?

20. In general: What did you like about the IRPA?

21. In general: What did you DISlike about the IRPA?

22. Is there anything else you would like to say about any of what we have talked about?

**BOOK NEXT SESSION**

### Focus Group Individual prompt sheet OCL 2

- Two areas to look at today:
  - Online activities
    - Online Activity 2: Finding web pages
    - IRPA 3

#### Thinking about Online Activity 2: Finding web pages

1. What do you remember about the Online Activity (which followed on from the summary)?
2. How would you describe the instructions TO FIND the Online Activity?
3. How would you describe the instructions TO DO the Online Activity?
4. In what ways did you find the Online Activity useful?
5. In what ways did you find the Online Activity NOT so useful?
6. In general: What did you like about the Online Activity?
7. In general: What did you DISlike about the Online Activity?

#### Thinking about the Instant Reflective Practice Activity

8. What do you remember about the IRPA?
9. How would you describe the instructions TO FIND the IRPA?
10. How would you describe the instructions TO DO the IRPA?

11. In what ways did you find the IRPA useful?

12. In what ways did you find the IRPA NOT so useful?

13. In general: What did you like about the IRPA?

14. In general: What did you DISlike about the IRPA?

15. Is there anything else you would like to say about any of what we have talked about?

**BOOK NEXT SESSION**

### Focus Group Individual prompt sheet OCL 2 second task

- We will be focusing on two aspects of OCL 2 second task:
  - Online Activity 2: Finding web pages
  - The handout

#### Thinking about Online Activity 2: Finding web pages

1. What do you remember about the Online Activity?
2. How would you describe the instructions TO FIND the Online Activity?
3. How would you describe the instructions TO DO the Online Activity?
4. In what ways did you find the Online Activity useful?
5. In what ways did you find the Online Activity NOT so useful?
6. In general: What did you like about the Online Activity?
7. In general: What did you DISlike about the Online Activity?

#### Thinking about the handout

8. In what ways did you find the handout useful?
9. In what ways did you find the handout NOT so useful?
10. What changes would you make to it?

11. In general: What did you LIKE about the handout?

12. In general what did you DISlike about the handout?

**Thinking about the online discussion itself**

13. Did you manage to comment on a fellow student's posting?

YES/ NO

If YES go to 14

If NO go to 18

14. What did you comment on?

15. Did your colleague reply?

16. In what ways did you find this part of the activity useful?

17. In what ways did you find this part of the activity NOT so useful?

18. Is there anything else you would like to say about any of what we have talked about today?

**BOOK NEXT SESSION**

**Focus Group Individual prompt sheet OCL 3 APA**

- One area to look at:
  - Online activities
    - Online Activity 3: APA referencing style

**Thinking about Online Activity 1: referencing sources using APA**

1. What do you remember about the Online Activity?
2. How would you describe the instructions TO FIND the Online Activity?
3. How would you describe the instructions TO DO the Online Activity?
4. In what ways did you find the Online Activity useful?
5. In what ways did you find the Online Activity NOT so useful?
6. In general: What did you like about the Online Activity?
7. In general: What did you DISlike about the Online Activity?
8. Is there anything else you would like to say about any of what we have talked about?

**BOOK NEXT SESSION**



# Appendix 23

## Focus Group: Interview Schedule

Thank you for agreeing to take part in this group. As you know this is part of the data gathering process for my PhD research supported by Jamie Barker.

This is an informal focus group and will last no longer than one hour.

Anonymity will be preserved – your names will not appear anywhere in the final report and/ or published papers etc.

The purpose of this meeting is to explore some of the issues raised by fellow students either in the one-to-one interviews or via questionnaire concerning the Discussion Board activities you engaged in last semester.

It is not a test.

There are no right or wrong answers.

Please feel free to criticise.

If you do have a criticism please try to give reasons for your view.

Your views will be used to shape the development and future delivery of the programme.

### **Thinking about the Discussion Board Activities.**

1. One student said that they felt they had ‘done something productive when you post your reply to the forum’

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

2. Another student said that it was ‘really good being able to see what everybody thought of the web site.

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

## Appendix 23

3. Over 75% of student respondents said they found the evaluation activities the most useful

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

4. A student mentioned that s/he liked 'how we were allowed to practise our skills on our own.

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

5. Another said the skills learnt in the online activities would 'prepare us for years 2 and 3.

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

6. A student said that they found the activities 'a bit tedious'. Another said they found the activities 'repetitive'.

How would YOU make them less tedious and repetitive?

**Thinking about the summaries we [Jamie and I] put together from your postings which we then turned into a handout.**

7. Half of students said they had looked back at the summary particularly at the evaluating web sites criteria. Those students said they found the summary handout 'useful'.

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

**Thinking about the Instant Reflective Practice Activities (IRPAs)**

8. One student said they found them 'not useful'.

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

9. Another said they 'didn't learn anything' from them.

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

10. Another said they found them good because they allow you to remember what you have done and what you need to improve on.

How would you respond to that?

Would you agree?

Why?

Would you disagree?

Why?

13/2/07

# Appendix 24

## **Interview schedule for Module Leader 5<sup>th</sup> March 2007**

Ensure that interviewee is comfortable and remind him of the purpose of the interview which is to gain his thoughts regarding the IL OCL activities that were delivered as part of the ELICS module in Semester 1 of 2006.

1. What do you think was successful about the project?

Supplementary prompts:

Why?

Could you explain?

What do you mean?

2. What do you think wasn't successful?

Supplementary prompts:

Why?

Could you explain?

What do you mean?

3. How will we 'sell' the OCL process to other staff who teach on the module?

Supplementary prompts:

Why?

Could you explain?

What do you mean?

4. How do you see the future in terms of the IL delivery for ELICS?

Supplementary prompts:

Why?

Could you explain?

What do you mean?

# Appendix 25

Sport, Health & Exercise

Study Skills Portfolio 2006-2007

Section E

**Independent Learning: Activity 1 – Finding information**

Resources

Book 1 details: Hare, Geoff. (2003). Football in France: A Cultural History.

This is an excellent resource because: it looks at a whole host of different aspects of French football, but most importantly, Hooliganism. It gives a detailed account of football hooliganism in France and is very informative. The author is well respected and this gives the book more esteem. There is also a number of case studies referenced and a bibliography for anyone wanting to do further research. The book is only 3 years old which means it is extremely up to date.

Book 2 details: Dunning, Eric. (1999). Sport Matters: Sociological Studies of Sport, Violence and Civilisation.

This is an excellent resource because: it looks at violence and hooliganism in sport from a sociological perspective, something which is not commonly done. It looks at why humans behave in a violent way and links it back to early civilisation. It is from a well respected author which gives it more weight and clarity. It was published in 1999 which means it is quite recent and up to date.



Journal article 1 details: Houlihan, Barrie. (1990). The politics of sports policy in Britain: the examples of football hooliganism and drug abuse. 9 – 1 – 55.

This is an excellent resource because: it is a publication as part of the Journal of the Leisure Studies Association. It was published by Routledge who is part of part of Taylor and Francis. The journal 'explores the development of policy towards football hooliganism and drug abuse by athletes'. It was published in 1990 but is still highly relevant in today's climate.

Journal article 2 details: Stott, Clifford & Pearson, Geoff. (2006). Football Banning Orders, Proportionality, and Public Order Policing .45 - 3 - 241

This is an excellent resource because: it is published by the Howard Journal of Criminal Justice. Its publisher is Blackwell Publishing. The article looks at the UK legislation on football banning orders and gives a critical analysis of it. The point that makes this article particularly good is the fact that it asks questions about whether football banning orders work as a deterrent to football hooliganism. It was published this year which makes a fantastic piece of updated text to work from.

Web page or site 1 details: <http://www.liv.ac.uk/footballindustry/hooligan.html>

Appendix 25

This is an excellent resource because:

The breadth of this article is very good. It explains the ins and outs of football hooliganism so it would be interesting for some one who knew very little about football hooliganism but at the same time it would still have relevance for a person who was knowledgeable about football hooliganism.

It also has a number of detailed references which show that the information being supplied is coming from reliable resources.

Web page or site 2 details: [http://www.sirc.org/publik/football\\_violence.html](http://www.sirc.org/publik/football_violence.html)

This is an excellent resource because:

The breadth of this article is very good. It covers all aspects of football hooliganism giving an intro and then describing all the different aspects of football hooliganism from theory and research perspectives to media coverage and racism.

The intended audience of this article is for anyone interested in finding out about football hooliganism. However I would have to say that the language used in this article is slightly more complex than the previous internet article on football hooliganism.

The book that the article was taken from was written in 1996 meaning that this is a pretty recent article and because of this and the reliability of the references being that they came from a book I would say that this is an article to be taken seriously.

$\frac{19}{6} = 3.18$

3

Spread = 5

$28 = 4.66 \quad \lceil \underline{30} = 5 \rceil$

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06146135

**Independent Learning: Activity 2 - Using electronic resources: Reflective Practice****Reflective practice on using the electronic resources: A personal statement by  
06146135**

After visiting the Thompson Library and Online Library, I have acquired a vast amount of knowledge of the wealth of information available both on the shelves in the library and online. This section of work has taught me how to reach all this information – something I had no idea how to do before – and what to look for when deciding if the book/journal is a useful and relevant resource. I would say that the most important thing I have learnt for sure is that the online library is the best starting point when researching an assignment in the future. A final and key factor I learnt from this work is that I need to look at the relevance of information on web pages, and evaluate them before diving in straight away and using the information.

# Appendix 26

## ***Tutor Summary***

---

**Well done to all those who contributed! You have identified some excellent evaluation criteria. Jamie and Geoff have summarised your work below.**

### **SUMMARY**

Woody stated that he would evaluate a web site by giving 'a quick overview'.

**Jamie and Geoff agree and suggest 5 headings for organising this 'quick overview'. We have also put some of your recommendations under each of these headings.**

#### **Authority**

John argued that 'it is important to check the author or who it was created by'. George mentioned that you can do this by finding out 'whether they have a good reliable background'. Ozzy pointed out that the author could be 'a major company like Microsoft'. **Jamie & Geoff would argue that company or organisation size does not necessarily guarantee information free from bias ask yourself –why is the information there?** Finally, Ringo mentioned that when looking at personal pages 'look at their reputation and what they study and research'.

#### **Currency**

Paul pointed out that we need to be able to work out 'how old the information is' and George recommended that we 'look at the last time the web page was updated especially when stats are involved'.

#### **Relevance**

Sandy recommended that when viewing a web page you need to 'look through and see how relevant it is to the information you are after'.

#### **Reliability**

Jody advised that, 'you could evaluate the web page by looking at other pages with the same topic and compare'.

George also identified that valid links are a good indication of reliability. Daniel made the point that you should be able to find 'other sources used' in writing the web page.

Sandy, George, Lemmy, Maddy, Ozzy and Ringo all mentioned the importance of the URL in working out a web page's origin and reliability.

Ringo mentioned that a good way of judging a web page can be done by 'looking at the URL address and seeing whether it is for example a government source'.

Ozzy mentioned that you can get clues from a URL to see whether it is a 'personal website and (therefore) the information may not be a reliable source'.

**Jamie and Geoff agree with Ringo and Ozzy regarding URLs BUT stress that we need to be more systematic in the way we analyse their structure.**

# Appendix 27

## Evaluating web sites criteria.

Use these criteria to carry out a quick overview of web sites to check their quality.

### Authority

It is important to check the author or who it was created by. You can do this by finding out whether they have a good reliable background. Remember that company or organisation size does not necessarily guarantee quality information that is free from bias. Ask yourself –why is the information there? Finally, when looking at personal pages investigate the author's reputation and what they study and research.

### Currency

You need to check how old the information is by looking at the last time the web page was updated. This is especially important when using statistics or other facts from your chosen web page.

### Relevance

You need to work out quickly how relevant it is to your assignment.

### Reliability

You can evaluate the web page by looking at other web pages with the same topic and compare. Unbroken links are a good indication of reliability. By the same token broken links may indicate an unreliable source. In addition, you should be able to easily find other sources referred to in the web page.

### URLs (web addresses)

These are useful for working out a web page's origin. It is a very quick way of judging a web page.

Here is an example URL

[www.le.ac.uk/footballresearch/resources/factsheets/fs1.html](http://www.le.ac.uk/footballresearch/resources/factsheets/fs1.html)

**www.le.ac.uk** = server name

**ac** = top level domain organisation code this denotes an academic website

Examples of other domains codes:

- **.ac, .edu** academic or educational servers
- **.co, .com** commercial servers
- **.gov** government servers
- **.org** non-governmental, non-profit making organisations

**uk** = country code, i.e. based in the United Kingdom

Examples of other country codes:

- **.au** Australia
- **.ca** Canada
- **.de** Germany
- **.fr** France

**footballresearch** = directory

**/resources** = sub directory **factsheets** = sub directory

**fs1.html** = file name (html is a type of file suitable for the web).

By deleting part of the URL (leaving [www.le.ac.uk/](http://www.le.ac.uk/) showing) will take you to the homepage, a good way of finding out more about the originator.

# Appendix 28



## Appendix 28

### Pre-delivery scores

Group A (experimental group) scores	Group B (intermediate group) scores	Group C (control group) scores
n=12	n=11	n=12
33	30	30
32	27	30
32	24	26
29	24	25
28	23	24
28	23	22
26	23	21
26	22	20
26	21	18
24	20	17
22	17	16
18		15
<b>Total</b>	<b>Total</b>	<b>Total</b>
324	254	264

# Appendix 29

## Appendix 29

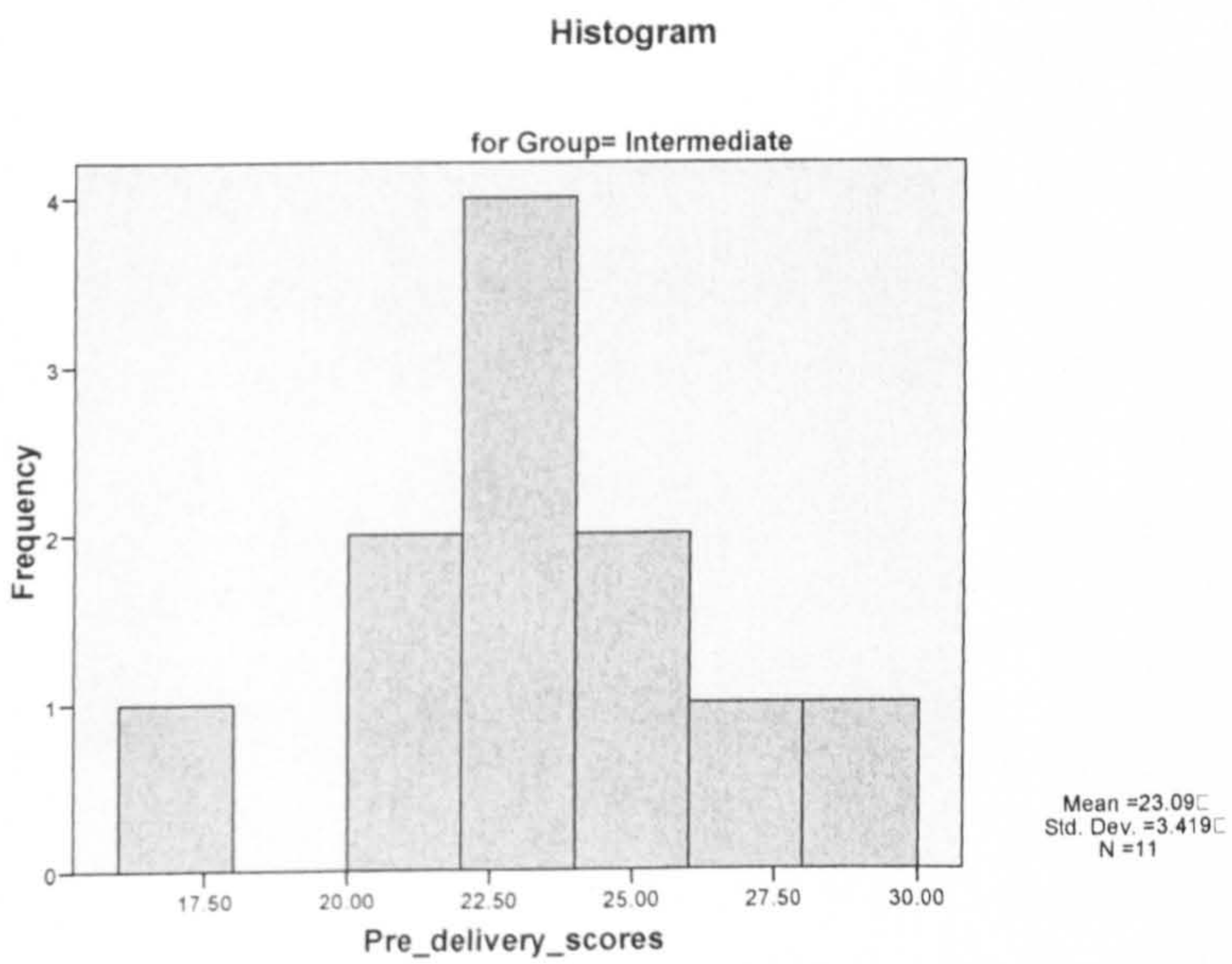
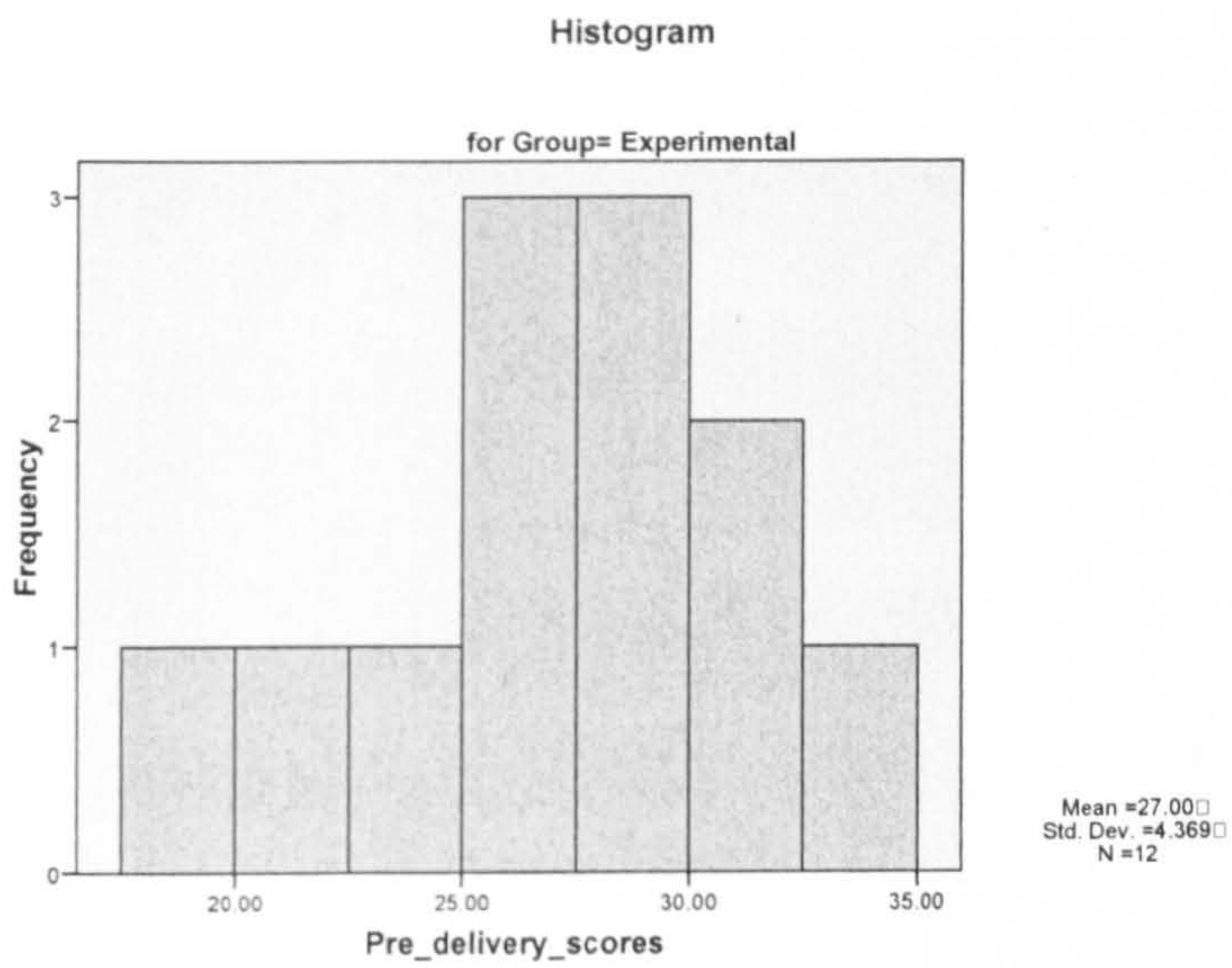
### Post delivery scores

Group A (experimental group) scores	Group B (intermediate group) scores	Group C (control group) scores
n=8	n=8	n=9
39	36	38
38	34	33
37	33	33
36	33	26
34	32	25
33	24	20
30	24	19
27	13	19
		17
<b>Total</b>	<b>Total</b>	<b>Total</b>
274	229	230

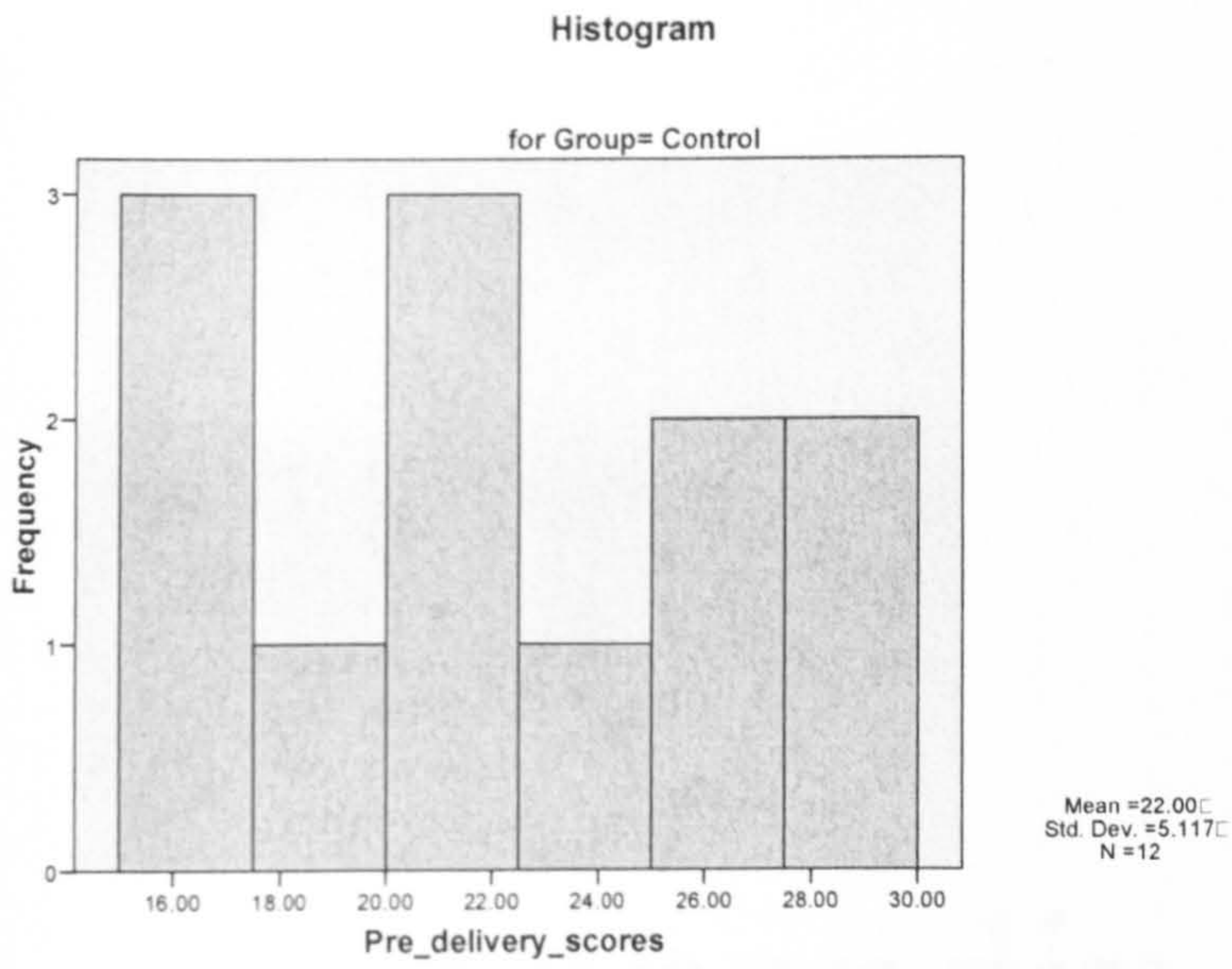
# Appendix 30

# Appendix 30

## Histograms for post-delivery scores



# Appendix 30



# Appendix 31

## Appendix 31

### Multiple Comparisons

Dependent Variable: Pre\_delivery\_scores  
Tukey HSD

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Experimental	Intermediate	3.90909	1.82982	.098	-.5874	8.4056
	Control	5.00000(*)	1.78960	.023	.6023	9.3977
Intermediate	Experimental	-3.90909	1.82982	.098	-8.4056	.5874
	Control	1.09091	1.82982	.823	-3.4056	5.5874
Control	Experimental	-5.00000(*)	1.78960	.023	-9.3977	-.6023
	Intermediate	-1.09091	1.82982	.823	-5.5874	3.4056

\* The mean difference is significant at the .05 level.

### Measures of Association

	Eta	Eta Squared
Pre_delivery_scores * Group	.460	.212

### ANOVA

Pre delivery scores

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	164.977	2	82.488	4.293	.022
Within Groups	614.909	32	19.216		
Total	779.886	34			



# Appendix 32

## Appendix 32

### Multiple Comparisons

Dependent Variable: Post\_delivery\_scores  
Tukey HSD

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Intermediate	5.62500	3.36357	.238	-2.8245	14.0745
	Experimental	8.69444(*)	3.26880	.037	.4830	16.9059
Intermediate	Control	-5.62500	3.36357	.238	-14.0745	2.8245
	Experimental	3.06944	3.26880	.622	-5.1420	11.2809
Experimental	Control	-8.69444(*)	3.26880	.037	-16.9059	-.4830
	Intermediate	-3.06944	3.26880	.622	-11.2809	5.1420

\* The mean difference is significant at the .05 level.

### Robust Tests of Equality of Means

Post delivery scores

	Statistic(a)	df1	df2	Sig.
Welch	4.871	2	13.567	.025

a Asymptotically F distributed.

### ANOVA

Post delivery scores

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	325.843	2	162.921	3.600	.044
Within Groups	995.597	22	45.254		
Total	1321.440	24			

# Appendix 33

Variety of evaluation criteria

Group A (experimental group)	Group B (Intermediate group)	Group C (control group)
n=14	n=11	n=10
7	4	5
5	4	3
4	3	3
4	3	2
4	2	2
4	2	2
3	1	2
3	1	1
3	1	1
3	1	1
2	1	
2		
1		
1		
<b>Mean score for Group A</b>	<b>Mean score for Group B</b>	<b>Mean score for Group C</b>
3.29	2.09	2.20

# Appendix 34

## Appendix 34

### Tests of Between-Subjects Effects

Dependent Variable: Variety of evaluation criteria

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	11.034(a)	2	5.517	2.877	.071	.152
Intercept	218.822	1	218.822	114.107	.000	.781
Group	11.034	2	5.517	2.877	.071	.152
Error	61.366	32	1.918			
Total	309.000	35				
Corrected Total	72.400	34				

a R Squared = .152 (Adjusted R Squared = .099)

# Appendix 35

Frequency of evaluation criteria

<b>Group A (experimental group)</b>	<b>Group B (intermediate group)</b>	<b>Group C (control group)</b>
<b>n=14</b>	<b>n=11</b>	<b>n=10</b>
5.00	4.33	4.67
4.75	4.00	3.00
4.50	3.25	2.83
4.00	3.17	2.83
3.83	3.17	2.50
3.80	2.67	2.50
3.75	2.00	2.33
3.67	2.00	1.67
3.17	2.00	1.50
3.00	1.40	0.83
2.83	1.00	
2.50		
1.50		
1.17		
<b>Mean score for Group A</b>	<b>Mean score for Group B</b>	<b>Mean score for Group C</b>
3.39	2.64	2.47



# Appendix 36

## Appendix 36

### Tests of Between-Subjects Effects

Dependent Variable: Frequency evaluation criteria used

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6.020(a)	2	3.010	2.590	.091	.139
Intercept	274.901	1	274.901	236.535	.000	.881
Group	6.020	2	3.010	2.590	.091	.139
Error	37.190	32	1.162			
Total	335.361	35				
Corrected Total	43.211	34				

a R Squared = .139 (Adjusted R Squared = .086)

# Appendix 37

### Coding strategy

This coding strategy furnished here contains: a list of codes with their letter abbreviation, a table of descriptions of each coding category plus examples, an actual fragment of transcript demonstrating how it was annotated in Word and then by hand to show how the process evolved.

#### *List of codes*

To make annotation of transcripts, questionnaires and assessment data it was decided that the codes be allocated a letter label to make the process more straightforward. The list of codes with their sub-sets are shown here.

- [R] = Roles
- [N] = Norms
- [T] = Tasks
- [K] = Knowledge state
- [C] = Cognitive state
  - [CCo] = Comprehension
  - [CA] = Application
  - [CA<sub>n</sub>] = Analysis
  - [CSyn] = Synthesis
  - [CE] = Evaluation
  - [CC] = Certainty
  - [CU] = Uncertainty
  - [CQ] = Questioning
- [M] = Metacognitive state
- [S] = Style state
  - [SP] = Positive – linked to motivation
  - [SN] = Negative
- [A] = Affective state
  - [AP] = Positive
  - [AN] = Negative
- [B] = Behaviour
  - [BS] = Shared
  - [BCh] = Changed
- [SC] = Source character
- [SB] = Source behaviour

**Coding table**

The codes used, their short tag, brief definition and example in order to analyse the data are set out below.

Code	Short Tag	Brief definition	Example
Roles	R	The 'person-in-context' in which an individual finds him/herself. Any instance which shows the person as a student in the university environment.	<i>"having to find out which books were in the library"</i> <i>"Made our replies on the Forum, we had to feedback on each others."</i>
Norms	N	Represented by the boundaries of the context, how to act in a university or a group situation.	<i>"you've got to respect the other person's opinion"</i> <i>"getting used to everything"</i> <i>"You've got to respect the other person's opinion"</i>
Tasks	T	The activities experienced within the pedagogical interventions such as, lectures, seminars, group work or individual work or reports of the ultimate goal, i.e., an assessment	<i>"I went into the link about what you should look for when you go onto the internet websites and using them as references"</i> <i>"Went through different web sites"</i> <i>"I think it asked us to check the strength of the website?"</i> <i>"essays and lab report I'm doing at the moment"</i> <i>"assignment"</i>

## Appendix 37

Code	Short Tag	Brief definition	Example
Knowledge state	K	remembering and retaining information exemplified by students expressing what they know or remember by describing, repeating and defining	<i>"Evaluating web sites – looking at URL e.g. .com/ .uk-taught me that website URLs mean something important"</i> <i>"I have acquired new knowledge on the library catalogue"</i> <i>"I know how to look for e-journals"</i>
Cognitive state	C	Reflects the thinking processes associated with situations	No example: this was disaggregated into the sub-divisions below
Comprehension	CCo	Interpreting and understanding, exemplified by students describing information in their own words, tell how they feel about it, say and/ or explain what it means	<i>"university search engine"</i> and <i>"search catalogue"</i> . <i>"we did the exact journals"</i>
Application	CA	Demonstrated by using the information to solve a problem or demonstrate its use in some way for example, using an evaluation criterion.	<i>"It is produced by the University of Leicester"</i> <i>"backed up by properly cited figures."</i> <i>"substantial bibliography"</i>
Analysis	CAn	Shown by students identifying the constituent parts of the information, its order, its causes, the problems and/ or solutions it generates	<i>"Gives a comprehensive background to football violence"</i> <i>"Looks like a decent website"</i> <i>"well supported and linked to reliable reports"</i>

## Appendix 37

Code	Short Tag	Brief definition	Example
Synthesis	CSyn	Exemplified by students identifying how the information may be different, what is missing, how it can be improved or developed or how the information can be re-created	<i>"Authority, I don't find as important. It could be written by the government or the FA or something and they could make a pretty stand up point, but you could have a 3<sup>rd</sup> year student from a university make just as good a point and just as relevant."</i>
Evaluation	CE	Demonstrated as judging and assessing exemplified by students stating how they will judge the information and pose the question, does it succeed in its purpose	<i>"judge", "deciding" "critically evaluating" "have learnt how to judge how good a book or a journal is"</i>
Cognitive Certainty	CC	Exemplified by statements which show feelings of knowing something or how to do something	<i>"It helped because I didn't know how to use the system before" "it got easier" "now, obviously, when I'm looking for references in the future I'm going to look and see whether it is from a big company"</i>
Cognitive Uncertainty	CU	Exemplified by statements which show a lack of confidence in the situation	<i>"I didn't understand it" "I found it a bit difficult"</i>

## Appendix 37

Code	Short Tag	Brief definition	Example
Cognitive Questioning	CQ	Where students show that a question has been raised in their minds either about their work or others	<i>"I was writing about how he hadn't writ about all the actual points"</i> <i>"You got to see what you was missing"</i> <i>"it's a bit of an eye opener when somebody says you should have done this, gets you thinking"</i>
Metacognitive state	M	Here this is evidenced by a realisation that something new has been learnt	<i>"I have realised that these sources [...]"</i> <i>"I learnt quite a few things"</i>
Style state	S	The disposition or level of self-efficacy or motivation individuals have towards a certain situation	No example, expressed positively or negatively as shown below.
Positive style state	SP	Style state expressed positively	<i>"You can get involved in the sessions yourselves, more hands-on"</i> <i>"you feel you've done something productive"</i>
Negative style state	SN	Style state expressed negatively	<i>"I can't learn from a lecture"</i> <i>"it didn't really learn me (sic) anything."</i>
Affective state	A	The emotional disposition of an individual towards the learning situation	No example, expressed positively or negatively as shown below



## Appendix 37

<b>Code</b>	<b>Short Tag</b>	<b>Brief definition</b>	<b>Example</b>
Positive affective state	AP	Affective state expressed positively	<i>"I think it was quite interesting gets you involved as well and that side of it was quite fun"</i> <i>"That was pretty good"</i>
Negative affective state	AN	Affective state expressed negatively	<i>I didn't enjoy that much"</i>
Behaviour	B	Primarily concerned with the physical activities in which individuals engage	<i>"searching", "find out", "put", "taking the information", "look at", "read the article"</i>
Behaviour shared	BS	Shows that students were readily working with and sharing ideas or information with others.	<i>"We bounced [ideas] off each other", "for other people to see", "other person", "everyone", "another student"</i>
Behaviour changed	BCh	Indications that students had changed their behaviour in using sources, information or evaluating information	<i>"I have been able to find much more in-depth information"</i> <i>"I look for where it comes from now"</i> <i>"I have used the evaluation criteria actually"</i>
Source character	SC	The different types of information source students identify as useful	<i>"links"</i> <i>"sources"</i> <i>"articles"</i> <i>"university search engine"</i> <i>"e-journals"</i>

Code	Short Tag	Brief definition	Example
Source behaviour	SB	How the 'information source' responds to a user and can be characterised as enabling contact with artefacts	<p><i>"You get the matches when you put the words in there", "being able to search from the keywords"</i></p> <p><i>"online library will allow me to view if certain books are available"</i></p> <p><i>"The way you [the tutor] went through everything with us"</i></p>

### **Coding routine**

In the first 'sweep' through the data coding tags were added in squared brackets [X] and the document was then amended. The coding tag was placed at either end of the transcript fragment thus: *"Yeah, we searched it [B] to look at [B]"* to bracket off the datum.

Here is an example from the transcript to illustrate how it was annotated:

-----  
**K\_1** 00:56 Oh yeah, the football hooliganism and everything. Oh yeah, we [B] searched [B] football hooliganism, was it on the [SC] university search engine [SC]? Yeah, we searched it [B] to look at [B] [SC][K]articles[SC][K] then you like made us write down words that we thought would be in the [SC]search catalogue[SC] and then I said Millwall and that came up and I just remember [B]searching[B] a lot of words and then [K]football hooliganism[K] and getting a couple of [SC][K]articles[SC][K] and that and from there...what did we do from there? Didn't we have to answer a few questions about it?  
 -----

## Appendix 37

In the second and subsequent 'sweeps' through the transcript the amended document was annotated by hand.

Here is the same example again showing how the transcript was subsequently annotated (including dates) using hand written annotations:

---

K\_1 00:56 Oh yeah, the football hooliganism and everything. Oh yeah, we [B] searched [B] football hooliganism, was it on the [SC] university search engine [SC]? Yeah, we searched it [B] to look at [B] [SC][K]articles[SC][K] then you like made us write down words that we thought would be in the [SC]search catalogue[SC] and then I said Millwall and that came up and I just remember [B]searching[B] a lot of words and then [K]football hooliganism[K] and getting a couple of [SC][K]articles[SC][K] and that and from there...what did we do from there? Didn't we have to answer a few questions about it?

SB  
11/8/07

6/8  
implied  
input i.e.  
behaviour

CV / CP ?  
type of B 11/8/07

K\_1 Q Can you remember doing anything else?

---