

**POSTGRADUATE PERSPECTIVES
OF DISTANCE E-LEARNING:
A QUALITATIVE CASE STUDY OF
ONLINE DISTANCE LEARNING
IN OCCUPATIONAL SAFETY AND
HEALTH**

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List of Abbreviations and Acronyms

Term	Full text
AC	Abstract conceptualisation
AE	Active experimentation
CAA	Computer aided assessment
CAF	Computer aided feedback
CAQDAS	Computer Aided Qualitative Data Analysis Software
CE	Concrete experience
CMC	Computer Mediated Communication
CPD	Continuing Professional Development
DG	Discussion Group
EHO	Environmental Health Officer
e-learning	electronic learning
GEMISIS	Government, Education, Medical, Industrial, & Social Information Superhighway
GOLDPhase	GEMISIS Online Distance Learning Pilot Health and Safety Environment
HTML	Hypertext Mark-up Language
ICT	Information and Communication Technologies
ISP	Internet Service Provider
IT	Information Technology
Kolb's LSI	Kolb's Learning Styles Inventory
MLE	Managed Learning Environment
MSc/Pg Dip.	Master of Science/Postgraduate Diploma
OLS	Online Symposium

Term	Full text
OSH	Occupational Safety and Health
RO	Reflective observation
RQ	Reflective Question
SAQ	Self Assessment Question
S-R	Stimulus-Response
UKOU	United Kingdom Open University
VLE	Virtual Learning Environment
WWW	World Wide Web

Title of Thesis and Abstract

Postgraduate Perspectives of Distance E-learning: A Qualitative Case Study of Online Distance Learning in Occupational Safety and Health

Heather Williams

Abstract

The use of the Internet as a medium for education has grown exponentially since the mid-1990s. Institutions of higher education are increasingly offering online access to distance education programmes, especially at postgraduate level. Some see e-learning as offering solutions to many problems traditionally associated with distance education.

Research into e-learning at a distance has largely focussed on the effectiveness of differing technologies for the delivery of online courses, the emphasis being upon the technology itself, with few studies examining the student experience of this new phenomenon. It is therefore argued that a gap exists, as the views of distance e-learners at postgraduate level have seldom been paid attention, with their specific and individual needs failing to be addressed. This study aims to rectify this gap by examining postgraduates' experiences of e-learning at a distance. The purpose of the study is to inform the future development of e-learning at postgraduate level and help determine how higher education can best support this rapidly expanding group of learners.

The research presents a qualitative case study of a group of students studying modules from the University of Salford's MSc/Postgraduate Diploma in Occupational Safety and Health in a virtual learning environment called GOLDPhase, which was specifically designed and developed to facilitate the study.

Issues related to the students' heightened awareness of their peers, their sensitivity to tutor feedback, and the learning strategies they adopted are identified and discussed. The findings show that e-learning engendered a range of barriers and enhancements for this group of distance learners. The enhancements were largely computer based and barriers were mostly sociological.

The findings have implications for both online teaching and online learning strategies. As distance e-learning is in its infancy the study will increase overall understanding in this area and contribute to the growing body of knowledge.

Chapter 1

Introduction to the Study

Distance education has undergone immense changes since the mid 1990s. Information and communication technologies are transforming higher education and potentially allowing learners access to any course, from any university in the world, at any time, and in any location (Bates and Escamilla de los Santos, 1997; Collins, 1998). However, using technology to deliver distance education to 'borderless markets' (Mayes, 2001) presents new challenges for higher education and for its students (Dearing, 1997). Whilst the Internet has provided opportunities to reach wider markets, both nationally and internationally, it has at the same time increased competition (Dearing, 1997; Kaplan, 1997; Waldvogel, 1999), both from existing providers in the public and private sectors and the emerging virtual universities. However, pressure to deliver online courses, coupled with inexperience in using the technology, has created many challenges, both for educational institutions and for tutors, who frequently fail to consider the needs of the e-learner (Thomas *et al.*, 1998; Beaudin, 1999). Thus, if educational institutions want to preserve and improve their reputations, retain their students, and remain competitive in this new and expanding market they need to gain an understanding of the needs of the online learners (Rangecroft *et al.*, 1999).

This study examines the experiences of a group of students studying modules from the University of Salford's Master of Science/Postgraduate Diploma in Occupational Safety and Health via distance e-learning. This chapter introduces the study by describing its background and context and introducing the area of concern. The purpose of the research, the research questions, and how the study proposes to address them are presented and the contribution to research is stated. Finally, the chapter provides an overview of the structure of the thesis and a brief description of each of the chapters.

1.1 Background to the research

It is important at this early stage in the thesis to explain the context from which the study emerged. The research was initiated as part of GEMISIS (Government, Education, Medical, Industrial and Social Information Superhighway), a larger research programme that was a collaboration between the University of Salford, Cable and Wireless plc, and the City of Salford. The mission of GEMISIS was to discern how the Internet could be used to serve the community, as opposed to merely entertaining it (GEMISIS, 1996). A vital element of the GEMISIS programme was the ERDF (European Regional Development Fund) financing of thirty doctoral researchers to explore how technology could benefit society in the areas of education, health, business, the community and crime prevention. This research project was funded by the GEMISIS programme.

1.1.1 The Master of Science/Postgraduate Diploma in Occupational Safety and Health

The focus of the study is the Master of Science/Postgraduate Diploma in Occupational Safety and Health (MSc OSH) at the University of Salford. The course of study is designed to meet the continuing professional development needs of those working in the occupational safety and health field, both in management and enforcement. The programme was originally validated in 1993 as a part-time attended course, students attending one day per week. A traditional paper-based distance learning option was added to the programme in 1997. The paper-based distance learning route attracted interest from prospective students living and working overseas, both ex-patriots from the United Kingdom and international students. As Information and Communication Technologies (ICT) became more widespread the viability of providing distance learners with online access to the programme became a prime area of concern as it would obviate the problem of using the postal service for both inland and overseas mail and reduce the inherent time delay.

At the time these developments took place the University of Salford had launched its GEMISIS programme, whose remit included investigating the application of ICT to education. The course tutor for the MSc OSH successfully

submitted a bid to supervise a GEMISIS doctoral researcher to investigate the educational value of delivering the course via the Internet. Thus, having a background in education and knowledge of ICT, I was matched to the MSc OSH project. Therefore, the programme upon which this research is based was pre-determined. Nevertheless, the course provided an ideal focus for the outlined research and I had complete autonomy to select, through reference to the literature, the precise focus of the study, which became students' perspectives of distance e-learning.

1.2 Area of Concern

The use of the Internet as a medium for education has grown exponentially since the mid-1990s. Institutions of higher education are increasingly offering online access to distance education programmes, especially at postgraduate level (Holtham and Tiwari, 1998). Adults pursuing a postgraduate qualification frequently have to balance part-time study with the demands of full-time employment and domestic responsibilities (Rangecroft *et al.*, 1999). Though traditional distance education programmes, which allow students to study from their home and workplace, can alleviate some of these problems, they often engender barriers to learning, including feelings of isolation (James *et al.*, 1998). Online learning is seen by some (Margolis, 1998; Lewis, 1999; Peters, 2000) as offering solutions to many of the problems traditionally associated with distance education and as a new vision for traditional education. Others, (Ehrmann, 1995; Noble, 1998a; 1998c; 1998b; 1999; Panitz, 1999), however, are more cautious of the move towards online learning.

The focus of research into online learning has largely been from the perspective of the institution delivering the programmes. Moreover, such studies have focussed upon the effectiveness of different technologies for course delivery (Gardner, 1998; McConnell, 1998), the emphasis being upon the technology itself. Few studies have examined the student experience of e-learning (Dearing, 1997; Beller and Or, 1998; Hara and Kling, 1999; Wegner *et al.*, 1999). Those that have, often centre on students attending campus and using the Internet to supplement their studies, rather than on those studying from a distance. Furthermore, studies that have addressed the student perspective of using the

Internet for distance education tend to be of a comparative nature and take a quantitative approach (Russell, 1997; Saba, 2000). Hence, more fundamental questions, focussing on the online learner, especially at postgraduate level, appear to have been overlooked. It is, therefore, essential that these concerns be addressed.

The problem, then, is that the views of distance e-learners at postgraduate level have been paid little attention and have seldom been the focus of research; thus their specific and individual needs remain unaddressed by academia. This study was designed to examine how postgraduates perceive and utilise Internet technologies for distance learning in order to assist higher education to determine how best to support this group of learners.

1.3 Purpose of the study and research questions

This thesis is therefore based on the argument that we have insufficient knowledge about postgraduates' perspectives of distance e-learning and as a consequence have little understanding of how best to support this group of learners. To bridge this gap in our understanding the overall purpose of this study is:

to facilitate an understanding of how students experience distance e-learning when studying modules from the University of Salford's MSc/Postgraduate Diploma in Occupational Safety and Health.

The study is guided by four research questions derived from the review of the literature, these are:

1. How do the students integrate distance e-learning into their domestic and working lives?
2. What are the students' experiences of the following elements of distance e-learning:
 - The virtual learning environment
 - Learning materials
 - Information

- Resources
- Communication
- Assessment

3. What andragogical issues arise from the study?

4. What are the students' learning style preferences and what issues arise from these?

The next section provides an overview of the approach and methodology used to research these questions.

1.4 Methodology

The strategy used to investigate the research questions was a single case study of a cohort of students studying modules from the MSc OSH in a virtual learning environment, named GOLDPhase (GEMISIS Online Distance Learning Pilot Health and Safety Environment). This was an in-depth case study that took a holistic (Yin, 1994) approach to examining the overall nature of distance e-learning for this group of students. The overall approach to the study was qualitative, however both qualitative and quantitative methods of data collection were used.

Data were collected using observation, in-depth interviews, online questionnaires, reflective diaries, student assessment, and miscellaneous documents. A grounded theory approach was taken to data analysis and this was assisted by the use of a Computer Assisted Qualitative Data Analysis Software package. Full details of the research strategy, data collection methods, and analysis of data are provided in Chapter 5.

1.5 Contribution to research

The study will contribute to the debate on the value of e-learning by focussing on the everyday realities of being a postgraduate distance e-learner studying modules from one specific programme of study. As such the study aims to make a contribution to the area of distance e-learning by:

1. Conducting a thorough literature review of the area of distance e-learning.
2. Identifying those factors, in the home and workplace, that might impact access to distance e-learning.
3. Providing a better understanding of how distance e-learners engage with the learning environment and the learning materials.
4. Providing a greater awareness of how students' perceptions of others within the virtual learning environment (VLE) might impact their learning.

Through a case study of this kind, where the experiences and reactions of students are taken into account, we can gain deeper insights into how the online course worked in practice. The aim is not to prove that this particular approach to online learning is more effective than other approaches, or more effective than paper-based distance learning, or to assume that the way in which these particular students reacted to online learning is typical of all online learners. The purpose is rather to highlight the issues, concerns and questions that emerge from the study. The information gained can then be used to inform decisions about the design of future online programmes in occupational safety and health, but also, and more importantly, help to inform decisions about the design of online courses in other institutions and in other disciplines.

1.6 Structure of the thesis

The thesis comprises ten chapters. The following provides brief descriptions of those that follow this introductory one.

Chapter 2, based on the literature, presents the background and context to traditional distance education; as such it lays the foundation for this study.

Chapter 3 builds upon the discussion in Chapter 2 and discusses the way in which technologies have facilitated distance education from its inception to the advent of online learning. It discusses the challenges

facing higher education and the debates that online learning has generated. A review of previous research in online learning is presented and the chapter culminates by identifying the questions that guided the study.

Chapter 4 follows on from the conclusions of Chapter 3 by examining learning theory and its application in the e-learning environment. It does this by firstly presenting and discussing traditional theories of learning. Attention is then turned to the more contemporary theories of andragogy and learning styles.

Chapter 5 describes the approach and methodology used in this study. It describes the research strategy, the methodological approach, and the methods of data collection and analysis.

Chapter 6 continues to set the scene for the case study by presenting the MSc OSH, the course of study that formed the basis of the investigation, and explaining how the cohort for the study was gathered. The chapter continues by presenting the GOLDPhase VLE and describing the theoretical concepts that determined its design.

Chapter 7 introduces the individuals who made up the cohort for the study and presents and discusses the findings to Question 1.

Chapter 8 presents and discusses the findings to Questions 2 and 3.

Chapter 9 presents and discusses the findings to Question 4.

Finally, **Chapter 10** provides conclusions about the achievement of the research including a summary of the main findings and the study's contribution to knowledge. In this chapter the strengths and limitations of the study are discussed and suggestions are also given for future research.

To maintain continuity of the thesis the findings emanating from each of the questions are discussed in context within the appropriate chapters, that is

Chapters 7, 8 and 9. The thesis does not, therefore, include a separate discussion chapter.

Notes:

The CD-ROM that accompanies this thesis includes a copy of the GOLDPhase VLE that facilitated this study and a copy of the Web site that contained the online questionnaires. Please see Appendix 1 for further details.

The utilisation of ICT for education has brought with it new terminology, and education via this medium is now frequently referred to as online learning or e-learning, terms which are used interchangeably here.

The terms 'distance e-learning' and 'online distance learning' are also used interchangeably here to describe e-learning situations where the students do not attend face-to-face classes. This is to differentiate between those who study at a physical distance from the university, as in the case of the students who made up the cohort for this study, and those who engage in e-learning to supplement their face-to-face learning sessions, as in a blended learning situation.

Conclusion

This chapter has laid the foundations for the thesis. It has presented the background to the research, introduced the area of concern and the purpose of the study, and set out the research questions. The methodology was then briefly described, the anticipated contribution to research was stated, and the thesis structure was outlined. Having provided these foundations the thesis can now proceed with a detailed description of the research, starting in Chapter 2 with the background and context to distance education.

Chapter 2

Traditional Distance Education: A Background and Context

Though education is frequently regarded as the distinguishing mark of civilized society, the view is evidently an error. The basic needs of man are the same, but the mode of their satisfaction varies with his habitat and culture. Training and education are universal; but the quality of the educational process changes.

(Woody, 1949, p. 3).

At the beginning of the twenty first-century distance education is a prime area of concern for educators and trainers throughout the world. It is practised in most countries and at all levels of education (Keegan, 1993). The wide range of journals and international conferences currently devoted to the topic evidences this. Universities have offered postgraduate courses in the study of distance education since the early 1980s, thereby acknowledging it as a field worthy of academic research and study (Mitchell, 1993). Moreover, universities and colleges are increasingly offering new and existing courses in a wide range of disciplines via distance education. However, distance education has not always enjoyed such a high profile, less than forty years ago it was looked upon with disdain and largely ignored by educators in mainstream education (Peters, 1994f).

This chapter presents the background to the field of distance education. It starts in section one by tracing the history of distance education and moves on to discuss its phenomenal world-wide growth during the second half of the twentieth century. In section two the differences that exist between conventional education and distance education are highlighted in order to distinguish between the two, and a brief profile of the type of students most likely to engage in distance education is presented. Section three focuses on three debates that have

taken place in distance education. The section starts with an examination of definitions of distance education as presented by experts in the field. This is followed by an examination of the terminology used to describe the process of teaching and learning at a distance, and the third debate to be discussed concerns the disciplinary status of distance education. Section four presents the key theories propounded by those recognised as experts in the field. Having set distance education in context by presenting its background, outlining its relationship to other areas of education and introducing the key debates and theoretical concepts, the chapter concludes by highlighting the key points raised in each section.

2.1 History of distance education

Though distance education only gained recognition in the latter half of the twentieth century, the concept of teaching and learning at a distance is not an entirely new phenomenon. St Paul's Epistle to the Corinthians and his letters of instructions to the early Christian Church could be considered an early example of distance education (Sewart, 1983; Bates, 1995). In more recent times an alternative to traditional classroom based instruction was provided through the establishment of commercially run schools that facilitated correspondence study, the forerunner to what we know today as distance learning or distance education (Peters, 1994c). In fact the use of the term 'distance' only began in the 1970s (Holmberg, 1995). This section discusses the history and growth of distance education and its impact on public sector education.

2.1.1 International growth

Distance education began in the United Kingdom at the time of the industrial revolution (Harry *et al.*, 1993) and in the USA some time towards the end of the nineteenth century. The concept has since spread to various countries across the world (Reddy, 1993). However, its practices and organisation tend to vary within national boundaries and are frequently influenced by the political ideologies of respective countries (Harry *et al.*, 1993). Different countries utilise distance education according to their specific needs, with many seeing it as a means of widening equal opportunities and access to higher education (Reddy, 1993). The LearnDirect initiative in the United Kingdom (UK) is a prime

example of this approach. In order to convey the international development and diversity of distance education the following provides a 'snapshot' of its worldwide growth.

The correspondence schools are thought to have started in England in 1840 when Isaac Pitman used the postal service to teach shorthand at a distance (Keegan, 1993). In 1858 The University of London, established in 1836, started their External Programme for the purpose of registering and examining distance learning students, but the teaching and preparation for examinations was conducted by private correspondence colleges (Kaye, 1981a). A parallel can be drawn here with the Oxford and Cambridge system, where the colleges teach and the university awards the degrees (Kaye, 1981a). In the century spanning 1870 to 1970 correspondence schools and colleges dominated the distance education field (Keegan, 1996). Most of them, however, were privately owned and run (Holmberg, 1995).

In Germany, basic research in distance education was pioneered by Otto Peters between 1960 and 1970 (Keegan, 1996). Peters was at first sceptical, however having researched the area he came to realise its scope and significance and subsequently became a firm advocate of the system and a leading authority on the subject (Peters, 1994g).

Paulsen *et al.*, (1992) traced the development of distance education in Norway. With a scattered population of 4.2 million Norway has been a supporter of the method since 1914 when the first distance education provider, NKS (Norsk Korrespondanseskole), was established. Though distance education in Norway is considered to be an important part of the educational system, and is supported by the government, it is largely run by private organisations. Norway has the distinction of being the first country in the world to regulate distance education through an Act of Parliament. The *Correspondence Education Act*, passed in 1948, established a committee to support the regulation and accreditation of distance education. In 1975 the government approved the provision of financial aid for distance learners, thus demonstrating a commitment to the country's ideology of providing educational opportunities and lifelong learning for all (Paulsen *et al.*, 1992).

In the United States of America (USA) distance education programmes started to emerge in the latter part of the nineteenth century. The earliest of these would appear to be the Society to Encourage Studies at Home, founded by Anna Eliot Tichnor in 1873 (Nasseh, 1997; Baker, 2000). This was followed by the Chautauqua College of Liberal Arts in 1883; Pennsylvania State College and the University of Chicago in 1892 (Duning, 1993; Nasseh, 1997; Baker, 2000); and the University of Wisconsin in 1906 (Gooch, 1998; Baker, 2000).

Australia, due to its geographically scattered population, has utilised distance education since the early part of the twentieth century. The Schools of the Air have transmitted to children in rural areas since the 1950s (Mitchell, 1993).

In Africa distance education is well established, although it has mostly been used for non-formal education such as agriculture, health studies and family planning programmes (Perraton, 1993). However, as early as the 1960s the governments of Botswana, Kenya, Malawi and Zambia implemented distance education programmes for use at secondary level and for teacher training (Perraton, 1993). The University of South Africa started teaching at a distance in 1946 and in 1962 became one of the first publicly funded distance teaching universities (Holmberg, 1995).

In China, Central China Television (CCTV) and China Education Television (CETV) has experienced considerable success with the use of radio and television for distance teaching at higher education level (Yuhui, 1993). In the late 1980s and early 1990s two out of every five university students in China were enrolled in the country's television universities (Yuhui, 1993). The system covers 9.6 million square kilometres and in the eight years prior to 1993 broadcast higher education to more than two million people (Yuhui, 1993).

Thus, from its early beginnings as correspondence education in England in the 1840s, distance education has spread to all five continents and meets the needs of hundreds of thousands of people each year. Whilst it is provided by both the private and public sectors there has, in recent years, been a move towards public sector provision as discussed next.

2.1.2 The emergence of public sector distance education

Up until the 1960s distance education was rarely the subject of scientific research (Peters, 1994f). This is because it was largely run by the private sector and educators within the public sector did not have access to impartial information on the subject (Peters, 1994f; Jarvis, 1995; Keegan, 1996). Whilst a body of research existed in Germany, up until the late 1960s it was only available in the German language (Peters, 1994f). This lack of empirical data, coupled with a disregard for the commercial status of distance education, meant that it was considered unorthodox and pedagogically unsound (Peters, 1994a).

An important turning point in the history of distance education came in 1969 with the establishment of the United Kingdom Open University (UKOU). Though distance education methods had been practiced at university level for over one hundred years (Duning, 1993), the UKOU was the first public sector university in the world to offer distance only teaching (Rowntree, 1992).

The successful establishment of the UKOU was instrumental in raising the status of distance education and caused a shift in provision from the private to the public sector, thus being a catalyst for world-wide growth in distance education (Holmberg, 1995; Keegan, 1996). Following the establishment of the UKOU industrial countries throughout the world created open universities by integrating new media technologies with traditional correspondence technologies, thus providing distance education opportunities for vast numbers of students at costs lower than those previously engendered by traditional teaching methods (Daniel, 1993).

The rapid growth of public sector distance teaching institutions gave distance education the respectability it had previously been denied (Harry *et al.*, 1993). Though the area had initially been viewed with suspicion, subsequent research revealed its scope and effectiveness and helped dispel some of the doubts about its quality (Peters, 1994f). In 1982 the International Council for Correspondence Education (ICCE) in the USA changed its name to the International Council for Distance Education (Harry *et al.*, 1993). This heralded a significant turning point as it recognised both the growth of distance education, in the form of open

universities, and the increasing 'multimedia approach' to the subject (Harry *et al.*, 1993).

Large-scale providers of distance education

By the 1990s distance education had become an integral part of many countries educational systems and was acknowledged as providing an ideal solution in meeting expanding student numbers without the need for capital expenditure on buildings (Keegan, 1996). By 1995 educational institutions across the world offered a wide range of distance learning programmes using a variety of media, ranging from print-based to online technologies. Keegan (1996), using the Institutional Statistics 1995 as his source, draws attention to the scale of distance learning provision by highlighting the numbers of students enrolled with large distance learning providers that year:

Table 2.1: Large-scale providers of distance education in 1995

Country	Name of institution	Enrolment	Foundation
China	CCTVU network	852,000	1979
Turkey	Anadolu University	600,000	1982
France	CNED	350,000	1939
Indonesia	Universitas Terbuka	353,000	1984
Thailand	Sukothai Thamairat OU	350,000	1978
India	Indira Gandhi N OU	242,000	1985
Korea	National Open University	200,000	1972
United Kingdom	Open University	200,000	1969
Spain	UNED	140,000	1972
South Africa	UNISA	130,000	1949
Total		3,417,000	

Adapted from (Keegan, 1996, p. 4).

Ten national institutions are highlighted, their total enrolment being 3.4 million students. The largest provider was the Central Chinese Television University (CTVU) network in China, which had 852,000 enrolments. Of the ten institutions listed only two were founded before the UKOU. These are the Centre National d'Enseignement à Distance (CNED) in France, founded in 1939, and the University of South Africa (UNISA) founded in 1949. The remaining seven were founded between 1972 and 1985. Therefore, by 1995 all of the ten institutions highlighted by Keegan had become well established with a minimum

of ten years experience, none were experimental, and all had gained reputations for high quality and experience in distance education provision (Keegan, 1996).

Growth in expertise

Concomitant with the expansion in distance education provision has been the growth in distance education research and literature. Experts in the field have emerged producing major publications on the subject (Kaye and Rumble, 1979; Sewart, 1983; Bates, 1995; Holmberg, 1995; Keegan, 1996). A wide range of journals devoted to distance education have become established including: *Epistolodidaktika*: the European Journal of Distance Education (founded 1964, discontinued 1999), *Distance Education* (Australia), *Open Learning* (UK), *Open Praxis* (published by the International Council for Open and Distance Education), *The American Journal of Distance Education* (USA), and *The Journal of Distance Education* (Canada). In addition, a variety of electronic journals (e-journals) related to the application of Information and Communication Technologies (ICT) to distance education are now available on the World Wide Web (WWW). These include: *Educational Technology and Society*; *JALN: The Journal of Asynchronous Learning Networks*, and *The European Journal of Open and Distance Learning*. Furthermore, the number of conferences dedicated to distance learning has steadily increased over the last two decades with many becoming established events. Therefore, at the beginning of the twenty-first century distance education is no longer a neglected area of research. The number of academic journals and conferences and the wealth of literature dedicated to the topic clearly demonstrate a world-wide commitment to research into distance education.

The foregoing illustrates the exponential growth that has taken place in the field of distance education since the 1960s. A significant factor in this growth has been the move from private to public sector provision, which has made distance education available to greater numbers of people and provided opportunities for research into the area. The number of students studying worldwide at a distance marks distance education out as being a statistically important area within education. From the late 1960s, when research in distance education first emerged, until the mid 1980s, was a time of uncertainty. During this period of

transition from correspondence to distance education the field struggled with a number of issues in order to establish itself. These issues are discussed in the remainder of this chapter. One such concern was the position of distance education in relation to conventional education; this is discussed in the following section.

2.2 Setting distance education in context

Distance education is frequently referred to as 'non-traditional' as it falls outside of the boundaries of conventional education (Keegan, 1996). It is, therefore, important to clarify its role within the wider context of education. As pointed out above, distance education was for many years considered second best to traditional face-to-face education and suffered from a poor reputation. Indeed, it is still surrounded by controversy, as the discussion of David Noble's (Noble, 1998a; 1998b; 1998c; 1999) argument that distance e-learning is the commodification of education, to be found in the next chapter, illustrates.

This section defines conventional education and non-traditional methods of education and discusses why distance education is considered to fall beyond the scope of conventional education. The relationships between distance education and other forms of non-traditional education are also explored. The section culminates by identifying that sector of the population most likely to engage in programmes of distance education and by identifying the typical characteristics of distance learners. The purpose of the discussion is to closely delineate the area of distance education and thus avoid some of the confusion that frequently surrounds the field.

2.2.1 Conventional education

The term 'conventional education' is used to describe the form of education we are all familiar with, where students travel to an institution and are taught by a teacher in a face-to-face situation. Kaye and Rumble (1979) define 'conventional education' as

formal classroom-based instruction in a school, college, or university setting, where teacher and students are physically present at the same time in the same place (p. 22).

Research into early civilisations indicates that conventional education goes back as far as 2,000 BC when children in ancient Egypt started their studies at five or six years of age and frequently continued until the age of sixteen or seventeen (Woody, 1949). Conventional education was evident in ancient Athens when Socrates (c.470-300 BC) based his teaching on interactive dialogue, and later with the founding of Plato's school the Academy (c.387) (Boyd and King, 1972; Curtis and Boulwood, 1977). At university level, conventional education formed the basis of teaching in medieval Europe's earliest universities in Salerno, Bologna, Paris, Ghent, Oxford and Cambridge (Boyd and King, 1972; Lucas, 1972; Curtis and Boulwood, 1977).

At the beginning of the twenty-first century conventional education still forms the basis of educational provision in all phases of education. The salient feature of conventional education, whether at primary, secondary, tertiary or higher levels of education, is that the student attends a central location in order to study. This has become the 'norm' and forms the basis of 'conventional' or 'traditional' education. Therefore, distance education deviates from the 'norm' by providing students with the opportunity to study from their home or workplace (Keegan, 1996) and is thus considered to fall into the 'non-traditional' category of education (Moore, 1973).

It is worth noting, as Jarvis *et al.*, (1998) point out, that effective learning is not necessarily connected to either conventional or non-traditional teaching methods. Many argue in favour of conventional education, whilst distance education has both its advocates and its critics (Jarvis *et al.*, 1998). In a society where conventional education dominates, non-traditional methods have not always received the recognition they deserve. This point is forcefully made by Wedemeyer (1983) in his use of the rather sombre phrase 'learning at the back door' in referring to non-traditional forms of education. He uses the phrase in order to highlight prevailing attitudes towards educational systems that deviate from 'conventional' education. Wedemeyer discusses the social isolation and lack of identity that non-traditional learners have suffered as a result of such attitudes. Yet, the value of non-traditional forms of education should not be

under-estimated as the students of such systems frequently contribute much to society whilst costing it little (Wedemeyer 1983).

2.2.2 Non-traditional forms of education

Distance education is not the only approach to education that is considered 'non-traditional'. Since the 1970s there has been a marked trend towards a range of provision for learning other than the taught face-to-face classroom based course. Various labels have been applied to these approaches. Terms, which describe specific approaches, such as 'open learning', are often applied generically to any form of learning which does not fall within the boundaries of conventional education as described above. Furthermore, many of these approaches include features associated with lifelong learning (Jarvis *et al.*, 1998). Therefore, the whole area of 'non-traditional' education is frequently surrounded by confusion, with the boundaries between the different areas being blurred. However, whilst there are subtle distinctions between some of the approaches there is also a degree of overlap between them. Moreover, terms such as 'open learning' and 'flexible learning' are frequently interpreted as having the same meaning as distance education or distance learning. To further define distance education those labels most frequently applied to 'non-traditional' learning opportunities are discussed here. This discussion is important as it helps to pinpoint the area of education with which this study is concerned, specifically, distance education.

Lifelong learning

Lifelong learning is often perceived to be a fairly modern notion rooted in the latter part of the twentieth century. It is, however, the terminology rather than the concept that is new. Previously referred to as lifelong *education*, the term lifelong *learning* gained ground in the late 1980s and 1990s when, due to changes in society, and an increased range of learning opportunities, there was a shift in emphasis away from education towards learning (Jarvis *et al.*, 1998). However, the concept of learning throughout life is not new. As Nettleship (1935) points out Plato was clearly an advocate of lifelong learning. In the second section of 'The Republic' he expressed the belief that as opinions, circumstances and the environment may change, the 'first' education may be "'sketchy' and 'inexact', and require 'filling up' and completing by a further

education". Plato therefore concluded that the first education represents "the germ of complete manhood" leading to higher studies (see Nettleship, 1935, p. 97). In the latter part of 'The Republic', Plato went on to describe his plans for higher education (Boyd and King, 1972).

In the twentieth century the idea of lifelong learning can be traced to 1929 in England and the publication of Basil Yeaxlee's book 'Lifelong Education' (Cross-Durrant, 1987a). The book was one of the first to articulate the idea of lifelong education in which all of a person's resources and experiences from birth to death could contribute towards the education of that individual (Cross-Durrant, 1987a). Indeed, some of the concepts formulated by Yeaxlee in the early part of the twentieth century, such as flexible learning and open learning, became general practice in the latter part of the twentieth century. His philosophy that opportunities for lifelong education should be available to all, regardless of social status or financial circumstances, are mirrored in today's policies for wider participation in higher education. The American philosopher and educator John Dewey (1859–1952) also advocated a holistic view of learning and living, and as such is also considered to have been an early advocate of lifelong learning. Dewey believed that as humans are capable of intellectual growth throughout their lives then education should be lifelong (Cross-Durrant, 1987b; Jarvis, 1995). The work of John Dewey is discussed in more detail in Chapter 4.

The idea of lifelong education lay fairly dormant until 1970, when the United Nations' put the concept forward for discussion as part of their International Education Year. The notion was adopted in 1972 when the United Nations Educational, Scientific and Cultural Organisation (UNESCO) commissioned a study that formed the basis for the introduction of a system of lifelong education. Thus, lifelong learning is generally thought of as a European concept grounded in advances in technology and changes in society (Cross-Durrant, 1987a; Jarvis, 1995).

The Internet is now seen a new medium though which the objectives of lifelong learning may be fulfilled (Beller and Or, 1998) and lifelong learning is seen as a necessary vehicle to enable adults to adapt to changing roles in the information society (Luther, 1998). This renewed interest in lifelong learning has spawned a

number of government initiatives. These are discussed more fully in the next Chapter.

Continuing Education

In the 1980s the term 'continuing education' became popular in the UK due to its implication that education should continue from school onwards with no specific 'end point' (Jarvis *et al.*, 1998, p. 3). Whilst some universities still have departments of continuing education, the term appears to have given way to that of 'lifelong learning'.

Adult Education

Morrish (1970) provides a comprehensive review of adult education from 1800 to the late 1960s. Before 1800 adult education was almost non-existent but the industrial revolution led to a rise in demand for learning, as many adults became aware of their lack of education. Between 1800 and 1850 voluntary groups strived to redress the problem of illiteracy by teaching basic reading, writing and arithmetic, but such efforts were thwarted due to pressure from the upper and middle classes and by 1850 voluntary teaching had declined. Philanthropic groups such as the Quakers and workers unions organised a large proportion of adult education in the latter part of the nineteenth century and in the early part of the twentieth century the Workers Education Association played a prominent role (Morrish, 1970).

It would appear, therefore, that adult education has traditionally been vocationally linked and directed at 'the workers', thus raising the well-argued issue regarding the differences between education and training, the former traditionally commanding more respect due to its association with liberal education conventionally provided in universities (Bell, 1996). This association may stem from adult education's early association with the Worker's Education Association and the inference that adult education was a "social mission" (Bell, 1996, p.156) designed to provide remedial support in basic skills (Luther, 1998).

In the twentieth century the need for adult education was acknowledged in the 1944 Education Act, which placed responsibility on local education authorities to provide further education for adults (Morrish, 1970; Jarvis *et al.*, 1998). The Act

did not, however, specify what form this should take, nor the extent to which it should be implemented (Bell, 1996). In fact in Britain the State played a minor role in adult education until Harold Wilson made a commitment to the Open University, thus moving adult education into a new era. The title 'university' raised the perception of adult education from provision for the 'workers' to a more middle class level which, in addition to vocational courses, also provided 'liberal' adult education (Bell, 1996).

Thus, until the last quarter of the twentieth century clear boundaries existed in relation to where adults in the UK learned. The few undertook courses of higher education in universities. Those who did not enter higher education and wished to pursue their education beyond secondary level, participated in adult education, initially provided by vocational organisations and later by local education authorities (Edwards *et al.*, 1996). However, the boundaries of adult education have now been extended into higher education thus diluting the term 'adult education'.

Open learning and Flexible learning

Open learning and flexible learning appear to have more similarities than differences. They are discussed together here in order to demonstrate the extent to which they overlap and to which the terms are used synonymously.

Open learning is a rather imprecise term that many of its adherents have attempted to define (Rowntree, 1992). Bates (1995) definition of open learning as, "the provision of learning in a flexible manner, built around the geographical, social and time constraints of individual learners, rather than those of an educational institution" (Bates, 1995, p. 27), provides a good overview of the essence of open learning. Rowntree sees open learning as both a "philosophy – a set of beliefs about teaching and learning" and "a method – a set of techniques for teaching and learning" (Rowntree, 1992 p. 13). Open learning in Britain became popular after 1970, the widespread use of the term once again being attributed to the establishment of the UKOU (Brookfield, 1986; Keegan, 1996; Niedrauer, 1997). Institutions world-wide have since adopted both the term 'open' and its principles (Keegan, 1996).

Whilst 'open learning' appears to be rooted in the 1970s and 1980s, the term 'flexible learning' became popular in the UK at the beginning of the 1990s when institutions of further and higher education implemented flexible learning principles in response to pressure from the government to be more flexible in response to the needs of industry (Further Education Unit, 1990). The fundamental principles of flexible learning are that it should address the needs of individual learners and that the student should have control over his or her own learning, therefore being an active learner as opposed to being a passive recipient of knowledge (Further Education Unit, 1990).

Whilst the term 'open learning' is still widely used there has, since the early 1990s, been a gradual drift away from its use and a marked trend towards the use of the term 'flexible learning'. This may be in response to the vagueness of 'open learning' (Keegan, 1996). As a result many institutions are attempting to cover all eventualities by combining the two terms, offering for example, 'open and flexible learning' (Rowntree, 1992). Regardless of the terminology used different systems will clearly offer varying degrees of 'openness' and 'flexibility' and will be open to questions such as 'how open or flexible?' and 'in what way are they open or flexible?' (Rowntree, 1992).

Nevertheless, it seems to be widely agreed that 'open learning' is for the most part a goal concerned with opening up new opportunities for people to learn (Bates, 1995), and is therefore concerned with access. On the other hand 'flexible learning' is about the variety of ways in which learning can be achieved once the opportunities have been provided and is therefore about strategies for learning. This is not, however, implicitly stated and both systems convey similar messages with regard to both open access and flexible methods.

Distance education as a non-traditional form of education

The five concepts discussed above: lifelong learning, continuing education, adult education, open learning, and flexible learning, fall within the 'non-traditional' category of education, as does distance education. They are not, however, synonymous with distance education (Holmberg, 1995). Some distance education programmes may incorporate other non-traditional methods, for example: open learning or flexible learning; and may also facilitate the

objectives of lifelong learning. Conversely, open learning and flexible learning programmes may include an element of distance learning, however the terms are not interchangeable and do not have the same meaning. The UKOU is a prime example of how distance education may be used in conjunction with other non-traditional philosophies or methods. The UKOU is 'open' in that it does not have any entry requirements for undergraduate courses, but once students have enrolled they engage in distance education, therefore the UKOU is both 'open' and 'distant' (Rowntree, 1992).

2.2.3 Students of distance education

The reasons why students undertake distance education programmes have been explored by Holmberg (1977). He reports that correspondence education, the forerunner of distance education, originated in order to provide opportunities for those who were unable to attend traditional school, college or university due to geographical location, lack of finance, or ill health. Distance education has also traditionally been aimed towards adults who wish to improve their social status. In some countries, Sweden and Germany for example, a lack of formal qualifications debarred people from many fairly humble occupations. In Britain correspondence education gained a reputation for providing professional qualifications, especially in business. Those born before 1970 may recall advertisements in periodicals such as the Reader's Digest in the UK, offering courses leading to 'rapid results' in professional qualifications. Distance education therefore provided a second chance for people to gain qualifications that would allow them to enter specific professions. Though distance education originated in order to meet the needs of those who require a second chance it has characteristics that have subsequently proved to be of value to the wider population. Hence, both the distance learners themselves and their typical needs have changed as distance education has evolved (Holmberg, 1977).

Student characteristics

It is difficult to generalise about the characteristics of the members of any particular group, however Kaye (1981b), drawing on data gathered from ten extremely diverse countries, found that distance learning students tend to share similar characteristics. Typically, they are aged between twenty and forty; study

on a part-time basis; are highly motivated; study from home; are not from wealthier families and are male. The fact that men have traditionally made up the highest proportion of distance learners can most likely be attributed to the fact that a high number of distance education courses have conventionally been job related and in many societies it is the men who have held the largest proportion of jobs. With regard to geographical distribution, Kaye found two tendencies, a widely dispersed population, and urban concentration. Thus suggesting that those in urban groups select distance education for its flexibility rather than location (Kaye 1981b).

Distance learners are, therefore, usually adults who are in employment, have social responsibilities and the demands of a family. They choose distance education because it is flexible, convenient and adaptable (Holmberg, 1977). The literature related to distance education appears to have paid little attention to the distance learners themselves. However, the subject of adult learning has been paid considerable attention and is discussed in Chapter 4, where the characteristics of adult learners are discussed in greater detail.

This section has pinpointed the precise area of concern by defining distance education as a non-traditional form of education and identifying the students who select to study in this way. The next section focuses upon internal issues within the field of distance education.

2.3 Debates in distance education

Distance education is a relatively new area within education and has thus been the subject of considerable debate as those in the field have thrashed out various issues in order to delineate the area. As distance education developed in the 1960s and early 1970s academic research into the subject increased with a number of notable writers emerging, amongst these were Börge Holmberg in Sweden, Michael Moore in the USA, and the Tübingen Group, a group of researchers in Germany which included Otto Peters (Keegan, 1996). As the volume of research increased so did the necessity to more closely define the field. At one time the lack of clarification of terms delayed research into the subject (Harry *et al.*, 1993). Confusion reigned in three areas; firstly, there was

uncertainty about the definition of distance education and the precise area of education to which it referred. Secondly, it was necessary to clarify the terminology to be used. These two debates ran throughout the 1970s and were largely resolved by the early 1980s. From the mid 1980s until the early 1990s deliberations centred on delineating the field of study. These three debates, which this author perceives to be 'What is it?', 'What are we going to call it?', and 'What are its boundaries' are discussed next.

2.3.1 Definitions

Though formal distance education has been available for over one hundred and fifty years it is the last thirty to forty that have witnessed the most rapid development in the field. During this period educators struggled to define the concept of distance education (Barker *et al.*, 1993) due to its diversity and rapid growth. In an attempt to clarify this area the definitions provided by experts in the field are presented here for examination. The definitions provided by Peters, Moore, and Holmberg are presented first.

The first definition presented was originally proposed by Otto Peters in 1965, and is translated in Peters (1994c):

...any form of instruction in which it is necessary to bridge a distance between teacher and student, which can be achieved not only with the help of letters and printed course material, but also by other technical media such as telephone, radio, television, audio and video cassettes, as well as by newer electronic media (p. 27).

Moore (1973) asserts:

Distance teaching may be defined as the family of instructional methods in which the teaching behaviors are executed apart from the learning behaviors, including those that in a contiguous situation would be performed in the learner's presence, so that communication between the teacher and the learner must be facilitated by print, electronics, mechanical or other devices (p. 664).

Holmberg (1977) sees the term distance education as covering:

...the various forms of study at all levels which are not under the continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises, but which, nevertheless, benefit from the planning, guidance and tuition of a tutorial organisation (p. 9).

The commonality shared between these three definitions is that they are all based on the separation of teacher and learner. The first two definitions, that is those provided by Peters (1994c), (though formulated in 1965) and Moore (1973), acknowledge the role that technology plays in the distance education process, whereas the third, provided by Holmberg (1977), omits any reference to technology. Whilst these three definitions are still accurate and relevant, they are rooted in their time and somewhat inadequate in today's multi-media e-learning environment.

Based on a synthesis of previous writers' definitions, Keegan (1996) provides a more contemporary definition of distance education using five defining elements:

Distance education is a form of education characterised by:

the quasi-permanent separation of teacher and learner throughout the length of the learning process (this distinguishes it from conventional face-to-face education);

the influence of an educational organisation both in the planning and preparation of learning materials and in the provision of student support services (this distinguishes it from private study and teach-yourself programmes);

the use of technical media – print, audio, video or computer – to unite teacher and learner and carry the content of the course;

the provision of two-way communication so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education); and

the quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals rather than in groups, with the possibility of occasional meetings, either face-to-face or by electronic means, for both didactic and socialisation purposes(Keegan, 1996, p. 50).

This author considers the above definition, provided by Keegan, to be the most appropriate in today's climate where distance education frequently incorporates the use of ICT. Firstly, because it clearly incorporates the main distinguishing feature of distance education, the separation of teacher and learner. Secondly, because it acknowledges, through the use of the term 'quasi-permanent', that many distance education programmes include varying degrees of face-to-face contact, for example, in the form of weekend schools or tutor groups. Thirdly,

because it acknowledges that two-way communication can now form an integral part of distance education programmes. Therefore, Keegan's definition is considered the most appropriate in the context of this study.

2.3.2 Terminology

The terminology used to describe the method of education where the student studies in a location that is physically separate from the teacher is surrounded by confusion (Keegan, 1996), with English speaking countries using a variety of terms to describe the process. In Australia it is known as the 'external system', in New Zealand it is referred to as 'extra-mural' (Reddy, 1993). In the UK and USA the terms 'distributed education', 'home study', 'independent study', 'correspondence study', 'remote learning', 'distance teaching', 'distance learning', and 'distance education' have been applied (Harry *et al.*, 1993). In the UK the term 'correspondence education' was popular until the mid 1980s, however, the increasing utilisation of technologies, including the telephone, radio, television, and video and audio cassettes, contributed to its demise as the term is heavily associated with printed text (Holmberg, 1983). In more recent years the terms 'distance learning' and 'distance education' have gained popularity as they allow for a more multi-media approach to the subject (Holmberg, 1983). However, considerable debate has taken place regarding the merits, and indeed the drawbacks, of both of these terms.

Several writers argue in favour of the term 'distance education'. Keegan (1996), for example, believes that 'distance education' should be used generically to encompass all forms of education at a distance. He sees the term 'distance education' as crossing all educational boundaries, from the teaching of children, to university education and corporate training. He further argues that the term should include distance teaching and learning strategies. The basis of Keegan's argument is that 'distance education' comprises both 'teaching' and 'learning'. Therefore, the terms 'distance teaching' and 'distance learning' only represent one half of the distance education process. Steiner (1995) and Niedrauer (1997) also write in support of the term 'distance education' arguing that 'distance learning' occurs as a result of 'distance education'. However, Rowntree (1992) is critical

of Keegan's use of the term 'distance education', believing that it excludes industrial and professional training and preferring the term 'distance learning'.

Distance education has now become the accepted term used to describe the field. However, in the UK the term distance learning is frequently used. This study uses the term distance education in referring to the field as a whole, but also uses the term 'distance teaching' in describing the teacher's role, and the term 'distance learning' in referring to the student's role in the distance education process.

Thus by the early 1980s issues related to the definition of distance education and the terminology to be used, were largely resolved. As the field became more established attention thus turned to disciplinary status, as discussed next.

2.3.3 Status

The issue of the disciplinary status of distance education has also been the subject of considerable debate (Coldeway, 1989). Holmberg (1986), asserts that distance education is an academic discipline in its own right, basing his argument on two key factors, firstly, the rapid increase in research conducted within the framework of distance education since the mid 1970s, and secondly, the emergence of a number of university courses offered for the study of the subject. Rumble (1988) takes a different view, arguing that although distance education has developed rapidly, the case for regarding it as either an emerging or an established discipline is unconvincing.

This debate continued well into the 1990s. Harry *et al.*, (1993) believe that it was resolved when universities started to offer taught degrees in distance education,¹ and see distance education as a new and specialised field within education Harry *et al.*, (1993). This view is echoed by Keegan (1996) who also sees distance education as a field within the discipline of education, which has links with other fields within its discipline, such as, adult education and educational technology. However, the accreditation of degrees in distance education marks it out as a field of university study that will lead to

¹ The Graduate Diploma in Distance Education was introduced in Adelaide, Australia in 1983, followed by the Masters Degree in Education in 1991, (see Mitchell, 1993).

professionalisation of the field through postgraduate research (Harry *et al.*, 1993).

This section has presented three debates that ensued during the last three decades of the twentieth century as distance education expanded and became established. The purpose of the first debate was to precisely define what distance education is. Whilst a number of explanations were put forward, the one offered by Keegan (1996) is considered the most apposite in relation to this study as it takes account of emerging ICT and is thus congruent with e-learning.

Examination of the second debate, related to what the phenomenon should be called, revealed that the terms distance education and distance learning are now generally accepted within the field, with the former being most popular in the USA and the latter being in common use in the UK. However, the term distance education is considered most appropriate here as it encompasses both distant teaching and distant learning.

Finally, this section examined the debate that sought to define the boundaries of distance education, and illustrates that distance education has now established itself as a field within the discipline of education.

Whilst issues related to definitions, terminology and disciplinary status are useful in helping us to set distance education in context and in understanding differing perspectives of the field, they are descriptive rather than explanatory and thus do little to explain the ideas and concepts that have shaped distance education. The following section will address this issue by presenting the major theories and concepts that underpin distance education.

2.4 Key theoretical approaches in distance education

Turning from debates related to definitions, terminology, and disciplinary status, to key theories, this section draws attention to some of the research and theorising that underpins distance education. Before discussing these issues it would be beneficial to examine what is meant by the term 'theory' and what its value may be in relation to distance education. A number of writers have attempted to define the meaning of theory. Knowles (1990) suggests a theory is

"a comprehensive, coherent, and internally consistent system of ideas about a set of phenomena" (p. 5). Garrison (2000) explains theory as "a coherent and systematic ordering of ideas, concepts, and models with the purpose of constructing meaning to explain, interpret and shape practice" (p. 7). Whilst both definitions are helpful in providing an explanation of the term theory, this author considers the latter to be the more comprehensive of the two, as in addition to explaining what a theory may constitute, it expands upon the concept by relating it to practice. Thus the definition of theory provided by Garrison (2000) is considered most appropriate in the context of this study.

The value of theory to the field of distance education is highlighted by Garrison (2000):

Theoretical inquiry is central to vitality and development of a field of practice – not to mention its recognition and credibility from those not yet initiated into the field. The theoretical foundations of a field describe and inform the practice and provide the primary means to guide future developments. The power of ideas, as represented in our theories, influences practice directly by focussing perspective, revealing knowledge and suggesting alternatives. Since ideas and ideals shape distance education practice, attention and effort must be devoted to the development of coherent, rigorous and valid theory. Theory is not limited to describing what is, but good theory should also help predict what will or could be (Garrison, 2000, p. 6).

Establishing theory for distance education has not been easy and its theoretical underpinnings have been fragile, resulting in the field suffering from a lack of identity (Harry *et al.*, 1993). However, the view that distance education would benefit from theory is not shared by everyone, Perraton (1983), for example, argued that a theory of distance education was unnecessary as it would stand in the way of practice and that the field had survived well enough without. Indeed, little theoretical development took place for over one hundred and fifty years due to distance education being in the private sector (Harry *et al.*, 1993). However, following the swing from private to government provision in the 1970s the field has been more widely researched and different theoretical issues have steadily emerged.

Theoretical approaches to distance education began to emerge in the 1960s and many perspectives have been presented over the last thirty to forty years. Keegan (1996) perceives these as falling into three categories: the theory of

industrialisation, theories of autonomy and independence and theories of interaction and communication. Otto Peters (1994b) proposed the theory of industrialisation. Contributors to theories of autonomy and independence include, Charles A. Wedemeyer (see Keegan, 1996) and Michael G. Moore (1973, 1993) from the USA. Theories of interaction and communication have been propounded by Börge Holmberg and John A. Bååth of Sweden, Kevin C. Smith in Australia, John S. Daniel in Canada, and David Sewart from the UK (Sewart *et al.*, 1983; Keegan 1996).

The theories of Otto Peters, Charles Wedemeyer, Börge Holmberg and Michael Moore have been selected for discussion here as they represent major contributions to the field and represent each of the categories defined by Keegan. The works of others have not been included, either because they have similar characteristics with those to be discussed, or because their impact has not been as significant in the field.

2.4.1 Otto Peters' theory of industrialisation

Otto Peters formulated the theory of industrialisation in the early 1960s. A translation of his most significant work is provided in (Keegan, 1994), which presents papers and extracts written by Otto Peters between 1965 and 1993.

Otto Peters, who categorised distance education as an industrialisation of the education process, was the first to produce a theory of distance education. Peters (1994f) reflects that he initially attempted to develop a theory by examining traditional categories of educational research but found they were unable to support a theory for distance education. Having failed to find a suitable model within conventional education Peters explored other fields, eventually making a comparison between the processes of industrialised production and distance education.

Peters (1994b) asserts that correspondence study, the forerunner of distance education, and the industrial model are intrinsically linked. In support of this argument he points out that the first correspondence schools were founded in industrialised countries and that it was industrialisation, in the form of the postal system and railway transport, which made them possible in the first place. He

further argues that whilst the industrial revolution has impacted most aspects of human life, it has, with the exception of distance education, failed to touch education. Peters also claims that traditional education is pre-industrial and has not changed since it replaced the ancient rhetorical form of education in the middle ages (Peters, 1994b). Moreover, Peters (1994e) cites the industrialised format of distance education as the reason for its unpopularity and poor reputation.

Using a mail order analogy Peters (1994b) likens distance education to the processes involved in the industrialised production of goods. In order to make the comparison he categorises the process under fourteen headings: rationalisation; division of labour; mechanisation; assembly line; mass production; preparatory work; planning; organisation; scientific control methods; formalisation; standardisation; change of function; objectification; and concentration and centralisation. Using these headings Peters then analyses each using business terms, aligning each stage to a corresponding one in the distance education process (Peters, 1994b). Whilst a full analysis of this process is unnecessary here, four of the stages are expanded upon to allow the reader a better insight into how Peters formulated his concept.

In relating the process of production to distance education Peters (1994b) makes the following analogies:

Division of labour – In the production process tasks are broken down into different stages, with one or more people performing each stage rather than working on the same task from its beginning to its end. This division of labour allows for the development of specialisation in specific areas. In relating this to distance education Peters contends that labour can be divided between the development of materials, the transmitting of information, counselling, assessment, and feedback, with individuals working in their own areas of expertise (Peters, 1994b) .

Mechanisation – Production processes make use of machines to replace the work done by humans. In distance education photocopying machines are used to

reproduce teaching materials and transportation is used to distribute them to the students (Peters, 1994b).

Mass production – Mass production is dependent upon large numbers of consumers, which in turn increases profitability. Students can be considered to be consumers and where demand for university places outstrips supply, distance education can be used to supply education to large numbers using economies of scale (Peters, 1994b).

Objectification – As production processes become more mechanised they also become less subjective as the individual has less control over the process. This dehumanising effect is evident in distance education, as the tutor is unable to personalise his or her teaching in the way that the face-to-face tutor can. The advantages of objectification are that the same materials can be reproduced for delivery at any time and in any place (Peters, 1994b).

Based on this comparative interpretation of distance education with industrialisation, Peters (1994f) thus concludes that the characteristic feature of distance education is "its high degree of industrialization" (p. 10). As this is a general characteristic, Peters asserts that it can be applied to all forms of distance education.

In response to criticisms that his concept of distance education may not be relevant in non-industrialised countries, or in a post-industrial society, Peters has continued to maintain his position, arguing that industrialisation is a long-term process that forms only a small part of social change (Peters, 1994d).

Furthermore, Peters contends that his view of distance education is in fact progressive, as unlike traditional education it has adapted to post-modern society and is particularly suited to contemporary issues, such as continuing education for adults (Peters, 1994d). In support of this argument Peters identifies the following four elements of distance education which he contends were present in the industrialised model of teaching and learning, yet also correspond to the post industrial society and the use of electronic media:

1. The learner will not be tied to his/her place of work (this has been the case for distance learners for over one hundred and fifty years);

2. Learners will increasingly take responsibility for their own learning;
3. Distance education providers will provide increasing opportunities for interaction between teachers and students;
4. Distance education will continue to integrate new technologies into its systems (Peters, 1994d).

Thus, Peters (1994d) argues that the seeds of the post-industrial era were already embedded in his original model.

Reflection and re-appraisal

In reviewing his previous work, and looking to the future, Peters (1994f) makes some interesting observations and predictions. Expanding upon his earlier premise that the industrialisation of distance education was the reason for its unpopularity, Peters contends that though people did not at the time fully articulate the reasons for rejecting distance education, they had a sense of unease about it for two reasons. Firstly, due to the communication gap between the teacher and learner, which led to depersonalisation and made people feel uncomfortable. Secondly, because they perceived a sense of commercialisation that they disliked, considering the idea of marketing education for profit to be distasteful and contrary to the traditional ethos of education Peters (1994f).

This author perceives the main value of Peters' theory as lying in its capacity to enable people to conceptualise distance education, especially during the time in which the theory was conceived. We have to remember that prior to the 1960s distance education was something of an enigma to those in mainstream education. Though Peters' theory is controversial it did, at the time, provide a handle that educators could grasp in order to help them understand the phenomenon, thus drawing attention to its existence and indeed its potential.

Furthermore, it is argued here that Peters' contention that traditional educational concepts are inappropriate for describing distance education no longer holds true, as the learning theory that underpins traditional face-to-face learning is also utilised in the online distance learning environment, as Chapter 4 illustrates. However, this is not to say that new theories of learning related to distance e-learning will not emerge.

A further aspect of Peters' theory with which this author takes issue, in the light of distance e-learning, is his assertion that the characteristic feature of distance education is "its high degree of industrialization" (Peters, 1994f, p. 10). Though this may have been the case in the 1960s, and to some extent is still the case in large distance education institutions, it is not necessarily so in distance e-learning. Many distance e-learning courses offered by today's universities, especially at postgraduate level, are prepared, delivered and assessed by individual tutors or small teams, in the same way that traditional courses are. Moreover, whilst Peters' analogy with industrialisation is plausible, it pays little attention to the pedagogical or andragogical aspects of the learning process.

Peters' (1994d) attempts to see through the mists of industrialisation to post industrialisation, are however more in tune with today's distance e-learning milieu. For example, his predictions that the gap between the teacher and the learner will be reduced and that distance education will, to some extent, replace conventional face-to-face education have to some extent already been realised. However, as Peters' notes, strengthening that link may be more problematic than first anticipated.

Whilst Peters (1994f) refutes that he formulated a theory of distance education, but rather conducted sociological analysis, his work appears to have been awarded the status of theory by others in the field, for example Keegan (1996) and Garrison (2000). This author concurs with Peters' view that he did not create a theory of distance education, as his concept appears to be more concerned with structure and organisation, and is thus of little value as a theory of teaching and learning.

Whether a theory, or a concept, the important question is whether or not the comparison is outdated in the light of distance e-learning. Though Peters' conceptualisation of industrialised education, delivered to the masses, has been considered distasteful by some, the model has been embraced and applied by governments worldwide in the form of open universities. The system has thus made education available to a wide number of people using economies of scale, this author therefore considers the concept to be of value in the context of large distance education institutions, but less so in small-scale distance learning

programmes of the type used for postgraduate studies. Furthermore, the concept serves to highlight the changes that have taken place in distance education over the last forty years or so. Moreover, Peters' concept of industrialisation provides an interesting comparison between conventional and distance education and as such provided a starting point for the development of theory within the field of distance education.

2.4.2 Wedemeyer's theory of independence

Keegan (1996) draws attention to the work of Charles A. Wedemeyer, formerly Professor of Education at the University of Wisconsin in the USA, whose ideas on distance education were largely expressed through his writings in the 1960s and 1970s. Wedemeyer's thoughts on education were somewhat liberal, advocating equal educational opportunities for all regardless of wealth, health, location or social status. He applied the term 'independent study' to distance education at university level.' However, Wedemeyer also saw independent learning as a solution to the shortcoming that he perceived in conventional education, arguing that the original purpose of learning in groups, or classes, was to enable the learner to continue to learn as an individual within a group, but that for reasons of economy this evolved into group learning. He thus saw the separation of teaching and learning as a way forward to allow freedom of learning. He did nevertheless advocate continuous contact between teacher and learner, believing that the outcome of such a method would be self-pacing, individualised learners who would choose their own goals and activities. Wedemeyer's work has been criticised by some on the grounds that it was unworkable and idealistic (Sewart *et al.*, 1983; Keegan, 1996).

Though Wedemeyer's thoughts were conceived in the mid 1960s, his ideas are pertinent to contemporary beliefs about distance education and can in fact be related to online learning, in that online learning can provide opportunities for individualised personal learning whilst maintaining contact between the teacher and the learner. Wedemeyer's ideas influenced others in the field of distance education, including Michael Moore, whose work is discussed later in this chapter.

2.4.3 Holmberg's theory of guided didactic conversation

Holmberg provided the term 'guided didactic conversation' to describe the process of two-way communication between distance education provider and the individual distance learner, thus characterising distance education as individual study under the guidance of the distance education provider (Holmberg, 1983). Holmberg takes a similar stance to Wedemeyer in that he takes a humanistic view of education emphasising the importance of treating students as individuals. He further advocates totally self-paced learning, including allowing students to choose when they take examinations. Taking the view that real learning is "an individual activity and is attained only through an internalising process" (Holmberg, 1983, p. 116). Holmberg considers this to be the background upon which distance education is based, as it leads to a study of how best to facilitate and support individual learning (Holmberg, 1983).

Focusing his ideas on the process of internalisation that takes place when an individual interacts with learning materials, Holmberg (1995) postulates that conversation between teacher and learner can be simulated via the learning materials. By adopting a personal tone in the text the teacher, or course provider, simulates a conversation with the learner. Holmberg (1995) refers to this as 'text elaboration' (p. 48). The student, perceiving the conversational character of the text, is then more able to interact with the materials. From this concept of guided didactic conversation Holmberg developed his theory that course materials that follow the principles of simulated conversation motivate students and facilitate learning (Holmberg 1995). The conversation, however, should be structured and guided. Structured in the form of well organised learning materials and guided by the objectives of the course (Holmberg 1977).

Holmberg summarises his argument as follows:

The stronger the characteristics of guided didactic conversation, the stronger the students' feelings of personal relationship between them and the supporting organisation.

The stronger the students' feelings that the supporting organisation is interested in making the study matter personally relevant to them the greater their personal involvement.

The stronger the students' feelings of personal relations to the supporting organisation and of being personally involved with the study matter, the stronger the motivation and the more effective the learning.

The more independent and scholarly experienced the students, the less relevant the characteristics of guided didactic conversation (Holmberg, 1995, pp. 49-50).

Holmberg (1995) therefore argues that courses that follow the above guidelines produce more successful students than those in which the materials adopt an impersonal tone. Holmberg's theory highlights the importance of the relationship between distance education providers and the student.

The purpose of Holmberg's theory of guided didactic conversation was to simulate the role of the teacher and is thus more pertinent to the correspondence era of industrialisation where learning packages were mass produced and the emphasis was upon written text rather than communication. Whilst the theory still has some value, in that it helps students to relate to the learning materials, it is less appropriate for e-learning where contact between the teacher and learner is more easily achieved.

2.4.4 Moore's theory of autonomy and distance

Michael Moore proposed two theories of distance learning. The first, emanating from the 1970s is his theory of 'independent learning and teaching' (Moore, 1973), which is the term he uses to describe distance education. Moore's work appears to be influenced by that of Wedemeyer, in that both focus on the 'independent learner'. This is not surprising since the two worked together at the University of Wisconsin between 1970 and 1973 (see Moore, 2003).

Moore's (1973) theory of independent learning and teaching is based on the two dimensions of autonomy and distance. Firstly, Moore (1973) contends that conventional teaching that takes place within a traditional environment, such as a classroom, lecture theatre, or seminar, and distance education are structurally different. In defining the dimension of distance Moore (1973) argues that distance can be measured by two variables, which he refers to as 'dialogue' and 'structure', rather than in terms of miles or length of time. Dialogue represents the level of two-way communication within a course and structure represents the

extent to which the course can meet the needs of the individual learner. The second dimension, that of autonomy, is based on the degree to which the learner is influenced by the tutor. The more autonomous learner is therefore less likely to be dependent upon the need for a personal relationship with the tutor. Hence, Moore (1973) contends that the more highly structured and less individualised a course, the higher the distance, because the materials are likely to be designed in such a way that the learner requires less support from the teacher, thus there is low dialogue. Conversely, learners who take part in less structured, highly individualised courses are likely to require a higher level of communication and interaction with the tutor, such programmes will therefore be lower in distance. Moore thus concludes that "the more distant, the more independent, but simultaneously, the more distance, the greater the learner autonomy" (Moore, 1973, p. 674).

2.4.5 Moore's theory of transactional distance

In 1993 Moore presented his theory of transactional distance. Expressing concern about the level of confusion that existed in relation to the use of terms such as 'independence', 'interaction' and 'distance' Moore contends that they were used in an imprecise manner. He further notes that some terms, such as, 'interaction', have been used so generically that the meaning has become obscure. In order to make progress towards a level of agreement in this area he therefore specifies three types of interaction in distance education: learner-content, learner-instructor, and learner-learner, thus re-appraising his earlier position in the light of the development of ICT (Moore, 1993).

Learner-content interaction

Learner-content interaction is the interaction that takes place between the learner and the learning materials. Moore (1993) relates this process to Holmberg's 'internal didactic conversation' and describes the process as learners talking to themselves about the concepts they encounter in the learning materials. Learning materials may be text, radio broadcasts, television programmes or lectures. Early correspondence courses provided guidance notes that explained texts and gave the students directions for their use. This was an early form of guided didactic interaction that aided self-directed learning (Moore, 1993).

Learner-instructor interaction

As the term implies learner-instructor interaction is the interaction that takes place between the teacher and the learner. In this process the teacher aims to motivate and stimulate student learning, implement teaching strategies and provide guidance and support (Moore, 1993).

Learner-learner interaction

The third form of interaction is that which takes place between learners and their peers. This is a new dimension to distance education that has been made possible in recent years through ICT. Learner-learner interaction can include one to one interaction and group interaction and can be a valuable source of learning (Moore, 1993).

Moore (1993) recommends that distance education programmes should utilise all three forms of interaction in order to be effective. Since different technologies support different forms of interaction it is therefore necessary to use a variety of technologies in order to maximise distance education programmes. This can be achieved through the use of both traditional media and newer ICT. Moore therefore recommends the division of labour by utilising the skills of a variety of specialists (Moore, 1993).

There is some level of agreement between the theories of Moore and Peters, in that both contend that conventional education and distance education are structurally different from one another. Furthermore, Moore's suggestion that distance education should employ the division of labour is congruent with Peter's characterisation of distance learning as an industrialised process.

This section has presented five theories of distance education formulated by four authors. As stated at the beginning of this section, the purpose of theory is to present a coherent ordering of ideas in order to explain phenomena and help direct practice (Garrison, 2000). Whilst the five concepts presented here have their similarities and difference each, in its own way, achieves these criteria, firstly by helping us to conceptualise distance education and secondly by providing explanations that have practical applications.

All four theorists are advocates of independent study with Peters and Moore perceiving distance education to be structurally different from conventional education. Each theorist has identified different defining characteristics of distance education. For Peters the defining characteristic is industrialisation, for Wedemeyer it is independent learning, for Holmberg it is simulated conversation and for Moore it is transactional distance.

Whilst these theories are independent in nature, there appears to have been a gradual progression from structural organisation towards communication. At the same time the emphasis seems to have shifted from issues related to distance to those related to pedagogy and andragogy. For example, Peters (1994d) argues that distance education is progressive and that his model of industrialised teaching and learning is also pertinent to the post-industrial society, where distance education will increasingly facilitate interaction between teachers and learners. Whereas, in his earlier work the subject of communication between teachers and learners appears to have been paid little attention. The same shift can be detected in the work of Moore (1993), who in his theory of transactional distance moves away from his original focus on structure and distance to place greater emphasis upon interaction and communication.

Hence, theories of distance education have evolved and adapted as new technologies have emerged. One of the striking features of these theories of distance education is the contention that distance education is structurally different from conventional teaching and learning. Whilst this might have been the case in the mid twentieth century the distinction is likely to become less sharp in the future as conventional education and e-learning become more integrated.

Some of the concepts presented in this section may appear to be narrow and grounded within the specific decade from which they emerged in the latter half of the last century. However, they provide an insight into the various concepts of distance education, whilst at the same time providing an overview of the growth and phenomenon of the area.

Conclusions

This chapter has presented the background to traditional distance education. Firstly, a brief history of the emergence and growth of the area was presented. Secondly, distance education was set in context in relation to other forms of teaching and learning. Thirdly, three debates that helped to define distance education were presented. Finally, the theoretical concepts that have underpinned distance education were examined. Viewed together this chapter provides an overview of the unique development of formal distance education from the mid nineteenth century to the end of the twentieth century.

The chapter has provided the reader with an introduction to the origins and growth of distance education by selecting from the literature those issues that demonstrate how the field developed from its inception to the present time. The chapter highlights the shift from private sector to public sector provision of distance education. This shift, which took place at the end of the 1960s, was an important landmark in the history of distance education as it triggered worldwide growth and academic research. By the end of 1995 institutions around the world were offering distance education to over 3.4 million students.

Distance education has traditionally been categorised as a 'non-traditional' form of education that is entirely separate from conventional forms of education. However, the distinction between distance and face-to-face education is likely to be eroded as e-learning progresses and is used to support conventional methods of teaching and learning.

The literature review highlighted the period of transition that distance education underwent in order to establish its role within education. This period spanned more than thirty years from the mid 1960s until the end of the twentieth century. During this time a number of issues were resolved including the definition, terminology, and status of distance education. Parallels can be drawn between this period and the late twentieth century and early twenty first century when education is undergoing similar experiences in relation to defining the appropriate labels, definitions and boundaries for e-learning.

As distance education gained recognition and was more widely implemented the need for a coherent theory became apparent and a number of theorists put forward their concepts. The descriptions of distance education theories and concepts presented above represent the major contributions to the field. The theories discussed illustrate the way in which the field has progressed, from a focus on structural issues related to geographical distance, to considerations of teaching and learning.

Whilst the issues discussed in this chapter largely relate to traditional distance education, many are of relevance to distance education in the online environment. Students who study at a distance share similar experiences, regardless of the medium by which they study.

The next chapter discusses the way in which the Internet has been utilised to facilitate distance education, which has led to the emergence of what is known as distance e-learning or online distance learning.

Chapter 3

The Emergence of e-learning: Issues and Concerns

Alvin Toffler (1980) described human history as being divided into three waves or patterns within society. Toffler saw the first wave as the agricultural phase starting c.8,000 B.C. when culture began to develop and wealth was land. The second wave began with the Industrial Revolution in the 18th century and was based on machinery, muscle and power. The third wave, based on mind rather than muscle, is driven by information technology and frequently referred to as the 'information age' or 'knowledge age'. This third wave places greater emphasis on freedom and individualism, as opposed to mass conformity, which epitomised second wave society. Toffler predicted that in the third wave technological advances would make information more available to the 'man in the street' and knowledge would become a major resource (Toffler, 1980).

Toffler's third wave has become a reality through the advent of the Internet. The Internet has provided new horizons for distance education by lessening the communication gap between tutors and students and between the students themselves. Whilst the Internet provides new opportunities for education it also presents a number of challenges and has stimulated considerable debate amongst academics. A wide range of research into online learning has been conducted since the mid 1990s, from which a variety of issues are now emerging. The purpose of this chapter is to explore these issues and to determine how the present study can advance knowledge in the area of distance e-learning.

This chapter presents the findings from the review of the literature by exploring the emergence of e-learning and the issues and concerns surrounding its implementation. Firstly, the way in which Internet technologies have lessened the communication gap in distance education, thus facilitating e-learning, is considered. Secondly, the impact of the Internet, and other drivers towards e-

learning, on the practice of teaching and learning, are explored. Thirdly, the debate that has ensued as a result of that impact is examined. The two remaining sections move the discussion forward by examining e-learning in practice. The first of these is devoted to online communication, as this is an aspect of e-learning that dominates much of the literature and hence requires closer examination. Finally, the reality of e-learning is discussed by presenting the findings of those who have practiced and researched it. The chapter concludes by highlighting the gaps in the research and setting out the purpose and aims of the study.

3.1 The role of technology in distance education

Why is the Internet likely to succeed as a vehicle for real education, when so many other inventions have faltered? (Rudenstine, 1997, p. 5).

Neil Rudenstine, President of Harvard University, posed this question in his opening address to the Harvard Conference on The Internet and Society in 1996. In so doing, he went on to express his belief that "there is a very close fit between the structures and processes of the Internet, and the main structures and processes of university teaching and learning" (Rudenstine, 1997, p. 5), whereas the same fit does not exist with radio, film and television. In expanding his argument Rudenstine made analogies between university structures and the capabilities of the Internet, including its ability to facilitate communication for learners. This section illustrates that whilst technology has always facilitated education, it is the Internet that has enabled both synchronous and asynchronous two-way communication regardless of time and place, thus lessening the communication gap for distance learners.

3.1.1 Three generations of distance education

Echoes of Toffler's thinking are evident in the writings of Nipper (1989) and Garrison (1993), both of whom refer to first, second and third generations of distance education, linking the three eras to the historical development of "production, distribution, and communication technologies" (Nipper, 1989, p. 64). Distance education has always employed the use of technology, from the

print-based technology that underpinned the early form of correspondence education, to the introduction of information and communication technologies (ICT) in the latter half of the twentieth century. As technologies evolved they enabled greater communication between the tutor and distance learner and established communication amongst the learners themselves.

Nipper (1989) and Garrison (1993) describe first generation distance education as correspondence teaching with written printed material as the medium. In this model tutor-to-student and student-to-tutor feedback processes are slow and sparse resulting in a lack of direct interaction between the two (Nipper, 1989; Garrison, 1993). Second generation distance education, labelled the multi-media model, emerged from the late 1960s onwards. In addition to printed materials the model utilises media such as audio cassettes, the telephone, and to some extent computers, in the form of computer aided learning (Nipper, 1989). In this model feedback processes are very similar to those of first generation systems. The communication flow is still slow and, with the exception of the telephone, mostly one-way (Nipper, 1989; Garrison, 1993). First and second generation distance education concentrate on the production and distribution of teaching materials to learners. Two-way communication between tutor and student is minimal and often with an intermediary, rather than with the originator of the materials. Communication between learners is more or less non-existent (Nipper, 1989). Despite advances in technology first and second generation distance education are still commonplace in the UK and throughout the world.

Third generation distance education, known as the telelearning model (Nipper, 1989), allows for direct communication between the tutor and the remote student, using two way synchronous and asynchronous communications media, and differs significantly from its ancestors. This progression from first to third generation marks an increase in learner control, allows opportunities for dialogue, and places an emphasis on thinking skills rather than mere comprehension.

Internet technologies and interactive multimedia now provide new horizons for distance education. With the rapid advances in technology further generations of distance education are doubtless on the horizon, however it is the issues related

to third generation distance education, that which facilitates two way and group communication, that are the concern of this study.

In first and second generation models of distance education the institution distributes the materials and the students learn from them, thus allowing little communication between the distribution and acquisition of information (Nipper, 1989). This produces a gap between teaching and the internalisation process that takes place within the student (Nipper, 1989). The gap occurs due to a lack of interactivity in which students are unable to ask questions or extend their learning through dialogue, either with the tutor, or their peers (Nipper, 1989). Third generation distance education includes interactive communication technologies that provide opportunities for overcoming this communication gap. Moreover, third generation technologies may help to decentralise distance education by placing greater emphasis on the individual as epitomised by Toffler's (1980) third wave.

First and second generation distance education encompasses the period during which the field was evolving and becoming established. The issues surrounding these two paradigms of distance education have been discussed in detail in Chapter 2. The remainder of this chapter concentrates on third generation distance education as identified above. The following explores the technological changes that led to third generation distance education.

3.1.2 The emergence of the Internet

The Internet represents the most important technological development of our generation; its effects may surpass those of television and could, over the decades, equal the influence of the printing press. (UCLA Centre for Communication Policy, 2000, p. 1).

A wide range of technological developments has influenced education, including writing, printing, the telephone, television, and the computer. Such developments spanned various lengths of time, however the speed of development of the Internet has been unprecedented in comparison to other technologies (Waldvogel, 1999). Written language developed about 3000 BC,

some thousands of years after spoken language, and provided a medium for the transmission of thoughts across time and space (Spencer, 1999). The writing of a manuscript could take up to one year therefore books were valuable and scarce. The next major development in communication was the invention of the printing press by Johannes Gutenberg in 1457, which provided rapid production and distribution of reading materials. This allowed for the sharing of information across distances, reduced the cost of books, made education more widely available and changed the way in which teaching and learning took place (Waldvogel, 1999). The printing press opened the door to the production of newspapers, television, and computers and was the most important technological revolution known to man (Waldvogel, 1999). Within a few decades Guttenburg's printing press dramatically changed the ways in which people communicated, learned and thought through the sharing of information and knowledge (Waldvogel, 1999). The number of books printed in the fifty years after the invention of the printing press equalled the number written by the scribes of Europe in the preceding one thousand years (Spencer, 1999).

For almost five hundred years after the invention of the printing press teaching methods changed very little and the main tools were writing materials and books (Spencer, 1999). The twentieth century witnessed a variety of technologies that were utilised in distance education including radio, television, and audio and video-cassettes. Most of these technologies, however were broadcast media and used one-way communication. With the exception of the telephone, the Internet was the first technology to provide two-way communication for distance education.

Distance education relies upon a communication medium to enable learners to study at a distance from the tutor. Advances in information and communication technologies (ICT) that occurred in the last two decades of the twentieth century reduced the time lapse in communication, thus fostering both synchronous and asynchronous tutor-to-student and student-to-student interactivity in distance education (Barker *et al.*, 1993). Moreover, the relative cost of using ICT has fallen due to the mass production of faster computer chips, broadband technology that provides speedier transmission of data, and the deregulation of

the telecommunications industries that took place during the 1980s in the United Kingdom and the United States (Harry *et al.*, 1993; Salas *et al.*, 2002). As a result of these changes distance learning students can gain wider access to ICT, from both the home and the workplace, thereby reducing the communication gap in distance education.

Internet growth

In 1969 research commissioned by the Advanced Research Projects Agency (ARPANET) in the United States formed the foundation of what is now known as the Internet (Zakon, 2003). The Internet has grown from four initial university hosts² (UCLA, Stanford Research Institute, the University of California Santa Barbara, and the University of Utah) in 1969 to 171.64 million by January 2003 (Zakon, 2003). Internet usage is difficult to estimate as one online computer may provide access for single or multiple users. Research reveals a large number of Internet surveys available on the World Wide Web. Whilst surveys of this nature need to be read with caution, as they use a variety of methodologies both for gathering data and as a unit of analysis, they do provide us with an estimate of Internet growth and usage. NUA Internet Surveys (2003) estimate the total number of Internet users in September 2002 to have been 605.60 million³. Table 3.1 provides a geographic breakdown of this figure.

² Host is defined as "a computer system with registered IP address" (Zakon 2000).

³ NUA's surveys are based on "both adults and children who have accessed the Internet at least once during the 3 months prior to being surveyed. Where these figures are not available, we use figures for users who have gone online in the past 6 months, past year, or ever. When more than one survey is available on a country's demographics, NUA will take the mean of the two surveys or, in the case where NUA feels one study may be more comprehensive/reliable than the other, NUA will quote this figure over the other" (NUA 2000).

Table 3.1: Estimated worldwide Internet usage in 2002

Region	Million
Africa	6.31
Asia/Pacific	187.24
Europe	190.91
Middle East	5.12
Canada and USA	182.67
Latin America	33.35
World total	605.60

Source: NUA Internet Surveys (2003).

Of the total 190.91 million users in Europe 34.3 million were in the UK and 1.31 million in Ireland (NUA Internet Surveys, 2003).

The World Internet Project aims to study and compare changes in Internet use on a worldwide basis. The first survey conducted by the project (UCLA Centre for Communication Policy, 2000) examined the social impact of the Internet in the United States of America (USA). It is recognised here that the USA is one of the world's richest nations, thus its Internet usage is not representative of countries worldwide, as the data in Table 3.1 above demonstrates. The findings of the survey are nevertheless considered to be of value in the context of this study, as they provide a general overview of Internet growth and acceptance in a country where educational values are similar to those in the UK. The study shows that the largest proportion of Internet growth has taken place since 1994 when the Internet was of little relevance to most people. By 1997 nineteen million people in the USA were using the Internet, in 1999 the number rose to 100 million. In little more than thirty years the Internet has become the fastest growing electronic communication tool known in history. It took only seven years for the Internet to reach thirty per cent of households in America. By comparison it took seventeen years for television, thirty eight years for the telephone, and forty six years for electricity to permeate thirty per cent of American households (UCLA Centre for Communication Policy, 2000).

As an indication of the level of social acceptance of the Internet the UCLA report (UCLA Centre for Communication Policy, 2000) cites the number of times that

the word 'Internet' was used in all major American media between 1990 and 2000. The data has been adapted to a table for presentation here.

Table 3.2: Increasing usage of the word Internet in American media

Year	Number
1990	346
1995	70,944
1997	219,866
1999	529,343
First three quarters of 2000	700,000

Source: UCLA Centre for Communications Policy (2000).

The increase of over two thousand per cent in the occurrence of the word 'Internet' in American publications, in less than ten years, illustrates the growing integration of the medium into society.

It is thus evident that technology has always played a part in distance education, from the printed correspondence first used in the mid 1800s, to the inception of Internet technologies at the end of the twentieth century. As distance education has progressed through three generations of technology, the communication gap has lessened, for both tutors and learners. The availability of the Internet is increasing worldwide, the number of users is escalating rapidly, and there is a growing acceptance of the medium as part of everyday life. By September 2002 over fifty eight per cent of the UK population had access to the Internet and thus the potential to engage in distance learning via this medium. Hence, widening access to the Internet, coupled with its ability to reduce the communication gap, may indeed lead to its success as a medium for education (Rudenstine, 1997). Concomitant with the growth of the Internet there have been educational and societal changes that have revitalised interest in distance education. The next section discusses these changes and how, along with the growth of the Internet, they have led to the emergence of what is now known as online learning or e-learning.

3.2 The changing landscape of teaching and learning

The countries that harness the power of telecommunications and computing to the education and training needs of the workplace will be the economic leaders of the 21st century (Bates, 1995, preface).

Widening access to the Internet, and its growing social acceptance, have had a significant impact on how students and universities are approaching the whole area of teaching and learning, in particular it has caused many universities to re-think how they deliver distance education (Dearing, 1997), thus creating renewed interest in a method of learning that many still associate with Isaac Pittman in the 1840s.

The growth of the Internet has not though been the only driver towards renewed interest in distance education. Government initiatives and societal changes, many of which are also technology driven, have had a huge impact on teaching and learning over the past ten or so years (O'Donoghue *et al.*, 2001; Nichols, 2002; Tait, 2003).

3.2.1 Drivers towards distance e-learning

The UK government is committed to promoting a culture of lifelong learning. As part of this commitment the report '*Learning for the Twenty First Century*' (Fryer, 1997) introduced the concept of the University for Industry. The University for Industry, in partnership with established education providers, offers a wide range of courses that are now marketed under the banner of 'LearnDirect'. Eighty per cent of these courses are delivered online.

The '*National Committee of Inquiry into Higher Education*' (Dearing, 1997) set out a vision for how ICT would change the face of higher education. The report places an emphasis on the importance of creating a society which is conducive to lifelong learning and in which all students are provided with the opportunity to develop to their fullest potential. The report notes that higher education is increasingly making use of new technology to deliver distance education to the home and workplace. More importantly, in setting out its commitment to the wide-scale use of technology for the delivery of educational programmes, the report clearly highlights the importance of research to investigate the

effectiveness of such technologies for learning and to examine how students utilise the technology.

The UK government's commitment to widening participation has resulted in a steady rise in the number of full-time non-traditional students in higher education (Green, 1999). Until the latter part of the twentieth century a university education was viewed as the prerogative of only the brightest of students, or in some countries of those who could afford to buy places. Expectations have increased and higher education is now considered to be the right of anyone who wishes to pursue it (Laurillard, 1993; Rogers and Wells, 1997; Reeves, 1999). From 1985/6 to 1997/8 the number of full time students in UK higher education more than doubled, rising from 599,000 to 1,230,400 (Green, 1999), thus exerting pressure on staffing levels, university accommodation, car parking facilities, and library resources.

Changing working conditions have led to an increase in adult learning. Technological innovation has changed the pattern of people's working lives and increased the probability that individuals will have numerous jobs throughout their lifetime (Ruberti, 1997; Lewis, 1999). Employers in the UK, in common with many other countries, require a skilled workforce in order to maintain a competitive edge in global markets (Lewis, 1999). Technological changes have led to the requirement for employees to update their skills on a regular basis. Professionals also need to maintain their continuing professional development. Consequently, employees are increasingly seeking vocational and postgraduate qualifications (Lewis, 1999). High costs and pressure of work mean, however, that employers are frequently reluctant to release staff to attend part time courses (Lewis, 1999). Therefore, employers and educational institutions are seeking new ways to provide access to education for employees, both at undergraduate and postgraduate levels (Lewis, 1999).

Changes in social conditions, such as, rising life expectancy, the increasing mobility of the population, and the escalating number of working mothers, mean that the market for education has expanded rapidly in recent years (Rogers and Wells, 1997; Beller and Or, 1998). Consequently, the student population has changed and now includes a higher proportion of mature adult learners. Adult

learners are frequently in full time employment with family responsibilities and would therefore prefer to study at the time and place of their choosing (Beller and Or, 1998). Whilst traditional learning environments have many advantages, for instance, the opportunity to mix with diverse populations and those with similar academic interests, they cannot always meet the needs of this growing market, as they restrict learners to time and place. Hence, there is an increasing demand for more flexibility. In recent years widening access to technology has provided opportunities for meeting some of these needs, as a result the utilisation of the Internet as a medium for distance education has been seen as a solution to some of these problems.

These converging changes, coupled with the advent of online learning, present a number of challenges for higher education and are discussed next.

3.2.2 Challenges facing universities

Paradoxically, as the demand for higher education increased, many began to question the efficacy of the traditional university system (Reeves, 1999). It is frequently argued that our universities have changed little since the mid 19th century. In 1995, Negroponte in his book entitled 'Being Digital', cited Seymour Papert's assertion that a surgeon transported from the mid nineteenth century to a modern operating theatre would not recognise a thing and would be rendered useless due to the advent of modern technology. Negroponte uses Papert's story to illustrate that should the same scenario be applied to a mid nineteenth century teacher, transported to a late twentieth century classroom, that the teacher would be quite at home in his or her surroundings, and that other than the limitations of subject matter, would be able to continue where his or her modern day counterpart left off (Negroponte, 1995). It is argued here that Negroponte's analogy no longer holds true, but rather serves to illustrate the rapid pace of change that has taken place in educational technology since 1995. Whilst many so called 'traditional' classrooms in the western world at the beginning of the twenty first century may ostensibly look similar to those of the nineteenth century, the teaching strategies used are frequently supported by technology, for instance, PowerPoint presentations and the use of the Internet. Moreover, the 'classroom' of today may not have a physical location but comprise students from

various locations, for whom the classroom exists in cyberspace. Neither of these scenarios would be recognisable to the nineteenth century teacher. Thus, at the beginning of the twenty-first century, technology is impacting the traditional classroom.

Re-evaluating teaching methods

Whilst higher education utilises modern technologies for teaching and learning it is suggested by many (Ehrmann, 1995; Wakeford, 1997; Arnold, 1999; Web-based Education Commission, 2000; Nulden, 2001) that our teaching styles are rooted in the Industrial Age and thus fail to meet the needs of today's students. Toffler (1980) asserts that whilst the mass education system of the Industrial Age, built on the factory model, had an overt curriculum, consisting mostly of the three R's, there lay underneath a covert curriculum. The covert curriculum was more basic and comprised three courses containing the three attributes of a good factory worker – punctuality, obedience, and rote learning (Toffler, 1980). This covert curriculum was preparation for life in the industrial society: show up on time, take orders without questioning, and learn to perform repetitive tasks (Toffler, 1980). It is argued here that punctuality, obedience and rote learning are of little use to today's online learners who can study at the time and place of their choosing, are unsupervised by the tutor, and in the information age need the skills required to seek information, to analyse, and to debate, rather than to learn by rote. Thus, the teaching styles of the Industrial Age are totally inappropriate for today's information age.

Wakeford (1997) contends that the lecture has had its day. The origins of the lecture theatre, originally designed so that many could reap the benefits of the one and only book available, are widely attributed to the 5th century BC in Ancient Greece, with Plato's oratory of Socrates texts setting the model of teaching that is still central in modern universities (Nyiri, 1997; Wakeford, 1997; Margolis, 1998; Arnold, 1999; Nulden, 2001).

The major criticism of the lecture is its broadcast one way style of teaching (Ehrmann, 1995; Wakeford, 1997), referred to by Laurillard (1993) as the "unidirectional transmission model" (p. 187). It is argued that the large number of students in lectures places the learner in a passive role, resulting in a decline in

dialogue between tutor and learner (Lewis, 1997; Wakeford, 1997; Arnold, 1999). Ehrmann (1995) contends that a consequence of this one way flow of information is that the tutor frequently has to make assumptions about students' prior levels of knowledge. In so doing he or she often over estimates students' levels of understanding of the subject and subsequently compounds misunderstandings by presenting yet another layer of misunderstood information to be added to previous misconceptions (Ehrmann, 1995).

The lecture method evolved when higher education was more élitist and academics believed that their role was to deliver knowledge and that the students' role was to understand it as best they could (Laurillard, 1993). Whilst this method might be appropriate for the brighter more motivated student, it can present a challenge for those who require more elucidation (Laurillard, 1993). A further consequence of the uni-directional model of teaching is that lecturing staff frequently report declining attendance at lectures after the first few sessions and even when attendance is high there is usually little interaction between the tutor and the students (Wakeford, 1997). Furthermore, Mayes (1997) argues that the lecture is ineffective for the transfer of knowledge, as students fail to listen for meaning, but instead concentrate on taking notes. Thus, the belief that the face-to-face large lecture theatre style of teaching is the most economical method of knowledge transfer is in question, as such an environment makes it difficult for students to develop as independent learners (Lewis, 1997).

Growing concerns that the traditional lecture style of teaching can no longer satisfy the needs of today's students have provided opportunities for re-thinking higher education as a whole. Some, (Daugherty and Funke, 1998; Arnold, 1999) assert that the Internet has the potential to replace traditional university education and could cause a revolution in teaching and learning. Arnold (1999) contends that face-to-face teaching in large lecture theatres can be so remote that little is to be gained from the tutor and students being present in the same time and place. He suggests that in the future the Internet will facilitate greater communication between the learner and tutor to the extent that distance education will eventually substitute conventional forms of teaching and learning. The consequence being that 'distance' will no longer be an issue in education (Arnold, 1999). Hence, the

long held assumption that face-to-face teaching is the piece de résistance, and that distance education is sub standard, is called into question.

Garrison (1999), whilst supporting the view that distance has become less of an issue, asserts that Arnold's argument is flawed, as whilst lectures may have their drawbacks they also have their advantages. For example, in face-to-face teaching it is possible to adapt the delivery of teaching materials according to the needs of the students, whereas distance teaching materials are static and as the tutor is separate from the learners, he or she is unable to perceive their changing needs. Moreover, the lecture is not the sole teaching method used in conventional higher education, face-to-face interaction takes place on a regular basis via tutorials and other forms of contact (Garrison, 1999). Thus, little is to be gained from pitching conventional and distance education against each other as the two may indeed compliment one another (Garrison, 1999).

However, the effectiveness of the lecture for student learning has rarely been examined (Wakeford, 1997) and the use of the Internet for online lectures may help ease some of the problems experienced in the large lecture theatre. Students are under increasing financial pressure and many have part-time jobs which exert additional pressure on their time (Wakeford, 1997). The use of the Internet means that academic knowledge can be made more freely available in the form of lecture notes, or recordings, which can be accessed at the convenience of the student, rather than being a transient medium delivered at the time and place chosen by the lecturer (Wakeford, 1997). A further advantage of using the Internet is that well prepared lectures can be accessed numerous times and are not redundant once the lecture has been delivered. Unlike the broadcast method of large lecture theatres, online lectures can be supplemented by email and computer conferencing to provide the type of two-way discourse that is frequently lacking in the lecture theatre (Ehrmann, 1995). Ehrmann argues that the use of online technologies can encourage students to ask probing questions and thus facilitate deep learning and not just surface learning. However, Ehrmann also expresses fears about the possible misuse of Internet technologies. He warns that using Internet technologies to perpetuate the uni-directional model of teaching, for example by beaming lectures via video link to thousands of

students, could isolate learners even further from the institute and from each other (Ehrmann, 1995).

Growing competition

A further challenge faced by universities is the threat of competition. The Internet has provided opportunities to reach wider markets, both nationally and internationally, however, it has at the same time increased competition (Kaplan, 1997; Waldvogel, 1999).

New technology is changing the way information is stored and transmitted. This has implications both for the skills which higher education needs to develop in students, and for the way in which it is delivered. It opens up the possibility of higher education programmes being offered remotely by anyone anywhere in the world, in competition with existing UK institutions, but also offers a global market place in which UK higher education can compete (Dearing, 1997, Summary Report [20]).

As predicted in the *Dearing Report* (1997) e-learning has become big business, not just for government funded institutions, but also for private enterprise. Universities now face competition for students from both the public and private sectors. The private sector has seen the rise of corporate universities and virtual universities (Waldvogel, 1999). An example of the large 'virtual universities' is the Western Governors, which began as a collaborative project between higher education institutions in the western states of the USA, but which has expanded to include institutions from further afield. The Western Governors University, allegedly inspired by the UK's Open University (Cornwell, 1997), differs from other forms of distance education in that it operates as a broker allowing students to take modules from any of the member institutions (Nourse, 1997). The university opened its virtual doors to students in the summer of 1998. Whilst critics contend that such forms of education deny young people the opportunity to socialise, the Western Governors' argue that the 'Virtual U', as it has become known, will ideally suit the older non-traditional student, who in the USA have overtaken the traditional student population (Cornwell, 1997).

If educational institutions want to preserve and improve their reputations, retain their students, and remain competitive in this new and expanding market they need to gain an understanding of the needs of online learners (Rangecroft *et al.*, 1999). A large number of educational institutions are turning to technology and

distance education in an attempt to address some of the problems outlined above (Thomas *et al.*, 1998). The Internet is seen as a medium that will enable them to deliver education to a larger and more diverse range of students whilst maximising existing resources and funds (Thomas *et al.*, 1998). However, pressure to deliver online courses, coupled with inexperience in using the technology, has created many challenges, both for educational institutions and for tutors, who frequently fail to consider the needs of the e-learner (Thomas *et al.*, 1998; Beaudin, 1999).

The Internet has thus provided new horizons for teaching and learning, particularly in the field of distance education, it has not, however, been the only driver towards e-learning. Government initiatives, workplace and societal changes, and the rising number of adult learners have also played their part. These changes have prompted higher education to reflect on current methods of teaching and learning and helped identify practices that some consider unsuitable for student centred learning. As a consequence, many in higher education have turned their attention to the Internet to help address some of these issues. The Internet, however, brings its own challenges for teaching and learning. Universities now face increasing competition for student enrolments from both the public and private sectors. Amidst the enthusiasm for online learning there is an underlying warning that if we are to avoid transferring the problems experienced in the traditional learning environment to the virtual one, we need to proceed with caution. Thus, the need for research to investigate the effectiveness of the Internet as a medium for teaching and learning is identified. Furthermore, this section has drawn attention to the rise in adult learners and highlights the need for closer attention to be paid to this group of students. This section, combined with the preceding one, has presented the rationale behind the migration to e-learning. However, this shift has re-opened the debate on distance education and the issues emerging from this are discussed in the following section.

3.3 Debates surrounding the use of technology for learning

A mistrust of technology in education is by no means new. Plato was concerned that transforming the spoken word into written text would diminish its meaning (Harasim, 1989; Walkosz *et al.*, 1997; Klass, 2000). He reasoned that speech is an imitation of thought and that writing is an imitation of speech, thus writing is but a detached lifeless replication of thought (Harasim, 1989). Writing can, however, transcend time and space, as our knowledge of Plato's thinking on this matter, through the written word, bears witness (Harasim, 1989; Walkosz *et al.*, 1997).

The advent of online learning has sparked considerable controversy. Firstly, with regard to whether or not technology has any impact on learning, and secondly, concerning whether online learning is driven by sound educational principles, or by profit.

3.3.1 The effect of media on learning

There has long been controversy about whether technology affects learning. Clarke (1983) and Agostino (1999) argue that media is just a vehicle to deliver learning and that there is little evidence to show any link between media and learning outcomes. Clark (1983) illustrates this point by making an interesting analogy between learning technology and a grocery delivery truck, arguing that media does not affect learning achievement any more than "the truck that delivers our groceries causes changes in our nutrition" (Clark, 1983, p. 445).

Numerous studies have reported that there is no significant difference between the learning outcomes of students' studying by distance learning and those studying in a face-to-face learning environment, thus supporting the views of Clark (1983) and Agostino (1999). Such studies have been conducted since 1912, when Edward Thorndike (see Clark, 1983) explored the use of pictures in education, and have subsequently focussed on a variety of media for distance education including radio, television, video, and more recently the Internet. This has led to what is now referred to as the 'no significant difference phenomenon' (Russell, 1999). The no significant difference phenomenon has been so widely

reported that the usefulness of such studies has diminished over time (Saba, 2000).

Studies that report the no significant difference phenomenon have, however, been dominated by comparative research of a quantitative nature. There is, therefore, a view (Russell, 1997; Phipps and Merisotis, 1999) that such studies reveal little and leave too many questions unanswered. It is further argued (Russell, 1997; Phipps and Merisotis, 1999) that such studies are flawed in design and that the results are thus inconclusive. Russell (1997), for instance, in highlighting the weaknesses of such studies notes that whilst technology will enhance learning for some, it will inhibit learning for others. Thus when combined, the results of such comparative studies will logically show no significant difference. Thus, whilst comparative studies demonstrate that distance learners can achieve learning outcomes that are comparable to their classroom counterparts, they may be of limited value, as they fail to reveal the complexities of distance education in relation to the media and the technologies employed (Russell, 1997; Saba, 2000).

Russell (1997) argues that technology does impact learning and that it is not neutral, as individual learning differences will affect how students react to its use. This author shares this view and learning differences are discussed in detail in the following chapter. Russell further contends that comparative studies mask how and why technology facilitates learning for some, but acts as a barrier for others (Russell, 1997). A better approach to research in distance education media would therefore be to identify those who do, and those who do not, benefit from technology and to determine how each group can best be accommodated (Russell, 1997).

3.3.2 The commercialisation of higher education

The rapid and exponential growth of online learning has led to educationalists expressing both optimism, and predictions of dire consequences. Those who are optimistic have been accused of advancing with 'ideological bravado' (Noble, 1998c), whilst the more cautious are frequently referred to as 'Luddites'.

Amongst those who have expressed concerns about online learning is David Noble, a Canadian history professor. In a series of articles entitled 'Digital

Diploma Mills' (1998a; 1998c; Noble, 1998b; 1999), Noble warns that from the early private correspondence colleges to the advent of online learning, distance education has not been driven by technology, but by profit. Noble (1999) asserts that far from being progressive, online learning is reminiscent of the mass-production era of correspondence education, where profit, rather than quality, was the driver. Noble's parallel between the late 1800s and late 1900s focuses on the quality of distance education courses, which he argues are the subject of aggressive marketing and substandard instruction. He further argues that the current commercial element within distance education is stronger than it was in its counterpart one hundred years ago and that the investment that it has entailed will fail to deliver on its promises (Noble, 1998a).

Noble contends that universities originally entered the distance education market in an attempt to protect their academic area. He believes that universities are taking enormous risks by investing vast amounts of money in online learning when little research has been conducted into the subject. Noble (1998a) further argues that in North America online learning has been forced upon both lecturing staff and students. The crux of Noble's argument is that university administrators are driving online learning in an attempt to transform the intellectual capital behind courses into artefacts that can subsequently be sold. Once courses are turned into artefacts Noble envisages that the lecturers, as originators of the materials, will be alienated both from the materials and the students, and that courses will be delivered by low paid instructors, thus making academics redundant, but leaving their intellectual capital behind (Noble, 1998a; 1998c; 1998b; 1999).

Noble therefore argues that online learning represents a battle between students and lecturers on one side and university administrators and technology providers on the other. A battle which faculty at Toronto's York University labelled "the classroom vs the boardroom" and which, according to Noble, heralds the "commercialisation of higher education" (Noble 1998a, Internet article). Noble further contends that no serious study of online learning has been made and that students have seldom been given the opportunity to voice their opinions (Noble, 1998a).

Noble's expression of concern for the needs of students should be weighed against his concern for the job prospects of university faculty, an aspect of online learning, which consumes a large proportion of his articles. Noble's main fear is that once lecturers place their materials online they will lose control of their intellectual property rights, which will be in the hands of administrators, and that lecturers will then be replaced by less skilled staff. Indeed, this is a threat that concerns academic staff in many universities, however, Klass (2000) makes the point that materials similar to those presented by lecturers are widely available in libraries and book shops, but seldom present a threat to the role of the lecturer. Moreover, institutions that have embraced the use of technology, have shown that such fears are unfounded and the lecturer's role and status have improved, as their use of technology allows them more time for the creation and development of materials, curriculum development, liaison with industry, and research (Lewis and Merton, 1996). Furthermore, Noble's argument that e-learning will be used to down size academic staff could just as easily have been applied to the use of the lecture theatre to deliver to large numbers of students rather than small group teaching (Klass, 2000). Ironically, Margolis (1998) suggests that online distance education can enhance education by eliminating the outdated lecture. Moreover, traditional universities are unlikely to face serious competition from online learning at undergraduate level. The newer virtual universities market their courses towards the non traditional and part-time adult sector, rather than towards first degree level (Klass, 2000).

Noble appears to be making a generalisation based on a few North American universities and applying it to higher education as a whole. An examination of the ways in which online distance education is being used to deliver courses to those who cannot attend universities may prove to be of more value, as such studies may highlight both the advantages and disadvantages of online education.

Noble's assertion that online learning is driven, not by technological change, but by the commodification of education, raises a number of pedagogical concerns and highlights the need for research into students' experiences of online learning. Noble's papers are somewhat filled with fear inducing rhetoric, describing online courses as "the technological tape worm in the guts of higher education" (Noble,

1999, Internet article); using George Santayana's emotive quote "Those who cannot remember the past are condemned to repeat it" (Noble, 1999, Internet article); and stating that "students want the genuine face-to-face education they paid for, not a cyber-counterfeit" (Noble, 1998a, Internet article). Nevertheless, his argument is persuasive and challenging and should not be entirely dismissed. Noble's views thus further highlight the need for research to help determine the student perspective of e-learning.

Renewed interest in distance education has evidently raised controversy. On the one hand it is argued that media neither diminishes nor enhances learning outcomes, on the other it is argued that e-learning has the potential to seriously damage academic learning and reduce the quality of teaching. There is, however, a further view, which advocates taking a closer look at the intricacies of e-learning through qualitative research, as opposed to comparing learning outcomes through quantitative study. The affect that learner differences may have upon how learners' approach e-learning has been touched upon here and this is an area of growing concern that is also explored in greater detail in the next chapter. Hence, the need for additional research into e-learning is further identified, though it is more precisely defined here as a need for qualitative research. Moreover, this section has highlighted the need for qualitative research that focuses on the students' views of e-learning. The two remaining sections in this chapter examine the use of Internet technologies for distance e-learning. The next section focuses on the role of online communication and the final section explores the wider aspect of e-learning.

3.4 Online communication

One of the major drawbacks of conventional distance education has been the lack of opportunities for interaction (Thompson, 1990; Filipczak, 1995). It has been argued (Pitt and Clark, 1997; Phillips *et al.*, 1998; Pincas, 2000) that Internet technologies have the potential for overcoming this problem. Asynchronous technologies in the form of email, mailing lists, threaded discussion boards, and synchronous technologies such as Internet Relay Chat and Instant Messenger, provide links between students and their tutor, students and the institution and between one other, thus helping to reduce the communication gap in distance

education. The level of interaction supported by these technologies extends beyond traditional classroom hours and enables collaboration regardless of geographical location or time zones (Pitt and Clark, 1997). However, the realities of using online communications for distance education may be more complex than originally anticipated. To place the discussion in context, this section firstly defines online communication and secondly explores the importance of communication for learning. This is followed by an examination of the perceived benefits of online communication. The section concludes by discussing the issues and concerns highlighted in the literature.

3.4.1 Definitions and terms

The use of online communication technologies for learning is frequently referred to as computer mediated communication or computer mediated collaboration, the abbreviation 'CMC' being in common use for both techniques. Both terms have been in use since the late 1980s, before the Internet was widely used for teaching and learning (Salmon, 2000). Interpretations of the first term, that of computer mediated communication, appear to differ. According to Santoro (1995) the term can be narrowly defined as the use of online computer technologies for direct human-to-human communication, yet broadly defined as encompassing all computer uses. The definition provided by Paulsen (1995) centres around technological aspects, rather than human communication, and encompasses information retrieval systems:

Computer-Mediated Communication (CMC): Transmission and reception of messages using computers as input, storage, output, and routing devices. CMC includes information retrieval, electronic mail, bulletin boards, and computer conferencing (Paulsen, 1995, online).

Kaye (1989) also defines computer mediated communication as including information retrieval systems such as online databases. More recently the term has come to be used in the narrower context to describe asynchronous online technologies that support one-to-one or one-to-many communication via the Internet and predominantly includes the use of email, email lists and bulletin boards. For the purpose of this thesis the meaning of computer mediated communication is confined to this narrower definition. The second term referred to above, that of computer mediated collaboration, is most often used to describe

online technologies that facilitate group work on collaborative projects. At the time of this study the MSc OSH did not include collaborative learning projects, therefore, this topic is not specifically addressed in this thesis. Hence, the abbreviation CMC is used here in the context of computer mediated communication, rather than computer mediated collaboration.

3.4.2 The social context of learning

Dialogue and the exchanging of ideas and opinions amongst students and tutors is integral to higher education (Laurillard, 1993; Jones and Webb, 2000), particularly at postgraduate level where it is one of the most widely used classroom teaching strategies (Rudenshtine, 1997). One of the purposes of classroom discussion is to encourage thinking (Muilenburg and Berge, 2000). Group discussion encourages learners to think for themselves and to be less dependent upon the tutor (Lovell, 1980). It also allows opportunities for all members of a group to contribute and to ask and answer questions, thus enabling them to learn from one another (Lovell, 1980). Learning in groups can help establish a learning community that can reach beyond information exchange, offering connections between individuals and a sense of belonging (Thompson and McGrath, 1999).

The importance of the social context of learning is outlined by Lovell (1980). Most adults spend a large percentage of their lives in social interaction with others, which involves the acceptance of certain "attitudes, values and norms" (p. 88) within the group. In order to establish these attitudes, values and norms individual members of the group need to interact with each other, which leads to social cohesion and affiliation. In turn a sense of affiliation helps establish acceptable forms of behaviour using others as guidance. If members feel comfortable within a learning group they are more likely to reveal any misunderstandings, fears, and anxieties without feeling vulnerable and hence to exchange ideas more freely (Lovell, 1980). Thus it is argued that effective learning requires student-to-student and student-to-tutor interaction (Neal, 1997). Prior to the advent of CMC such interaction most often took place in face-to-face social settings where groups were formed. The experiences gained within such groups usually influence the way in which adults engage with their learning

(Lovell, 1980). Individuals who take part in e-learning courses do not meet face-to-face in this way. However, CMC can help them to communicate as members of a group. Whether such a group becomes cohesive, or develops a sense of community, depends upon the individuals within the group and how they utilise the online communications.

As group attitudes, values and norms are formed from previous experiences (Lovell, 1980), and students may have little experience of communicating online, the formation of virtual learning groups may differ from those formed in the classroom. The use of CMC within online learning is therefore an important area for investigation. Wegerif (1998) contends that the extent to which online learners feel connected to one another can influence success or failure in online courses. Furthermore, the accepted benefits of distance education, for example, being able to study at the time and place of choosing and not having to travel, may not be realised if student learning is ineffective (Neal, 1997).

3.4.3 The perceived benefits of Computer Mediated Communication

The literature related to distance e-learning suggests that online technologies offer a number of advantages for discussion that are unavailable in the traditional classroom or via conventional distance learning methods. The salient features of CMC include:

- Asynchronous dialogue, CMC is both time and place independent. Students can initiate and respond to messages at any time of the day or night and from anywhere in the world (Harasim, 1989; Levinson, 1989).
- Computer mediated communication can support one to one and group dialogue.
- More than one topic can be discussed at a time.
- Students can simultaneously converse with their classroom peers in groups of two, three or more without the discussions degenerating into chaos as they would in the physical classroom (Carlson, 1992).

- Individuals can choose to participate in those topics of most interest to them (Kaye, 1989).
- Students can obtain feedback from their peers (Ehrmann, 1995).
- The use of CMC can save tutors from addressing the same problems on numerous occasions with different students (Kaye, 1989; Laurillard, 1993; Merlic and Walker, 1996).
- Transcripts of dialogue can be captured, stored, and re-accessed for the benefit of future students (Kaye, 1989; McKendree and Mayes, 1997).

Other, less obvious, claims have been made about the attributes of CMC. For example, analysis of student contributions to a CMC conference at the Open University showed that the average length of students' messages was 200 words (Laurillard, 1993). As Laurillard points out this is equivalent to over one minute of continuous speech, which would be rare in the classroom. However, as Laurillard does not reveal the percentage of the group that contributed to the conference, nor the number of postings per student it is difficult to ascertain the value of such postings in terms of student interaction.

The time delay in asynchronous CMC is often seen as a barrier to communication. However, Woodd (1999) points out that this may be an advantage for certain types of learners. For example, for those with the 'assimilator' (Kolb, 1993) or 'reflector' (Honey and Mumford, 1992) style of learning, the time delay allows them the opportunity to assimilate information and carefully consider their reply (Woodd, 1999).

A further advantage of CMC is that those who monopolise conversations can, to a large extent, be ignored. It is not unusual for talkative and enthusiastic students to monopolise classroom discussions, sometimes to the annoyance of others who feel that their time has been stolen and that such talkative students have prevented them from getting to the materials they wanted to learn (Merriam and Caffarella, 1991). Whilst verbose students may also monopolise online discussion, their actions cannot prevent others from accessing Web based learning materials and continuing their learning (Merriam and Caffarella, 1991).

Of particular interest is the claim (Carlson, 1992; Ehrmann, 1995; Rudenstine, 1997; Palloff and Pratt, 1999) that CMC empowers learners, making it easier for those who feel less confident or shy in the traditional classroom to join discussions, to speak out, express their opinions, and be noticed.

It is thus suggested that the use of CMC for online learning can offer the advantages of both face-to-face education, in the form of group and one-to-one interactivity, and of distance education in the form of freedom from time and place constraints (Kaye, 1989).

3.4.4 Issues and concerns in Computer Mediated Communication

Despite the positive rhetoric surrounding CMC some studies have shown that students and tutors have reservations about whether online technologies can effectively support classroom discussions at a distance. One such concern is whether the sense of community experienced in the traditional classroom can be replicated online. Wegerif (1998) conducted a study of twenty-one education professionals studying a Teaching and Learning Online course with the Open University. The course was designed for those who wished to develop online teaching skills. The CMC element of the course was well received with one third of the students considering it to be the best part of the course. However, six of the students made few contributions to the conferences. The online community appeared to split into two groups, those who were on the inside and those who felt on the outside. Wegerif (1998) contends that there is a line between being an insider and an outsider in online communities. Whilst Wegerif considered the use of CMC to be an overall success, this author believes that the percentage of students (twenty-nine per cent) who did not successfully engage in online dialogue represents an area for concern. Especially as the group were self-elected educational professionals whom it is presumed were motivated to learn how best to utilise online communication in their own courses. If members of this group experienced difficulties then there may be implications for less experienced students who are asked to take part in online dialogue.

A strategy frequently used to encourage student participation in CMC is to award students with assessment points for their contributions. This method was used

by Jones and Cawood (1998) in a technology in communications course at Manchester Metropolitan University. Observations revealed that some students were reluctant to participate in online discussion and that the contributions of many of those who did participate were "an artificial construct" (p.1.13), the purpose of which was to gain assessment accreditation. The authors believe that this practice is not uncommon, but little acknowledged for fear of undermining the process of CMC (Jones and Cawood, 1998).

A lack of physical cues in CMC is further area of concern. Panitz (1999) perceives asynchronous online learning as a threat to social interaction in learning, which he believes can only be achieved through face-to-face interaction in the classroom. In face-to-face encounters participants can look one another in the eye to judge each other's sincerity (Harasim, 1989). They can use facial expressions and body language to emphasis their view or to indicate that they wish to interject. Such visual cues can convey more in a second than can dialogue or an entire page of written text. An illustration of how visual cues can transmit compressed information is given by Negroponte (1995) who depicts a scene where a group of people at a dinner table are engaged in a conversation about a mutual friend. At a certain point in the conversation one of the guests gives a meaningful wink to his wife. The information conveyed in the wink would take detailed explanation if transmitted verbally (Negroponte, 1995). Online dialogue lacks the subtly of these visual cues and it is argued (Panitz, 1999) that the use of 'smiley' icons and formatted text does little to compensate.

A further difficulty reported in relation to online dialogue is keeping asynchronous online discussions on topic. Beaudin (1999) conducted a study with 135 online tutors in order to determine effective methods for counteracting this problem. The study identified the most important factors in keeping online discussions on topic as being: the careful wording of questions, supporting students by providing them with guidelines to help them prepare their responses, representing questions in a different format where discussions become diverse, and providing summaries of discussions (Beaudin, 1999). The study thus indicates that online discussions require regular input and direction from the tutor to keep them from straying from topic. However, the cohort of online

tutors who compiled the list of strategies was gathered from online sources and the paper does not specify whether individual members of the cohort drew their experiences from online teaching at undergraduate or postgraduate level. Knowledge of the online tutors' teaching backgrounds may place a different perspective on the study, as the communication skills of undergraduates and postgraduates tend to differ considerably, with undergraduates generally requiring additional direction.

As we have seen, dialogue is considered to be an integral part of the learning process in higher education. It encourages thinking, helps establish a learning community, and can provide a sense of affiliation between learners; factors, which it is argued, enhance learning. Computer mediated communication provides the means for establishing communication in distance e-learning courses. Whilst some of the advantages and disadvantages of using CMC for student dialogue have been explored and discussed in the literature, this method of communication is still in its infancy. It is, therefore, argued here that there may be other underlying issues about which we know little, for example, whether differing learning styles, an area previously touched upon in this chapter, affect the way in which learners utilise CMC. Hence, further research is required in order to identify these hidden factors. The next, and final section in this chapter, takes a more holistic look at e-learning by examining the literature in the broader context.

3.5 E-learning in practice

The emergence of e-learning has brought with it a number of issues and concerns. Many writers have expressed disquiet regarding the lack of research into this new phenomenon. For instance, Wegner (1999) and Beller and Or (1998) express concern that the implementation of Internet based distance education has proceeded with little consideration of the effect on student learning. Daugherty and Funke (1998) contend that the Internet has the potential to replace traditional university education and could cause a revolution in teaching and learning, but that a myriad of issues need to be examined before this kind of revolution takes place. Hence, this section examines research into

distance e-learning, paying particular attention to the perceived advantages and disadvantages.

3.5.1 The perceived benefits of e-learning

Distance e-learning can add value to the teaching and learning process in a variety of ways (Retalis *et al.*, 1998). Some of the benefits of distance e-learning, as identified in the literature, are discussed here.

Flexibility

One of the major benefits of e-learning is its flexibility. E-learning allows students freedom from the constraints of time and location and enables them to incorporate their learning into their work and family responsibilities (Daugherty and Funke, 1998). E-learners, unlike attending students, can choose where and when their learning sessions take place (Shave, 1998). Online lectures are readily available at any time of the day or night and can be re-viewed or re-read according to need (Pitt and Clark, 1997). The availability of online lectures means that distance e-learners do not have to attend lectures at a specific time as 'missed' sessions can be 'attended' at their own convenience (Retalis *et al.*, 1998).

The flexibility offered by distance e-learning is not merely confined to the convenience of time and place. Synchronous and asynchronous CMC provides students with the opportunity to hear outside speakers, to engage in dialogue with subject experts, to learn with a wide range of students from different cultures and backgrounds and to send messages to tutors outside of normal office hours (Sherry, 1996; Shave, 1998).

The ability to send assignments and receive feedback via email provides further flexibility for distance e-learners. Carswell *et al.*, (2000) conducted a large scale comparative study to examine the experiences of undergraduates studying an introductory course in computing at the UKOU. Three thousand five hundred students enrolled for the course of which 300 studied via the Internet and the remainder by conventional distance learning methods. No significant difference was reported between the learning outcomes of the two groups. However, the most significant advantage reported was that the Internet enabled a faster turnaround time for student assignments. The turnaround for postal OU students

is usually two weeks whilst turnaround for the Internet students was one week. Distance learners are dependent upon tutor feedback for motivation and progress, hence a speedy turnaround time for assignments is an important issue. Carswell *et al.*, (2000) argue that the improved turnaround time provided increased flexibility, as the students were able to apply the timely feedback to the next stage of their learning. This was particularly beneficial to overseas students, for whom assignment turnaround time is often in excess of two weeks (Carswell *et al.*, 2000).

Development of information technology skills

A further advantage of e-learning reported in the literature is that it helps students to develop their information technology (IT) skills. Daugherty and Funke (1998) used survey questions to seek the opinions of both students and academics in relation to e-learning. Nineteen postgraduate and thirty-six undergraduate health science students and seventy-six academics at a south-eastern US university participated in the study. An interesting finding to emerge from the survey was that online learning helped the students to appreciate the value of IT skills as a means of achieve learning outcomes, whereas learning IT skills in isolation had seemed meaningless. Concomitantly, academics reported an improvement in students' knowledge of technology applications including the use of email, PowerPoint, and graphics programs (Daugherty and Funke, 1998).

Increased enthusiasm and motivation

A further finding to emerge from the survey by Daugherty and Funke (1998) was the students' enthusiasm for the World Wide Web (WWW) as a source of resources and information. Undergraduates reported that information found on the WWW exceeded that normally provided via course textbooks and lectures. The postgraduate group, which comprised schoolteachers studying education at masters' level, commented on the applicability of their WWW finds to their teaching discipline.

Increased motivation to learn is a further advantage of e-learning to emerge from the literature. Daugherty and Funke (1998) found that an extension to using the WWW to access information and resources was that the viewpoints and

information acquired from different sources motivated students to examine and debate issues more closely and to question previously held values. There was evidence that accessing a wider range of resources improved critical thinking skills (Daugherty and Funke, 1998).

The view that e-learning motivates learners is supported by Gilliver *et al.*, (1998) who conducted a quantitative study of 111 students studying accountancy at a polytechnic in Singapore. The study showed that those students who were provided with access to the course materials via the Internet achieved significantly higher examination results than the control group, which did not have Internet access to the course materials. The authors contend that the improved learning outcomes can be attributed to increased student motivation engendered by the use of the online environment (Gilliver *et al.*, 1998).

Similar findings are reported by Retalis *et al.*, (1998) who used the WWW to enhance an existing classroom based introductory course in software engineering at a university in Athens. The existing course had a number of problems, including dwindling attendance at lectures as the course progressed, little classroom interaction, and minimal opportunities for tutor contact between timetabled sessions. The study found that the WWW enhanced the existing course in terms of flexibility in that it enabled students to study at the time and place of their choosing, provided additional resources, enabled students to 'attend' missed lectures and stimulated interest in the subject matter (Retalis *et al.*, 1998).

A study by Wegner *et al.*, (1999) found that online students displayed a more positive attitude towards their learning than their classroom based counterparts. The comparative study focused on two groups of postgraduates studying a curriculum design and evaluation course at a university in Missouri. The experimental group comprised fourteen students studying via the Internet, whilst the control group comprised seventeen students studying in the traditional classroom. The findings of the study showed no significant difference between the learning outcomes of the two groups. The authors of the paper admit that this finding took them aback somewhat, as the online group had not visited the university at any stage during the study, and it had been hoped that the findings

of the study would validate the importance of the presence of the tutor in the classroom. An unexpected finding from the study was that students in the Internet based group were found to be more positive about their learning experiences than those in the control group. The distance online group appeared to be more willing to participate in surveys, gave higher tutor evaluation ratings and more positive comments than the attending group. The study concluded that students studying via the Internet were not disadvantaged in comparison to those studying in the classroom (Wegner *et al.*, 1999).

Increased learner autonomy

Self-directedness and learner autonomy are important skills for distance learners and studying via the Internet may help them to develop such skills.

Traditionally, tutors have controlled the learning environment as they had the monopoly on information. In such a situation students have little control over the information that is pushed towards them. As information has become more widely available learners are able to take control of their own learning and as such are less dependent upon the tutor (Pitt and Clark, 1997). Online learning allows students the opportunity to undertake selective learning according to their needs. In the online environment the information is available, but students can choose to focus on those elements of learning that they deem most relevant to their individual learning needs (Pitt and Clark, 1997). For example, a student may already have a good understanding of a particular concept and thus choose to skim over that particular section of the learning materials. Thus, rather than learners having bits of information pushed at them, they can choose whether or not to "pull at them" (Negroponte, 1995, p. 84). The instant availability of online lectures, easy access to databases, journals, newspapers, and university catalogues enables learners to be proactive in their information seeking and even to publish their work online (Pitt and Clark, 1997). Issues related to self-directedness and learner autonomy are discussed in greater detail in the next chapter under the heading of 'Andragogy'.

3.5.2 Issues and concerns in e-learning

The task of identifying barriers to e-learning via the published literature has proved more difficult than identifying its benefits. This is perhaps not

surprising, since a large proportion of the e-learning related literature has been written by its tutor advocates, rather than by its end users. Nevertheless, a number of important issues have emerged and these are discussed here.

Information technology

From the student perspective there are a number of pre-requisites to e-learning, firstly, potential e-learners need access to a computer and an Internet connection via a modem or cable. Secondly, they require the appropriate software; thirdly, they need basic IT skills. Without these three basics, e-learning cannot begin to take place. Whilst in the western world such factors are becoming less of an issue over time they cannot be ignored, and for some, are a cause for concern.

Information overload

Whilst it is argued that the Internet motivates learners (Daugherty and Funke, 1998; Gilliver *et al.*, 1998; Retalis *et al.*, 1998), and provides a rich source of information (Daugherty and Funke, 1998), there is also a view that the online environment can be a distraction to learning (Roszak, 1996). Citing pop-up advertisements and the number of hits provided by online searches, Roszak contends that such diversions "clutter the mind" (p. 12) and distract students from the task in hand (Roszak, 1996).

As the use of the Internet in higher education becomes more widespread, students are increasingly turning from the traditional library to Internet technologies in seeking course related information. This is a further area of concern cited by Roszak (1996), who contends that the level of quality control built into educational libraries is seriously lacking in the online environment, where papers may have been written by those with little knowledge of the field being studied by the student (Roszak, 1996). Ciolek (1997) echoes this view, arguing that the Web is in a constant state of flux and cannot deal with large volumes of information in the way that traditional sources do.

The volume of information on the Internet demands specific skills to enable students to locate and evaluate information (Hess, 1999). Concerns have therefore been raised in relation to how students approach the task of information seeking and how they retrieve and evaluate their finds (Hess, 1999).

Postgraduates are one group in higher education who frequently conduct Internet searches to support their research. However, the skills required for seeking information online differ from those used in the traditional library. To help gain an understanding of the cognitive strategies used by postgraduates in searching for information online Hess (1999), conducted an in depth study of how one postgraduate approached the task. The study showed that the student suffered from information overload and that two factors largely contributed to this. The first was a lack of knowledge of how to conduct Internet searches; a lack of mechanical skills, for example, the ability to navigate the Web, use the various tools, and filter searches, were included in this category. The second factor was related to personal characteristics and time management skills, which impeded successful searches (Hess, 1999).

Unfulfilled student expectations

A further issue of importance in e-learning is that students might have unrealistic expectations about the nature of undertaking a course online, with some perhaps perceiving it to be a soft option to attending classes. Baylen and Tyler (1998) conducted a case study with a group of students studying at postgraduate level with a university in Florida. The study found that students had a number of expectations about online learning that were not realised. Firstly, they were disappointed to find that the pace of learning mirrored that of face-to-face learning, whilst they had expected to be able to work at their own pace, without the restrictions presented by weekly deadlines. Secondly, they expected online learning to provide a sense of community and were disappointed with the low level of online interaction, finding that they missed the sense of community usual in more traditional courses. Furthermore, students expected that substituting face-to-face learning with online learning would reduce the amount of time engaged in study. On the contrary, they found that whilst they did not spend time travelling, that online learning consumed a similar amount of time to face-to-face learning and did not allow them the extra time they had anticipated. The authors concluded that students require careful preparation before embarking on online learning so that they understand and manage both their own expectations and the realities of the medium.

In a qualitative case study of Web-based distance education Hara and Kling (1999) set out to discover how online students overcome isolation in the virtual environment, but found frustration to be a greater problem. The study found that frustration emanated from three areas: a lack of prompt tutor feedback, technical problems, and unclear instructions on the Web. Hara and Kling (1999) note that whilst such factors inhibit educational opportunities they are rarely reported in the literature, which most often focuses on the positive aspects of online learning. The authors of the report therefore assert that the study emphasises the need for research to identify students' experiences of online distance education as few research studies consider this aspect.

Gender issues

Studies have shown that gender may affect the differing ways in which people accommodate their e-learning. Burke (2000a; 2000b; 2001), in exploring e-learning within her own field of Women's Studies, argues that distance learning in the home is subjected to gender bias as women frequently experience attitudinal, emotional and physical barriers in relation to access to ICT in the domestic environment. Burke's study took the form of an online questionnaire completed by 150 women from: UK (50%), USA (28%), Australia (17%), and Canada and Singapore (5%). Respondents were made aware of the study via online academic networks. The study showed that whilst online learning provides flexible learning opportunities for women who have domestic responsibilities, or whose schedule does not fit traditional learning patterns, opportunities for women are frequently dependent upon the approval of those with whom they share their domestic space. Furthermore, many of the women who engaged in learning using ICT from home experienced guilt in relation to their learning, as they feared that their families may feel neglected or that relationships may be threatened. Though the attitudes of children and partners in relation to women's use of ICT varied, the women themselves appeared to need approval before engaging in ICT use. A further factor that affected women's access to ICT in the home was control of the computer by males in the household. Whilst thirty three per cent of the women surveyed had more than one computer in the household, most were relegated to the slower or less up to date machine. For example, ownership of laptop computers was most often

allocated to male members of the household. Only nineteen per cent of those surveyed had a separate room in which to study, the remainder used a shared living or family room or a bedroom (Burke, 2000a; 2000b; 2001).

Burke's (2000a; 2000b, 2001) study may only show the tip of the iceberg. The questionnaire was distributed via academic online lists, and whilst academics were asked to encourage students to respond, it is likely that many of the responses were from the female academics themselves. The women in this group may therefore enjoy higher social standards than the average student and thus be in a better position to purchase a second computer or have additional space for learning.

The findings of a survey of over 500 men and women undertaken by the American Association of University Women in Washington (Kramarae, 2001), also indicates that women who take distance online courses face more challenges than men. The report differs from Burke's in that it largely focuses on the problem of finding time for e-learning. The study found that sixty per cent of online learners are females over the age of twenty-five and that in order to accommodate their online studies they add a 'third shift' to their already busy schedule (Kramarae, 2001). Such women fulfil their responsibilities as employees and mothers and then fit their learning into a third shift, often studying whilst other family members are sleeping (Kramarae, 2001). Whilst online learning enables women to study at the time and place of their choosing, it does not create additional time in which to study, and thus exerts additional pressure and anxiety. Women in the study cited support from work and family and personal characteristics such as self-motivation, good organisational skills and independence as important factors for success in online courses (Kramarae, 2001).

The studies of Burke (2000a; 2000b; 2001) and Kramarae (2001) highlight the inequalities faced by many women in relation to time and space for e-learning. However, it is argued here that not all of the issues raised may be confined to women, for example, using shared space for study is likely a problem faced by both genders, and may be related to both the home and the work environment. Thus, increased knowledge of such issues may help educators gain a better

understanding of the problems facing, not just women, but all adult learners whose physical learning environment is increasingly work or home based.

It is apparent, from the foregoing, that distance e-learning has both benefits and drawbacks. Some of the benefits, such as flexibility and convenience of location, mirror those inherent in conventional distance education, as do some of the drawbacks, for example, finding the time and physical space for study. More importantly, new issues are emerging, many of which have not previously been encountered in distance education. Such issues include how people use ICT in distance education, the effect of the technology on motivation and self autonomy, how distance e-learners seek information and resources, how they interact with the virtual learning environment, the learning materials, and assessment, and how they integrate access to e-learning into their domestic and working lives. It is these issues that are identified here as requiring further investigation.

Conclusions

This chapter has explored the changing role of teaching and learning in the light of Internet technologies. Firstly, the way in which Internet technologies have widened opportunities for distance learners and helped narrow the communication gap were discussed. Secondly, the drivers towards e-learning were explored and the impact of such drivers on teaching and learning were examined. Thirdly, the controversies arising from the migration to e-learning were presented and discussed. The issues raised in these three sections highlighted the need to explore e-learning more closely. Hence, section four examined the role of CMC in e-learning and section five explored a wider range of e-learning issues.

This review of the e-learning literature highlights that the focus has mostly been upon the technology itself, rather than upon the learning process. One significant area that has been neglected is that of the students' experiences of e-learning (Dearing, 1997; Beller and Or, 1998; Thomas *et al.*, 1998; Beaudin, 1999; Rangecroft *et al.*, 1999; Wegner *et al.*, 1999). It is true that a number of studies have sought students' views in relation to specific areas of e-learning

(Wegerif, 1998; Palloff and Pratt, 1999; Carswell *et al.*, 2000), but a more holistic view of how students experience e-learning has rarely been considered. For example, whilst Burke (2000a; 2000b; 2001) and Kramarae (2001) have explored domestic issues in e-learning from the feminist angle, little is known about the wider perspective of how students integrate e-learning into their physical environments at home and work.

Moreover, little is known about how students utilise and interact with the online learning environment and its differing elements, such as, the learning materials, assessment issues, the communication tools, and the gathering of information and resources. Whilst research has been conducted in some of these areas, for example, communication (Jones and Cawood, 1998; Wegerif, 1998; Beaudin, 1999) and information and resources (Roszak, 1996; Ciolek, 1997; Hess, 1999), most studies highlight the need for further research.

Two further areas, pertinent to online learning, that have previously been neglected, are adult learning and individual learning styles. Issues related to adult learning, for example, student motivation (Gilliver *et al.*, 1998) and self autonomy (Pitt and Clark, 1997), are frequently grouped under the category of adult learning theory, also known as andragogy (Knowles, 1980; 1990). However, few studies have explored adult learning theory and individual learning styles in relation to online learning.

Furthermore, most of the studies that have considered the student view of e-learning have taken a quantitative approach (Daugherty and Funke, 1998; Gilliver *et al.*, 1998; Carswell *et al.*, 2000), which may fail to reveal the complexities of the phenomenon. Consequently, little is known about how e-learners perceive online learning and thus how they can best be supported in the online environment.

Thus, having conducted an initial review of the literature and identified the gaps in the research, the overall purpose of this study was identified as being:

To facilitate an understanding of how students experience distance e-learning when studying modules from the University of Salford's MSc/Postgraduate Diploma in Occupational Safety and Health.

Having identified the purpose, or aim, of the investigation a number of broad objectives were also derived from the review of the literature, these were:

- To gain an insight into how the students fit online learning into their daily routines.
- To gain an understanding of how students experience different aspects of an online learning environment.
- To examine how online learning can support self-directedness in distance learners and to explore the learning strategies that e-learners employ in the online environment.
- To explore how the individual learning styles of the students may influence their online experience.

These objectives raised four initial questions, which can be considered under the general headings of 'personal issues', 'elements of the learning environment', 'andragogical issues' and 'learning styles':

Objective 1 was addressed by the question: 'How do the students integrate distance e-learning into their domestic and working lives?'

Objective 2 was addressed by the question: 'What are the students' experiences of the following elements of distance e-learning:

- The virtual learning environment
- Learning materials
- Information
- Resources
- Communication
- Assessment

Objective 3 was addressed by the question: 'What andragogical issues arise from the study?'

Objective 4 was addressed by the question: 'What are the students' learning style preferences and what issues arise from these?'

The purpose of this chapter has been to identify gaps in the research in relation to online learning. Adult learning theory and individual learning styles are two of the areas identified as previously being paid little attention. Both of these are underpinned by learning theory, but as they emerged from the initial literature review little attention has been paid to that theory here. This omission is thus addressed in the following chapter, which discusses theories of learning, paying particular attention to adult learning theory and learning styles theory.

Chapter 4

Applying Learning Theory to e-learning

Almost everything occurring in learning theory today is, in some way, an extension of one of the major theories of learning ... In order to truly understand such an extension it is necessary to understand the theory from which it is derived.

(Hergenhahn, 1982, p. 425).

Learning theory, a component of educational theory, deals with the processes of learning and as such attempts to explain how learning takes place (Moore, 1974; Hilgard and Bower, 1975). Research into how learning occurs began with the study of animals, progressed to the study of children, and finally to the study of adults (Knowles, 1990). It is argued (Knowles, 1990) that the study of learning theory took this path because early research into learning was undertaken by experimental psychologists, whose methods demanded a rigid control of variables, and that the conditions under which children and animals learn could be more easily directed. Consequently, most theories of learning emerged from the study of how animals and children learn and not from the study of adults (Knowles, 1990).

Learning theory first emerged in the closing decades of the nineteenth century, thus it was the twentieth century that witnessed the formulation and interpretation of the majority of the theories of learning. The first half of the last century was principally devoted to the formulation of theories and the second largely to their interpretation (Knowles, 1990). However, from the late 1960s theories of adult learning began to emerge and the last three decades of the twentieth century were almost entirely concerned with the formulation and

interpretation of this new aspect of learning theory (Knowles, 1990). As this study is primarily concerned with distance e-learning at postgraduate level it is this latter topic, that of adult learning theory, and one of its components, that is, learning styles, that are the main focus of this chapter.

The purpose of this chapter is to provide an understanding of learning theory, its historical context and background. Setting out the theoretical background to learning theory will provide a foundational basis for research questions three and four, as identified in the review of the e-learning literature in the previous chapter:

- What andragogical issues arise from the study?
- What are the students' learning style preferences and what issues arise from these?

Thus, in order to provide a conceptual background to learning theory the first section in this chapter outlines the key theories of learning. The second section focuses on the more contemporary theory of andragogy. The third and final section explores the concept of individual learning styles. The chapter concludes by drawing out the implications of learning theory for distance e-learning.

4.1 Traditional theories of learning

Learning, so central to human behaviour yet so elusive to understanding, has fascinated thinkers as far back as Plato and Aristotle. Indeed, the views of these two men underpin much modern-day research on learning conducted by psychologists and educators... Plato believed that the physical objects in our everyday world have corresponding abstract forms that we can come to know... [through reflection]. Aristotle, on the other hand, believed that all knowledge comes through the senses; these sense impressions can be pondered upon... [to discover the laws that govern them]. Plato's "rationalism" can be seen in Gestalt and cognitive psychology; Aristotle's "empiricism" is particularly evident in early behavioural psychology. (Merriam and Caffarella, 1991, p. 123).

Whilst learning has been defined in a variety of ways, a common element of definitions is that learning results in a change in behaviour. This view typifies those expounded by psychologists who investigated learning up until the mid twentieth century (Merriam and Caffarella, 1991). Such definitions, however, pay little attention to the *process* of learning including, for example, the role of

experience. Whilst still encompassing the notion of change, more recent definitions of learning have been modified to include the *potential* for change (Merriam and Caffarella, 1991):

A relatively permanent change in our potential for performance as the result of our past interaction with the environment (Lovell, 1980, p. 30).

Learning is a relatively permanent change in behaviour or in behavioural potentiality that results from experience and cannot be attributed to temporary body states such as those induced by illness, fatigue or drugs (Hergenhahn, 1982, p. 8). [Emphasis in original.]

The conceptualisation of learning as a process, as defined by Lovell (1980) and Hergenhahn (1982), places the emphasis on what happens when people learn. It was attempts to explain what happens when people learn that first led to theories of learning (Merriam and Caffarella, 1991).

It is perhaps useful at this point to reiterate Garrison's (2000) definition of theory presented in Chapter 2:

Theory is a coherent and systematic ordering of ideas, concepts, and models with the purpose of constructing meaning to explain, interpret and shape practice (Garrison, 2000, p. 7).

Psychologists have been formulating learning theories for over one hundred years. Different schools of psychology have taken differing theoretical approaches, resulting in a wide range of concepts (Lovell, 1980). Interpreters of learning theory have attempted to classify these into some conceptual order. For example, Knowles (1990), divides learning theories into two categories: the mechanistic world view and the organismic world view, as proposed by Reese and Overton (1970). On the other hand Merriam and Caffarella (1991) discuss learning theories under the categories of: behaviourist, cognitivist, humanist, and social learning, whereas Moore (1974) perceives them as falling into the categories of 'Associationism' and 'Field' theories of learning. Lovell (1980) also divides learning theories into two groups: the stimulus-response view and the Gestalt tradition. It is thus evident that there is no general consensus of opinion on this matter. However, the categorisations used by Moore and Lovell are similar, in that both writers include in the first category those theories based on the assumption that learners respond to internal or external stimuli, and in the second include those theories that take the approach that learning is an integrated

and holistic process that stems from the brain. This approach is similar to the widely accepted classification of learning theories into the two fundamental positions of behaviourist and cognitive, both of which hold these basically differing assumptions about learning. These two main positions of behaviourist and cognitive are used here to provide a framework for the discussion. This categorisation also mirrors the differing approaches of empiricism and rationalism as taken by Aristotle and Plato (Hilgard and Bower, 1975; Merriam and Caffarella, 1991). The range of learning theories in both categories is vast, and an in depth review of them all is neither practical nor apposite here. Therefore, a background to the key twentieth century theories of behaviourism and cognitivism is provided, together with a summary of the contributions made by some of the classical theorists of that century. Whilst behaviourism and cognitivism form the basis of learning theory there is a further approach to learning that has emerged in recent years, that of constructivism. Constructivism is grounded in cognitive learning theory and is therefore discussed under that heading, however, its impact is considered to be significant in the context of this thesis.

4.1.1 Behaviourism

Behaviourism encompasses a number of theories, the fundamental view being that animals and humans react to appropriate stimuli in ways that can be objectively observed and measured (Lovell, 1980; Curzon, 1990). In behaviouristic theories the learner is seen as adapting to the environment and learning is a passive process. Behaviourists view humans as biological machines that react to appropriate stimuli rather than to mental functioning (Curzon, 1990).

The earliest proponent of behaviourism was John Watson (1878-1958). Other behaviourists include Ivan Pavlov (1849-1936), Edward Thorndike (1874-1949), Clarke Hull (1885-1952), Edwin Guthrie (1886-1959), and Burrhus Skinner (1904-1990). Whilst each of these theorists made significant contributions to the learning theory of behaviourism the work of Watson, Pavlov, Thorndike, and Skinner has been selected for further comment here as their work has been particularly influential within the field.

Ivan Petrovich Pavlov – classical conditioning

Pavlov (1927) describes his experimental research into conditioned reflexes. Basing his work on that of Descartes some 330 years earlier, Ivan Pavlov began his work on reflexes in 1902. Descartes worked on the assumption that every activity of the organism is a reaction to some external stimulus and that the nervous path provides a connection between the stimulus and the response, thus, he argued, the purpose of the nervous structures is to make this connection in the animal body, thus animals basically behave as machines. Pavlov decided to conduct experimental analysis of the subject. His study of the nervous systems of animals led to the basis of classical conditioning theory. In his classical conditioning experiment Pavlov gave a dog food, the sight of which made the dog salivate. He then rang a bell each time the dog was presented with food. Eventually it was found that if the bell was rung before the dog was presented with the food that the dog salivated at the sound of bell alone, thus the stimulus of the bell made the dog salivate. Pavlov named the sight and smell of the food the 'unconditioned stimulus' and the salivation of the dog the 'unconditioned response'. He further termed the ringing of the bell as the 'conditioned stimulus' and the dog's association between the bell and the arrival of the food as the 'conditioned response' (Pavlov, 1927). Pavlov's work with dogs thus formed the basis of classical conditioning, which he attributed as the basis of human learning.

John Broadus Watson – the laws of frequency and recency

Watson, the first person to use the term behaviourism (Hergenhahn, 1982; Jarvis *et al.*, 1998), began his career with research into animal behaviour and later with children. Like Pavlov, Watson's work also focussed on the theory of classical conditioning. Watson held the position that humans are born with no mental abilities, just a few reflexes and basic emotions, and that these reflexes and emotions can become attached to a variety of different things through classical conditioning (Hergenhahn, 1982). In emphasising this point he contended that given a dozen healthy infants, and the right conditions, he would be able to choose any one at random and raise that child to be whatever he chose, from

doctor or lawyer to beggar man or thief, regardless of the child's abilities or background (Hergenhahn, 1982).

Watson asserted that classical conditioning comprised two laws: the law of frequency and the law of recency. The law of frequency stresses the importance of repetition, asserting that the more frequently a stimulus and a response (S-R) are associated, the stronger the habit will become. The law of recency asserts that the most recent response to a stimulus is the one most likely to be associated with it (Curzon, 1990).

Edward Lee Thorndike - connectionism

Thorndike formulated the 'Law of Effect'. His best-known work was the 'puzzle box experiment' in which he placed a hungry cat in a box and put food within the cat's view, but just beyond its reach. Inside the box there was a string attached to a lever that opened the door. After considerable frustration and scratching the cat accidentally pulled the string and the door opened. The cat was returned to the box many times over and whilst there was some trial and error the behaviour that resulted in the door opening was gradually performed more quickly over time, thus showing steady progress. The experiment was repeated on numerous occasions with different cats. The successive time delays between the cats entering the box and escaping were plotted on a graph, from which Thorndike constructed a 'learning curve' that showed that the cats had become increasingly proficient in escaping from the box (Bolles, 1979; Curzon, 1990). Thorndike did not, however, attribute the cats' behaviour to understanding, in that he did not believe that the cats had an insight into the principle that the string worked the lever that opened the door. He argued that if it were the case, that the cats had suddenly grasped the idea, then the learning curve would have shown greater fluctuation up to that point and then shown a sharp and sustained rise, whereas the graph suggested a more gradual improvement in performance. Thorndike thus concluded that the cats automatically associated the stimulus with the desired response, rather than with an association of ideas (Skinner, 1953; Bolles, 1979). Thorndike's interest consequently lay in what held the stimulus and response (S-R) together, hence

his theory of connectionism, which describes the neural bond that connected the stimulus and the response (Hergenhahn, 1982).

From these experiments Thorndike also formulated the 'law of effect' that specified that an act, which results in a satisfactory outcome, is more likely to be repeated than an act that is followed by an unsatisfactory outcome (Curzon, 1990; Jarvis *et al.*, 1998). For example, had the cats been punished when leaving the box, rather than being fed, then they would have stopped trying to escape (Bolles, 1979). The 'puzzle box experiment' also reveals the principles of motivation, if the cats had not been hungry then they probably would not have attempted to get out of the box in the first place (Bolles, 1979).

Therefore, Thorndike's main contributions to learning theory were, firstly, the concept that behaviour is determined by a S-R connection, and secondly, that learning occurs when a response produces a specific type of event, such as a satisfying result.

Burrhus Frederic Skinner – operant conditioning

Skinner, who also worked with animals and food, is considered to be the founder of operant conditioning. He studied the responses of rats, pigeons, dogs and monkeys to various techniques for obtaining food (Curzon, 1990; Jarvis *et al.*, 1998). In operant conditioning the response is reinforced by succeeding stimuli, hence the stimulus is used to control and predetermine the response (Jarvis *et al.*, 1998).

Skinner (1953) explains the basis of operant conditioning. Reflexes, both conditioned and unconditioned, are related to the internal physiology of the organism. Skinner examined behaviour in relation to its affect upon its surroundings and found that the future behaviour of an organism is often determined by reactions to its previous behaviour. For example, rewarding a type of behaviour increases the likelihood of it being repeated, whilst punishing a type of behaviour decreases the likelihood of it being repeated. The consequences of behaviour are thus fed back into the organism and "alter future probability" (p. 90). Skinner's theory thus specified that a response followed by a reinforcing stimulus is likely to be repeated and vice versa (Skinner, 1953).

Operant conditioning, in the form of reward and punishment, is frequently, though sometimes unconsciously, employed by teachers and parents, in their attempts to reinforce good behaviour and extinguish bad behaviour in children. Skinner's work has been widely applied in the area of psychotherapy for behaviour modification, an approach taken with both children and adults to help alleviate problems such as phobias, stuttering, and psychotic behaviour (Hergenhahn, 1982).

The implications for teaching and learning within the behaviouristic model are that the tutor controls the learning environment and learners take a passive role. Whilst this style of teaching and learning is most appropriate for children it does have an application for adults in some areas, for example, in safety training, aeroplane piloting, and surgery, where learners need to develop responses to specific stimulus situations.

The above discussion illustrates that the basis of behaviourism is shaping learners' responses to different stimuli. Behaviourist theories are thus based on the study of observable, objectively measurable behaviour, and the belief that behaviour can be explained, predicted and controlled without reference to cognitive processes (Curzon, 1990). The behaviouristic view of learning dominated education from the beginning to the middle of the twentieth century.

4.1.2 Cognitivism

Cognitive psychology derives its name from the Latin 'cogito' meaning 'to think' (Curzon, 1990), and differs from behaviourism in that it is based on the thought processes that lie behind behaviour. Solso (2001) provides the following definition of cognitive psychology:

Cognitive psychology is the scientific study of the thinking mind and is concerned with:

How we attend to and gain information about the world

How that information is stored and processed by the brain

How we solve problems, think, and formulate language.

(Solso, 2001, p. 2)

Whilst cognitive psychology emerged in the mid twentieth century, philosophers throughout the ages, from the ancient Greeks through the Renaissance, to the end of the nineteenth century, contemplated the view that knowledge is located in the brain. For instance, Thomas Hobbes in his book 'Human Nature', written in 1650, pondered the order of mental events, and the empiricist John Locke in 'An essay concerning human understanding', published in 1690, explored the concept of reflection (see Hilgard and Bower, 1975, pp. 4-5). Such beliefs, however, became unfashionable at the beginning of the twentieth century with the advent of behaviourism. Thus the study of processes such as consciousness, attention, memory, and thinking, was largely ignored for fifty or so years (Solso, 2001).

Cognitivism rejects the S-R patterns presented by behaviourists as being too simplistic, believing that whilst an organism interacts with its environment, not only will its behaviour change but there is also a change in knowledge of that environment (Moore, 1974). Criticisms of behaviourism were particularly strong from Gestalt psychologists (Moore, 1974; Merriam and Caffarella, 1991).

Gestalt, a German word, means "an organised whole that is perceived as more than the sum of its parts" (Thompson, 1995, p. 568) and Gestalt psychologists claim that rather than trying to make sense of a new experience by linking its component parts, we should try to view it as a whole from the outset (Moore, 1974). The Gestalt objection to the behaviouristic S-R theory is that it does not take account of the learner's ability to make connections and grasp the whole situation. Moore (1974) illustrates this point by giving the example of a child who learns by rote that three times three is nine, and thus in response to the stimulus 'What is three times three?' replies with the appropriate answer. A Gestaltist would argue that whilst the answer is correct, it is merely verbal and does not indicate understanding. On the other hand, if the child were to see three groups of three objects, then he or she would apprehend the total situation and thus learn, in the true sense, that three times three is nine (Moore, 1974). This simple example by Moore demonstrates the fundamental difference between the behaviouristic and cognitive schools of learning theory. Thus, from the mid-twentieth century Gestalt views of learning began to challenge the behaviouristic view and have been integrated into the group of learning theories known as cognitivism (Merriam and Caffarella, 1991).

Cognitivism encompasses the work of: John Dewey (1859-1952), Edward Tolman (1886-1959), Jean Piaget (1896-1980), Lev Vygotsky (1896-1934), Jerome Bruner (b. 1915), Robert Gagne (1916-2002), David Ausubel (b. 1918) and Paulo Freire (1921-1997), amongst others. The work of Dewey, Piaget, Vygotsky, and Bruner has been selected for further comment here, as their work has been particularly influential within the field of cognitivism.

John Dewey

John Dewey, philosopher and educationalist made several contributions to knowledge, his most significant being in the field of education. Commonly referred to as the father of progressive education in America, Dewey rejected the practice of rote learning, which was the common mode of instruction in his day, arguing that whilst mechanistic methods of learning may produce quick results, they may also impair reflective ability (Curzon, 1990). He further argued that the behaviouristic, S-R, interpretation of learning was too rigid and that a more holistic view of the human organism, would better inform psychologists on the processes of learning (Curzon, 1990).

Dewey believed that education comes about through experience and that children must be engaged in meaningful and relevant activities that allow them to apply the concepts they are endeavouring to learn (Dewey, 1938). He further believed that children learn best through social interaction, which encourages individual growth, and that they learn more from guided experience rather than didactic instruction (Dewey, 1938). In support of these arguments he contended that school should not be viewed as an entirely separate entity within a child's life but that it should be incorporated within society and thus provide opportunities for children to problem solve naturally in real life situations (Moore, 1974).

There was some criticism of Dewey's so called 'progressive', child centred ideas. However, in his publication 'Experience and Education' (Dewey, 1938), he attempted to resolve some of these issues by claiming that the dichotomy between 'traditional' and 'progressive' education does not have to follow the "Either-Or philosophy" (p. 20) and that the lessons learned from dealing with issues from the past will help in dealing with those of the present and the future (Dewey, 1938).

Jean Piaget

The Swiss psychologist Piaget, best known for his research on cognitive development in children, took the view that the best way to understand the adult mind was to explore how it develops and changes from birth and how it adapts to the environment (Solso, 2001). Piaget contended that two major principles are at work in intellectual growth: adaptation and organisation. The first principle, adaptation, involves two processes – assimilation and accommodation. Thus mental structures assimilate external events and convert them into thoughts. Similarly, where new and unusual situations are encountered they are accommodated by the mental structures to meet the new challenges presented by the situation (Solso, 2001).

The second principle, organisation, relates to the way in which mental structures adapt and develop to form the adult mind. Piaget identified four major stages of cognitive development that lead to this maturation. The first stage, the sensorimotor phase is from birth to two years, during which the child exists in a world of here and now, has no language skills and no understanding of objective reality. At this stage intelligence develops through sensory experiences and movement. The second stage is the preoperative phase, from two to seven years. In this stage the child engages in egocentric thought, reason is dominated by perception, and thought is intuitive rather than logical. The child gradually develops a capacity for more insightful learning, can work problems out in his or her head, and makes use of symbols such as pictures and words to represent ideas and objects. The third stage is that of concrete operation, from age seven to eleven or twelve. In this phase the child has the ability to understand numbers and engage in concrete thinking. The child can also apply logic, but requires physical examples to which the logic can be applied, hence the label given to this phase. The fourth stage is the formal operations phase, from age eleven or twelve to adulthood. At this stage the person can co-ordinate thought in a hypothetical or abstract situation without requiring references to concrete applications, thus showing a marked difference from the preceding stage of concrete operation. For Piaget this final stage of cognitive development represents the end of intellectual growth (Cotton, 1995; Solso, 2001).

The educational psychologist, Seymour Papert, in describing the essence of Piaget's theory wrote:

He is revered by generations of teachers inspired by the belief that children are not empty vessels to be filled with knowledge (as traditional pedagogical theory has it), but active builders of knowledge – little scientists who are constantly creating and testing their own theories of the world (Papert, 1999, Internet article).

In section three of this chapter the reader will recognise some of the concepts identified by Piaget, such as assimilation, accommodation, and concrete application, as having been adopted by Kolb in formulating his learning style inventory.

Lev Semenovich Vygotsky

The major theme of Vygotsky's work is that social interaction plays a fundamental role in the development of cognition.

The work of Vygotsky, a Russian professor, was dominated by three main ideas:

Firstly, psychology needs a new framework and an appropriate methodology; secondly, the study of human development is the key to understanding people; and thirdly, the relationships between thought and language demand reappraisal (Curzon, 1990, p. 93).

Vygotsky's work fell out favour in the then Union of Soviet Socialist Republics (USSR) after his subject area of paedology, which took an interdisciplinary approach to child development, was downgraded by a party decree for 'bourgeois deviation' (Curzon, 1990). In recent years his work on developmental psychology has been translated and attracted considerable interest amongst western teachers with his work now being considered on a par with that of Piaget (Curzon, 1990; Vygodskaya, 1997).

Whilst accepting Piaget's general stages of child development, Vygotsky refuted his contention that development precedes learning; rather believing the reverse - that learning precedes development (Solso, 2001). A further area of disagreement was related to speech. Piaget believed that egocentric speech precedes social speech, whilst Vygotsky believed that egocentric speech is social in nature and thus used by children to communicate. Vygotsky's position on speech reveals his principal theory of child development in which he postulates

that the development of thinking is from society to the individual and not from the individual to society (Solso, 2001).

Vygotskaya (1997) provides an overview of Vygotsky's development theory. Vygotsky believed everything is learned on two levels. The first, and lower level, includes the biological characteristics of the nervous system such as memory, elementary perception, and spontaneous attention. The second, higher level, includes the human functions that appear through a transformation of the lower functions, for example abstract reasoning, logical memory, language and voluntary attention. The child's higher mental functions are formed through interaction with others, and then integrated into the individual's mental structure. Thus the individual consciousness is formed through relations with others. This can take the form of a more experienced partner (whether peer or teacher) who is able to provide 'scaffolding' of the subject matter to support the student's evolving understanding. Vygotsky called this process of scaffolding the 'Zone of Proximal Development' (ZPD) and stated that its use can reveal hidden potential, thus enabling teachers to tailor teaching methods to the individual (Vygotskaya, 1997).

Jerome Seymour Bruner

The American psychologist Jerome Bruner advocated discovery learning. He saw learning as an active, social process in which students construct new ideas or concepts based on current knowledge (Curzon, 1990). The student gradually constructs internal models that provide a pattern of meaning for existing experiences and from which he or she can originate and test hypotheses, thus integrating experiences into their existing mental constructs.

Bruner's theory of cognitive development was stimulated by the work of Piaget and led him to propose three stages of intellectual development: enactive, iconic, and symbolic. The enactive mode is where a person learns through actions, such as learning to swim; the iconic mode is where learning occurs through perceptual means, such as pictures and models; and the symbolic mode describes the capacity to translate experience into words and to think in abstract terms (Hilgard and Bower, 1975). Bruner's principle was that a progression through these three stages of concrete, pictorial and symbolic activities leads to more

effective learning. Bruner noted that the enactive mode could be related to S-R theory, the iconic mode to the Gestalt way of thinking, and the symbolic mode to the psycholinguists such as Piaget and others (Hilgard and Bower, 1975; Curzon, 1990).

Constructivism

As cognitive paradigms returned, the concept of social learning and the construction of knowledge began to appear. Constructivism is grounded in cognitive learning theory (Pearce and Hess, 1999) and emerged from the work of Piaget, Vygotsky and Bruner, with Piaget's work being used as the founding principle. Conway (1997) suggests that advances in technology have contributed to the move towards this approach.

Constructivist learning is based on the premise that learners actively construct knowledge, rather than relying on that imparted by the teacher (Hoover, 1996; Pearce and Hess, 1999). Constructivism is a cognitive perspective of learning that takes a variety of forms, including cognitive constructivism, which emerged from Piaget's theories, and social constructivism, which emerged from Vygotsky's theories. Despite the various strands of constructivism the basic principle is that knowledge is constructed by individual learners and thus cannot be transmitted from one person to another, but rather reconstructed by each individual (Kearsley, 2003). Thus constructivism places the emphasis on the learner, rather than the tutor, and learners are encouraged to find their own solutions and to build on prior knowledge (Kearsley, 2003). This places the learner in an active, rather than passive role (Hoover, 1996), and contrasts sharply with the broadcast one way teaching style, with the role of the tutor as transmitter of knowledge, as depicted in the preceding chapter.

Hoover (1996) highlights some of the implications that constructivism has for teaching, these are summarised below:

Tutors who take a constructivist approach need to:

- Take the role of facilitator, rather than transmitter of knowledge, by providing adequate opportunities for learners to construct their own knowledge.
- Provide opportunities for students to test their understanding.
- Provide learning environments that afford differing experiences for a wide range of learners.
- Encourage group interaction and discussion.
- Allow ample time for learners to reflect upon their new experiences.

Whilst the principles of constructivism can be applied at all stages of education from early schooling to university, it is argued (Jonassen *et al.*, 1993) that they are most appropriate for the acquisition of knowledge at advanced level, as required in higher education. Jonassen *et al.*, (1993) describe knowledge acquisition as a continuum comprising three phases of knowledge growth: introductory, advanced, and expert. Introductory learning occurs when learners have little prior knowledge. In the advanced learning stage learners are able to solve more complex problems. In the expertise stage learners are able to draw on "interconnected knowledge structures" to solve problems more efficiently. Their efficiency at this level usually derives from their ability to transfer previously acquired knowledge to the current situation, rather than from given instruction. This higher level of learning is of particular value to practitioners as it encourages reflective learning (Jonassen *et al.*, 1993).

Jonassen *et al.*, (1993) suggest that introductory knowledge acquisition is best achieved through behaviouristic approaches, gradually moving towards constructivist approaches as the learner moves along the continuum. At the expert end of the continuum the learner is able to engage in richer, more complex forms of knowledge acquisition, through constructivist learning methods. Thus the constructivist approach is not suitable in all contexts but most likely to be appropriate for practitioners studying in higher education who engage in knowledge construction at expertise level (Jonassen *et al.*, 1993).

Cognitivism, therefore, differs from the traditional view of learning in that it is based on the unobservable thought processes behind behaviour. From the cognitivist aspect learning is controlled by what is in the head, rather than what is in the environment (Bolles, 1979).

The implications for teaching and learning within the cognitive and constructivist approaches are that the teacher acts as facilitator, guiding the students and encouraging critical thinking, analysis and synthesis. The emphasis is upon the learner. Learners learn by fitting new information together with existing knowledge. The theory of constructivism is thus considered important in the context of e-learning where students have wider opportunities for constructing their own knowledge.

Whilst there may be opposing camps within learning theory it is important to note that all theorists based their theories on established fact drawn from experimentation and whilst there may be disagreement amongst the different schools, these facts are readily accepted by all theorists (Hilgard and Bower, 1975). Any disagreement amongst theorists or schools of thought are thus based on differences in interpretation (Hilgard and Bower, 1975). Neither the behaviourist nor the cognitivist positions are necessarily right or wrong, as both are applicable in different situations.

This section has discussed two main positions in learning theory, the behaviouristic approach and the cognitive approach. Both positions encompass a wide range of theories and theorists, united by their overall perspectives about where the "locus of control" (Merriam and Caffarella, 1991, p. 129) over learning lies, for behaviourists it lies with the environment, and for cognitivists it lies within the individual learner (Merriam and Caffarella, 1991). Both viewpoints are of value and the theories from each can be used in a variety of learning situations, in either traditional or e-learning environments.

The differing viewpoints expressed through these theories illustrate that there is no single theory of learning, but rather a gradual accumulation of knowledge. By building on existing ideas each theory presents a new perspective on learning, thus enabling us to gain a better understanding of the learning process.

The literature related to learning theory is vast and whilst the brief summary provided above cannot do justice to all of the theorists and their theories it is hoped that it has provided a sufficient overview for the reader and that it serves as the basis for the discussion that follows. Most of the theories of learning discussed in this section are pedagogical and have been formulated from research based on the learning of children. Whilst pedagogical theories are appropriate for some forms of adult learning there is an alternative in the theory of andragogy. This is discussed in the next section.

4.2 Andragogy: a theory of adult learning

In the introduction to this thesis the group of learners that form the basis of this study were identified as occupational safety and health professionals, most of whom were in full-time employment and studying occupational safety and health at postgraduate level by part-time study. As adult learners they are representative of an increasing segment of education today (Tice, 1997). This section discusses andragogy, a non-traditional theory of learning that relates to adults, and as such is appropriate to this study.

The section starts by introducing the background to andragogy and explaining how the theory emerged. The assumptions on which the theory is formulated are then presented and explored. The section culminates with a justification for examining the concept of andragogy within the context of distance e-learning.

4.2.1 Background to andragogy

Andragogy is offered as an alternative approach to pedagogy for the teaching and learning of adults (Nottingham Andragogy Group, 1981). The leading proponent of the term andragogy was Malcolm Knowles who in 1968 used the term to describe his theoretical framework for thinking about adult learning. Knowles argued that the art and science of helping adults learn should have a separate label to differentiate it from pedagogy, the term used to describe the art and science of teaching children (Knowles, 1980; 1990)⁴. Knowles is so closely

⁴ The Modern Practice of Adult Education: From Pedagogy to Andragogy (1980) is the revised and updated edition of The Modern Practice of Adult Education: Pedagogy Versus Andragogy (1970). Knowles' ideas about andragogy were originally expressed in the 1970 edition.

linked with the term andragogy that many in the field of adult education incorrectly assume that he invented it. He was, however, responsible for introducing the term to the United States in the late 1960s (Brookfield, 1986; Davenport, 1993; Jarvis, 1995). Malcolm Knowles used pedagogy as the basis of his thesis for andragogy. In order to provide a background to the emergence of andragogy a brief examination of the roots of pedagogy therefore follows.

Pedagogical model

It is important to note that in the discussion that follows, references to the assumptions of pedagogy are based on Knowles' perception and interpretation of the term.

Knowles (1990) traces the origins of the word 'pedagogy' to the seventh century:

Starting in the seventh century in Europe, schools began being organized for teaching children – primarily for preparing young boys for the priesthood – hence they became known as cathedral and monastic schools. Since the teachers in these schools had as their principal mission the indoctrination of students in the beliefs, faith, and rituals of the Church, they evolved a set of assumptions about learning and strategies for teaching that came to be labelled "pedagogy" – literally meaning "the art and science of teaching children" (since the term is derived from the Greek words "paid," meaning "child," and "agogus," meaning "leader of"). This model of education persisted through the ages well into the twentieth century and was the basis of organization of our entire educational system (Knowles, 1990, p. 28).

Knowles (1980) argues that in the nineteenth century, when educational provision started to expand, the only model of education in existence was the pedagogic model described above. Therefore, our entire education system, including higher education, was based on this model. Knowles describes the pedagogic model as one that does not allow the learner to take responsibility for learning but rather assigns all decisions about what will be learned to the teacher. He therefore contends that pedagogy is premised on the transfer of knowledge and skills that remain valid and useful throughout the entire life of the learner and can be passed from generation to generation. Whereas in today's climate of lifelong learning, changing technology, and continuing enquiry, helping people

However, as the British Library is unable to locate a copy of the 1970 edition the 1980 edition has been used as the source of reference for this work.

to learn how to learn is of more relevance to them than simply transferring facts from the teacher to the learner (Knowles, 1980).

Moreover, Knowles (1980) asserts that pedagogy is based on certain assumptions about the learner that are congruent with the learning of children and that teachers have applied the pedagogical model to the teaching of adults without examining its underlying assumptions. We will return to the assumptions of pedagogy later in this section when they will be contrasted with Knowles' alternative assumptions of the characteristics of the adult learner.

The emergence of andragogy as a theory of adult learning is discussed next.

4.2.2 The emergence of andragogy

During the eighteenth and nineteenth centuries elementary education became more widespread and the pedagogical model continued to be re-enforced. However, nineteenth century social developments such as the Industrial Revolution and workers' unions started to provide a milieu for andragogy. By the end of the nineteenth century the teaching of adults had started to gain momentum and during the early years of the twentieth century educators began to re-think the pedagogical model. The years between 1926 and 1940 witnessed a growing body of knowledge on adult learning. However, these were mostly isolated insights, concepts, and principles that did not produce a unified theory. In fact, in addition to andragogy, the term 'adult pedagogy' was also used, which must indeed be an oxymoron. In 1928 Edward L. Thorndike's publication 'Adult Learning' discussed research that proved that adults could learn, this was an important step forward and provided a scientific foundation for the study of adult learning. From 1929 onwards teachers began to experiment with different methods for teaching adults, however they had no theory to support their new teaching strategies (Knowles, 1980; 1990; Savicevic, 1991).

It was the publication of Eduard C. Lindeman's 'The Meaning of Adult Education' in 1926 that laid the foundation for a systematic theory about adult learning. Lindeman's work was heavily influenced by the educational philosophy of John Dewey. The basis of Lindeman's thesis was that for adults the curriculum should be built around the needs and interests of the students,

instead of the students being required to adjust themselves to an established curriculum. Lindeman placed value on the adult's experience gained from work, recreation, and family-life, arguing that too much of learning consists of vicarious substitution of someone else's experience and knowledge (Jarvis, 1987; Knowles, 1990; Davenport, 1993).

Conditions for the development of andragogy became more favourable after World War II when the concept of adult education had been established. There were two reasons for this, firstly, the first quarter of the twentieth century witnessed the organisation of adult education, and secondly, after World War II research on adult learning began to emerge. During the 1940s and 1950s various disciplines in the human sciences added to the growing body of knowledge on adult learning. Some of the most important contributions came from the discipline of psychotherapy. These include Sigmund Freud whose work in identifying the influence of the subconscious mind on behaviour influenced learning theorists. Carl Jung introduced the concept that human consciousness possesses four functions – sensation, thought, emotion, and intuition, which influence the concepts of the balanced personality and the balanced curriculum. Other contributions to adult learning theory include Erik Erikson who developed the theory of the 'eight ages of man' as a framework for understanding the stages of personality development (Knowles, 1980; 1990; Savicevic, 1991).

In the late 1960s research emerged that challenged the belief that adults' ability to think declines with age. This new evidence suggested that the level of a person's thinking ability is not merely related to age but that it is also influenced by a person's environment and their social and historical context. In the 1970s the concept of the adult's potential for further development was known as the 'plasticity' model. The realisation that adults were capable of cognitive growth had an impact on lifelong learning and caused educators to question many of the previous assumptions and concepts of adult learning. This led to a re-conceptualisation of the idea that the strategies employed in the teaching of children and adolescents are automatically applicable to the teaching of adults (Nottingham Andragogy Group, 1981).

Amongst those who were attempting to formulate a theory of adult learning was Malcolm Knowles who argued that most of the formal learning theories at that time were based on research with animals and children and bore little resemblance with adult learning (Knowles and Associates, 1984). Knowles also observed that most of the research by educational psychologists in fact focused on reactions to teaching rather than on the process of learning (Knowles and Associates, 1984).

Knowles was first introduced to the term andragogy by a Yugoslavian adult educator, named Dusan Savicevic, who was attending one of Knowles' sessions on adult learning at Boston University in the summer of 1967 (Knowles and Associates, 1984). Knowles, who had already developed a theoretical framework for adult learning, then used the term in an article entitled 'Androgogy, Not Pedagogy' published in *Adult Leadership* in April 1968. It is interesting to note that Knowles originally misspelled andragogy as 'androgogy'. (Knowles and Associates, 1984; Knowles, 1990).

Though the term andragogy was little known in Anglo-North America prior to the late 1960s, it had been the subject of some controversy in Europe, where it appears to have been used intermittently. A Dutch adult educator, Ger van Enchevort, traced the origins of the term and his findings are summarised by Knowles (1990). The first known use of the term was by Alexander Kapp in 1833. Kapp, a German grammar school teacher used the word to describe the educational theory of the Greek philosopher Plato. A few years later a German philosopher, Johan Friedrich Herbart, strongly opposed its use and the word was forgotten and disappeared for nearly a hundred years. The term re-emerged in 1921 in a report by Eugen Rosenstock, a teacher at the Academy of Labor in Frankford. In the report he argued that adult education required special teachers, special methods, and a special philosophy. From 1921 until the late 1950s the term was used intermittently. Heinrich Hanselmann, a Swiss psychiatrist used it in his 1951 book: 'Andragogy: Nature, Possibilities and Boundaries of Adult Education'. In 1954, in the Netherlands, Professor T. T. ten Have used the word andragogy in his lectures; later in 1959 he published outlines for a science of andragogy. In 1956 Yugoslavia M. Ogrizovic published a dissertation:

'penological andragogy' and in 1959 a book entitled 'Problems of Andragogy'. In 1957 Franz Poggeler, a German teacher published a book entitled 'Introduction to Andragogy: Basic Issues in Adult Education' (Knowles, 1990). By the 1960s the term was widely used by leading adult educators in Yugoslavia, France and Holland. In Yugoslavia faculties of andragogy were established at the universities of Zagreb and Belgrade and in Hungary at the universities of Budapest and Debrecen (Nottingham Andragogy Group, 1981; Jarvis, 1987; Knowles, 1990). Thus, the development of andragogy in Europe was a gradual process spanning over one hundred and thirty years and can be considered to be evolutionary, rather than a revolutionary educational innovation.

When Dusan Savicevic first introduced Knowles to the term Knowles interpreted its meaning as 'the art and science of helping adults learn'. He first started to construct a model of andragogy based on the concept that it would be the antithesis of pedagogy. In fact he gave his book entitled 'The Modern Practice of Adult Education' (1970) the subtitle 'Andragogy Versus Pedagogy' (Knowles, 1990).

Thus from the beginning of the twentieth century there was a growing awareness that adults learn in a different way to children and by 1968 Knowles had developed a theory of adult learning. The assumptions upon which Knowles built his theory are discussed next.

4.2.3 Assumptions of andragogy

Knowles drew upon psychological literature to support his thesis for andragogy, for example, the work of Friere and Dewey (Knowles, 1980). Using concepts from psychology Knowles then developed his andragogical model about the adult learner and developed a set of assumptions about adult teaching and learning. Knowles (1980) originally listed four assumptions of pedagogy and four assumptions of andragogy, a fifth being added to each category in 1984, and a sixth, being placed at the top of the list in 1990. Thus the theories and concepts of Knowles' interpretation of andragogy have been adaptive rather than static. To allow the reader to make comparisons between the two models the six assumptions of pedagogy and the six assumptions of andragogy are juxtaposed in Table 4.1.

Table 4.1: Knowles' assumptions of pedagogy and andragogy

	Pedagogy	Andragogy
The need to know	Learners only need to know that they must learn what the teacher teaches if they want to pass and get promoted; they do not need to know how what they learn will apply to their lives (Knowles, 1990, p. 55).	Adults need to know why they need to learn something before undertaking to learn it (Knowles, 1990, p. 57).
Concept of the learner	The role of the learner is, by definition, a dependent one. The teacher is expected by society to take full responsibility for determining what is to be learned, when it is to be learned, how it is to be learned, and if it has been learned (Knowles, 1980, p. 43).	It is a normal aspect of the process of maturation for a person to move from dependency toward increasing self-directness, but at different rates for different people and in different dimensions of life. Teachers have a responsibility to encourage and nurture this movement. Adults have a deep psychological need to be generally self-directing, although they may be dependent in particular temporary situations (Knowles, 1980, p. 43).
The role of experience	The experience learners bring to a learning situation is of little worth. It may be used as a starting point, but the experience from which learners will gain the most is that of the teacher, the textbook writer, the audiovisual aid producer, and other experts. Accordingly, the primary techniques in education are transmittal techniques – lecture, assigned reading, AV presentations (Knowles, 1980, p. 44).	As people grow and develop they accumulate an increasing reservoir of experience that becomes an increasingly rich resource for learning – for themselves and for others. Furthermore, people attach more meaning to learnings they gain from experience than those they acquire passively. Accordingly, the primary techniques in education are experiential techniques – laboratory experiments, discussion, problem-solving cases, simulation exercises, field experience, and the like (Knowles, 1980, p. 44).

	Pedagogy	Andragogy
Readiness to learn	People are ready to learn whatever society (especially the school) says they ought to learn, provided the pressures on them (like fear of failure) are great enough. Most people of the same age are ready to learn the same things. Therefore, learning should be organized into a fairly standardized curriculum, with a uniform step-by-step progression of all learners (Knowles, 1980, p. 44).	People become ready to learn something when they experience a need to learn it in order to cope more satisfyingly with real-life tasks or problems. The educator has a responsibility to create conditions and provide tools and procedures for helping learners discover their "needs to know." And learning programs should be organized around life-application categories and sequenced according to the learners' readiness to learn (Knowles, 1980, p. 44).
Orientation to learning	Learners see education as a process of acquiring subject-matter content, most of which they understand will be useful only at a later time in life. Accordingly the curriculum should be organised into subject-matter units (eg., courses) which follow the logic of the subject (e.g., from ancient to modern history, from simple to complex mathematics or science). People are subject-centered in their orientation to learning (Knowles, 1980, p. 44).	Learners see education as a process of developing increased competence to achieve their full potential in life. They want to be able to apply whatever knowledge and skill they gain today to living more effectively tomorrow. Accordingly, learning experiences should be organized around competency-development categories. People are performance-centred in their orientation to learning (Knowles, 1980, p. 44).
Motivation to learn	Learners are motivated to learn by external motivators – grades, the teachers' approval or disapproval, parental pressures [taken from Knowles (1990), p. 56, but first introduced in Knowles (1984)].	While adults are responsive to some external motivators (better jobs, promotions, higher salaries, and the like), the most potent motivators are internal pressures (the desire for increased job satisfaction, self-esteem, quality of life, and the like) [taken from Knowles (1990), p. 63, but first introduced in Knowles (1984)].

Compiled from Knowles (1980; 1984; 1990).

The assumptions of andragogy are examined more closely later in this section, however, it is perhaps appropriate to first clarify how Knowles defines the term adult, as different cultures and societies have differing conceptualisations of the status of adulthood. For example, for some, adulthood may be determined by the

biological ability to reproduce, for others it may be based upon the rules of society such as reaching voting age, being able to buy alcohol, or holding a driving licence, yet again it may be based upon the person's own psychological perception of themselves (Knowles, 1990). As these factors vary in different countries, cultures, and individuals, they offer little guidance in relation to adult learning (Knowles, 1980). For Knowles (1980) the attainment of adulthood is based upon two factors, the social definition and the psychological definition. The social definition rests upon the extent to which the individual's culture recognises him or her as performing the role of an adult. The psychological definition rests upon the individual's self concept of himself or herself through their self-directedness, for example the extent to which the individual is responsible for his or her own life (Knowles, 1980). Thus the attainment of adulthood, in the context of andragogy, is achieved through social status and the concept of self, rather than through the attainment of biological age.

Knowles (1980) stated that not all his assumptions about adult learners may be correct, but that they are there to be "challenged, tested and modified" (p. 14) through the process of inquiry. The following explores each of the assumptions in greater detail and presents some of the criticisms by others in the field.

The need to know

Adults need to know why they need to learn something before undertaking to learn it (Knowles, 1990, p. 57).

Knowles (1990) contends that one of the most important tasks of the tutor is to convey to the student the purpose in learning what is being taught, and how what is learned can be applied in real life situations. Knowles identifies a number of tools that may help the learner to identify the gaps between their existing knowledge and the knowledge they wish to acquire. Such tools include the use of role models, simulated experience and diagnostic assessment (Knowles, 1990).

The learner's self concept

It is a normal aspect of the process of maturation for a person to move from dependency toward increasing self-directedness, but at different rates for different people and in different dimensions of life. Teachers have a responsibility to encourage and nurture this movement. Adults have a deep psychological need to be generally self-directing, although they may be dependent in particular temporary situations (Knowles, 1980, p. 43).

Knowles, in common with other major theorists of adult education, including Cyril Houle, Allen Tough, and Stephen Brookfield, developed his idea of andragogy from a concept of self-directed learning, which is consistent with that of lifelong learning (Jarvis *et al.*, 1998). The notion of self-directedness appears to consume a major part of Knowles' writing concerning andragogy.

Adults gradually perceive themselves as being self-directed and as such have a concept of their own value. They acquire the ability to manage their own lives by making their own decisions and living with the consequences (Knowles, 1996). Once they have achieved this status they have a desire to be perceived by others as possessing these qualities and resent those who try to control them (Knowles, 1990). However, Knowles (1990; 1996) contends that many adults who are self-directed in other areas of their lives regress to dependency the moment they enter a classroom. He claims that this is because they were conditioned during childhood and that the classroom environment induces childlike behaviour, thus childhood experiences can impair learning ability in adulthood. In such a situation adults frequently withdraw from learning programmes, as their naturally self-directing nature, contrasted with their dependency in the classroom, causes internal conflict. Moreover, whilst initially relying upon the tutor, most adults resent being treated like children (Knowles, 1990; 1996).

Knowles (1996) contends that the answer to this problem lies with the tutor, whose responsibility it is to create a learning environment that is conducive to adult learning and places the learner in the adult role. However, even in situations where the learning environment is conducive to adult learning, learners may have an expectation that they will be treated like children and thus

need to go through a process of "re-orientation to learning as adults" (1996, p. 85), after which they become empowered and able to engage in self-directed learning (Knowles, 1996). Consequently, tutors need to create physical learning environments in which learners can feel relaxed and comfortable, and, more importantly, a psychological climate where adults feel accepted, valued and able to participate without the fear of ridicule (Knowles, 1996).

A number of writers have questioned certain aspects of Knowles' assumption of self-directedness in adults. Brookfield (1986) questions whether such a formulation of self-direction as an indication of adulthood is empirically verifiable as many adults fail to demonstrate self-directedness throughout their lives, regardless of age. Brookfield develops this argument further by pointing out that as some people never achieve self-directedness, or fail to display mature behaviour, adult education would become complicated, as it would not necessarily apply to those who have achieved a certain chronological age, but rather to those who met a certain 'condition'. Newstrom and Lengnick-Hall (1991) argue that Knowles' social and psychological definition of adulthood through self-directedness, as discussed above, raises the question of who makes the assessment about whether a person has reached adulthood. Furthermore, Brookfield (1986) and Hanson (1996) argue that self-direction is a western goal, which in some cultures may be contrary to the belief that conformity to the group is of prime importance, thus in such cultures the social structure does not allow the opportunity for self-directedness.

A further issue in relation to self-directedness is Knowles' contention that this characteristic is absent in children. Whilst acknowledging that young children may not be self-directed, in that they do not set objectives and diagnose needs, Tennant (1988) argues that children frequently learn in a natural and spontaneous manner, which demonstrates their independent approach to learning.

Jarvis (1995) points out that self-direction is a difficult process for some adults and that many adult learners are dependent upon the tutor. This view is supported by Hanson (1996) who conducted research into mature students entering full-time higher education and found that they were only too willing to comply with the authority and direction of the tutor. Thus there are some people

who may never achieve self-directedness and for whom the andragogical approach will be unsuitable and the pedagogical approach more appropriate.

The role of the learners' experience

As people grow and develop they accumulate an increasing reservoir of experience that becomes an increasingly rich resource for learning – for themselves and for others. Furthermore, people attach more meaning to learnings they gain from experience than those they acquire passively. Accordingly, the primary techniques in education are experiential techniques – laboratory experiments, discussion, problem-solving cases, simulation exercises, field experience, and the like (Knowles, 1980, p. 44).

Adults have more experience and different types of experiences than they had as children. Knowles (1996) contends that children tend to relate their experiences to external factors, such as who their parents are and where they attend school, whilst to the adult, experience is what the person has done, or what has happened to him or her as an individual, hence experience becomes a part of the person. Knowles further contends that where such experience is not utilised the individual feels rejected as a person. Thus adults have a richer reservoir of experience than children and consequently have more to contribute. The negative aspect of experience, however, is that it may cause adults to develop habits that result in narrow-mindedness. The implications of experience for adult learning are that individuals can share their experiences through dialogue, case studies, role-playing and group work (Knowles, 1996). The role of experience thus emphasises the shift from the uni-directional transmission model of teaching (Laurillard, 1993) towards a more constructivist style of learning.

Brookfield (1986) supports Knowles' assertion that as people develop they accumulate experience which can be used as a resource for learning. Indeed, he perceives the value of critical reflection on experiences to be one of the most significant elements of adult learning (Brookfield, 1986).

Readiness to learn

People become ready to learn something when they experience a need to learn it in order to cope more satisfyingly with real-life tasks or problems. The educator has a responsibility to create conditions and provide tools and procedures for helping learners discover their "needs to know." And learning programs should be organized around life-application categories and sequenced according to the learners' readiness to learn (Knowles, 1980, p. 44).

Readiness to learn refers to the importance of identifying when learning is appropriate to need. In the last few years this has been increasingly referred to as 'just in time learning'. In the andragogical model readiness to learn is assumed to have been attained when the learner identifies the need to know something specific that will help them to effectively deal with a specific aspect within their lives or to perform a social role (Knowles and Associates, 1984). A simple illustration of this is a situation where a newly married person may attend 'DIY' classes in order to learn how to make things for the home, as an aspect of learning that they may have previously considered unnecessary.

The relevance of this assumption to the process of learning is questioned by Tennant (1988) who believes that children, as well as adults, need to perform social roles. Tennant further argues that readiness to learn in adults is retained from the natural curiosity of childhood.

Orientation to learning

Learners see education as a process of developing increased competence to achieve their full potential in life. They want to be able to apply whatever knowledge and skill they gain today to living more effectively tomorrow. Accordingly, learning experiences should be organized around competency-development categories. People are performance-centred in their orientation to learning (Knowles, 1980, p. 44).

Because adults usually enter a learning situation after experiencing a need to learn something specific, they are more likely to be orientated to the problem, rather than learning for the sake of it (Knowles and Associates, 1984). The implications of this are that educators need to design learning programmes in a way that ensures that they meet the specific needs of the target group.

Furthermore, learning programmes need to include an explanation of why learners need to know certain things, for example, why it is necessary to gain knowledge that underpins subsequent learning (Knowles, 1990; 1996).

Brookfield (1986) takes issue with Knowles' assumptions related to readiness to learn and orientation to learning. Firstly, in his assumption regarding readiness to learn Knowles states that learning programmes should be organised around life-application categories. Secondly, his assumption regarding orientation to learning states that learning experiences should be organised around

competency-development. Brookfield argues that such views may encourage a behaviouristic attitude to learning in which student learning is measured by competency-based performance, thereby neglecting reflective learning. Brookfield also points out that many adults undertake learning purely for personal fulfilment and not necessarily to achieve specific life skills (Brookfield, 1986).

Motivation to learn

While adults are responsive to some external motivators (better jobs, promotions, higher salaries, and the like), the most potent motivators are internal pressures (the desire for increased job satisfaction, self-esteem, quality of life, and the like) (Knowles, 1990, p. 63).

The sixth, and final assumption of andragogy, added by Knowles in 1984, is the motivation to learn. Knowles, however, does not greatly expand on this aspect of his model, other than to say that research conducted by Tough in 1979 (see Knowles, 1990, p. 63) showed that whilst most adults are motivated to continue learning, this motivation is frequently inhibited by internal and external factors. Internal factors include a negative concept of self as a student. External factors include a lack of learning opportunities and resources, and time constraints (Knowles, 1990).

Tennant (1988) criticises the assumption of motivation on the grounds that Knowles fails to fully distinguish between internal and external motivators. He further contends that the literature does not support Knowles' assertion that internal motivators are more prominent in adults.

This author takes the view that there is considerable overlap between four of Knowles' assumptions, these are: the need to know, readiness to learn, orientation to learning, and motivation to learn. The boundaries between these four assumptions appear to be fuzzy and could possibly be subsumed under one or two categories. The two remaining categories, the self-concept of the learner, and the role of experience are considered here to be of prime importance and to underpin Knowles' theory of adult learning. Whilst acknowledging some of the difficulties associated with certain aspects of Knowles' theory, for example, how one defines adulthood (Brookfield, 1986; Newstrom and Lengnick-Hall, 1991; Hanson, 1996), the fact that some adults prefer to be dependent upon the tutor

(Jarvis, 1995), and the argument that competency-based assessment may deter cognitive learning, (Brookfield, 1986), this author considers Knowles' assumptions of the characteristics of adult learners to be valid.

The andragogical model perceives the role of the teacher to be that of a facilitator who uses his or her skills to design and manage a programme where learners utilise a variety of resources in addition to the teacher. Such resources may include peers, subject specialists and a variety of media (Knowles and Associates, 1984). The skill of the andragogue lies in being aware of the resources available and the ability to link the learners to them.

Though Knowles' conceptualisation of andragogy has been the subject of criticism, many acknowledge that it has been a major influence on adult learning and that the concept has generated issues that are central to the concerns of the adult learner (see Conway, 1985; Brookfield, 1986; Davenport, 1993; Jarvis, 1995; Milligan, 1995). Those involved in the teaching of adults today frequently employ the principles of andragogy. However, the basic assumptions of andragogy have become so embedded in the educational system that many often fail to recognise them and simply identify such methods as merely being good teaching practice (Lee, 1998).

This subsection has presented the assumptions of andragogy and explored some of the criticisms of those assumptions. The following discusses the ways in which andragogy might be applicable to distance e-learning.

4.2.4 Andragogy and e-learning

Having explored the concept of andragogy this author contends that an andragogical approach to teaching and learning might be especially congruent with distance e-learning, for the following reasons:

- According to Knowles (1996) adults are nearly always voluntary learners, whilst this may not be strictly true, for example, for those who have been coerced by their employers, it is probably true of distance e-learners who frequently study in their own time. Thus, distance e-learners are likely to be voluntary learners and hence more

likely to have identified the need to know, have a readiness to learn, and to be motivated to study before they embark upon an e-learning course.

- As the distance e-learner does not need to enter the physical classroom, he or she may be better able to develop self-directedness, because:
 - opportunities for adopting a childlike role are significantly reduced
 - opportunities for being tutor dependent are reduced
 - learners can create a physical environment to suit their individual needs and in which they feel most comfortable.
- Distance e-learning provides opportunities for learners to:
 - share their experiences through online dialogue
 - engage in constructivist learning
 - learn through case studies and group work

Moreover, as the cohort that formed the basis of this study were studying a familiar subject and already had an understanding of the relevance of the subject to their lives and working environment, then the andragogical model is particularly appropriate to their needs, as would be the case with any group of professionals studying their subject at postgraduate level.

Whilst others have recognised the significance of andragogy for distance education, for example Burge (1988) used the concept of learner-centeredness to produce a set of guidelines for traditional distance education, and Charlton (1995) explored the association between andragogy, distance education, and interactive courseware, little research appears to have been undertaken in relation to andragogy and e-learning.

Thus, andragogy has exerted a strong influence on how adult educators approach teaching and learning and is frequently considered as a viable alternative to

pedagogy for the teaching of adults. Whilst Knowles' assumptions of the characteristics of adults have been the subject of debate they are generally accepted as being valid.

Knowles' theory of andragogy could be considered to have been ahead of its time. The teaching and learning strategies that he advocated are compatible with today's learner-centred environment. Moreover, they are especially congruent with distance e-learning, as they support a constructivist style of learning in which the tutor acts as facilitator and the learner is self-directed and motivated to learn.

Knowles' assumptions of the characteristics of adult learners indicate that he recognised that learners have individual differences and preferences for learning. Learning styles theory is a further important aspect of cognitivism and is explored in the following section.

4.3 Learning styles theory and e-learning

Examination of the literature related to learning theory encompassed the theory of learning styles. Closer examination of this area of learning theory led this author to identify its potential in helping gain an understanding of how and why students from similar educational and occupational backgrounds may differ in their experiences of e-learning. The purpose, therefore, of applying learning styles theory in this study is to facilitate an understanding of the students' perspectives of e-learning and thus assist in determining how those differences may be best accommodated in future e-learning courses.

This section will firstly highlight the ways in which conventional and online learning differ for both teachers and learners. It is argued here that little is known about how students' use virtual learning environments and that a greater awareness of learning styles theory can help e-learners to learn more effectively and assist tutors in the design of learning environments. The concept of learning styles is then introduced and an overview of a variety of learning styles instruments is presented. The discussion then focuses on Kolb's Learning Styles Inventory (LSI), the instrument used in this study, and discusses the theory that underpins the LSI. The section concludes with a discussion of previous studies

that have utilised learning styles theory for both conventional and online learning.

4.3.1 Rationale for applying learning styles theory in this study

The aim of any e-learning programme is to help learners achieve the prescribed learning objectives (Larocque and Faucon, 1997). In the traditional classroom environment the tutor is present to guide the learner towards those objectives through a variety of teaching strategies and learning activities. Moreover, in the traditional classroom the tutor has the opportunity to detect deficiencies in student learning through direct observation and where necessary to implement remedial measures. Such measures may include varying the teaching methods employed or the learning activities provided. Jonassen and Grabowski (1993) argue that teaching strategies can, and should, be adapted to accommodate students' differing levels of ability or ways of learning. In the virtual learning environment, however, the tutor is frequently unable to directly observe the student. This is especially so in the distance e-learning situation where the tutor and students are in separate locations, the exception being in blended e-learning situations, where online learning is integrated with classroom learning and the tutor may, therefore, have opportunities for observation. As the distance online tutor is not present to direct learning or to foster independent learning, the online learner needs to be more self motivated and self directed in order to achieve the objectives of the course or programme, thus the responsibility for learning is transferred from the tutor to the learner (Martinez, 2002). Whilst the move towards learner autonomy has been a gradual one that began in the latter half of the twentieth century, the shift in responsibility for learning from tutor to student, engendered by e-learning, is seismic in comparison. This shift in responsibility presents new challenges as the strategies and methodologies employed in the traditional classroom may not be appropriate in the online environment (Martinez, 2002).

Just as approaches to learning differ, so do approaches to teaching. There is no single right way to teach and many tutors naturally confine their teaching to the method that reflects their own learning style to the exclusion of others

(Entwistle, 1981; Davison *et al.*, 1999). However, designing learning environments to accommodate all learner types is essential for effective learning, as whilst individual teaching styles will suit some students they are unlikely to address the learning styles of an entire group. Moreover, Smith and Kolb (1986) argue that students may reject a learning environment that doesn't match their learning style.

In higher education it is usual for tutors to design their own learning programmes with little knowledge of their students' individual needs. This 'uni-directional, transmission model' (Laurillard, 1993, p.187) personified by the lecture, has until recently gone unchallenged in higher education where academics have traditionally focussed on their subject matter, seeing their task as being to deliver knowledge, rather than to know whether students understand it (Laurillard, 1993). Students are thus expected to fit into the tutor's pre-constructed framework (Robotham, 1999). Furthermore, many tutors assume that the teaching strategies successfully used in the traditional classroom can be successfully transferred to the online classroom (Diaz and Carnal, 1999), thus learners may be further subjected to teaching strategies that are inappropriate for their needs (Robotham, 1999). This can lead to students becoming too dependent upon the tutor as they assume the tutor's style to be the correct one, with the result that the tutor can then become a barrier to students' learning (Robotham, 1999), and a deterrent to the development of autonomous learning. Boud *et al.*, (1993) suggest that "before learning can occur, the experience of the learner must be engaged" (p. 13). It is thus argued here that online learners presented with learning environments that do not match their learning styles are less likely to become engaged in the learning process.

Online learning is still in its infancy and little is known about how learners perceive and utilise this new way of learning. It is, therefore, further argued that tutors need to gain a greater understanding of how e-learners use VLEs and how different learners may respond to differing online situations. One way in which this may be accomplished is through an understanding of individual students' learning styles. An examination of individual learning differences may help identify new approaches to teaching and learning that will facilitate more

independent e-learning (Martinez, 2002) and therefore encourage students to become autonomous learners.

In the 1960s and 1970s a number of instruments for measuring learning styles began to emerge. Most of these instruments are based on self-analysis and people's own perceptions of how they learn. Such instruments do not test ability, personality or skills. One of the benefits of the self-reporting method used by learning style instruments is that they are non-threatening. Furthermore, most are fairly concise and simple to complete. Moreover, they prompt learners to reflect upon how they learn and frequently help them to identify different ways of approaching learning (Jonassen and Grabowski, 1993). The Further Education Development Agency (FEDA, 1995) usefully describe a learning style as "the pattern in the way an individual achieves different learning objectives" (p. 5).

Because learning styles instruments are based on learners' own perceptions of how they learn some learning styles theories have been the subject of debate and their validity has been questioned. This issue will be discussed in more detail later in this section. Although research on the subject is considered inconclusive many educationalists (Kolb, 1984; FEDA, 1995) are of the opinion that an understanding of learning styles can help learners to realise their full potential and assist tutors in the design of learning programmes. Learning style theory suggests that, as learners are individuals they bring different skills to the learning situation and that they learn in different ways. Raising students' awareness of their learning styles can help them to recognise how best to approach learning situations; and matching resources with learning styles can help learners to make the most of a learning situation.

The need for further research into the significance of learning styles in relation to distance learning programmes, hypermedia and VLEs has been recognised by educationalists since the early days of online learning. In 1992 Shirk argued:

Little research has been accomplished in the area of learning styles and their design assumptions about how effective certain hypermedia discourse structures are upon the learning process or on different learning styles. There is much work to be done in observing learners using hypermedia systems of all sizes and in a wide variety of subject areas. Perhaps, then we can make more accurate

predictions about what is effective and what is not. (Shirk, 1992, p.91)

In the UK, the report '*Higher Education in the Learning Society*' (Dearing, 1997) encouraged a learner centred approach and advocated student self knowledge of learning styles.

It is not for us to offer institutions a compendium of learning strategies to enable them to achieve excellence in a world in which it is unrealistic to expect a return to former staff to student ratios. But it seems plain that an effective strategy will involve guiding and enabling students to be effective learners, to understand their own learning styles, and to manage their own learning. We see this as not only directly relevant to enhancing the quality of their learning while in higher education, but also to equipping them to be effective lifelong learners. Staff will increasingly be engaged in the management of students' learning, using a range of appropriate strategies. (Dearing, 1997, Recommendations 8.15)

In 1998 the Quality Assurance Agency (QAA) for Higher Education in the United Kingdom issued a set of guidelines for distance learning. The guidelines were produced as a starting point for a Code of Practice for universities and colleges offering distance learning programmes in the UK and overseas, thus demonstrating the QAA's commitment to distance learning at a strategic level (Aylett *et al.*, 1998). The paper offers a number of questions as examples of the types of questions that institutions may wish to ask themselves before establishing distance learning activities. The following question is posed under guideline No. 1:

*Do our selected teaching media offer students sufficient variety to suit different learning styles? (Aylett *et al.*, 1998)*

On the other side of the Atlantic the American Federation of Teachers and the National Education Association (Phipps and Merisotis, 1999) commissioned an opinion paper that concluded that contemporary research on the effectiveness of distance learning is inconclusive. The paper made specific reference to learning styles and technology:

Understanding of how the learner, the learning task, and a particular technology interact is limited. Learner characteristics are a major factor in the achievement and satisfaction levels of the distance learner. Information regarding a student's preferred learning style will influence how the course is designed and the type of technology to be used. Additional research could result in more information regarding why different technologies might be better suited for specific learning tasks (Phipps and Merisotis, 1999, online).

The above extracts illustrate the growing recognition of the importance of using learning style theory to help identify effective teaching strategies in online courses.

Though learning styles theory is a relatively young field it is generally accepted that as individuals, students learn in different ways and have preferences for particular learning styles. If this is so, then there are implications for both tutors and learners. The existence of learning styles necessitates care in the design of the environments in which learning takes place and this is as pertinent to virtual learning environments as it is to physical ones.

Having introduced the notion of learning styles it is now apposite to examine the concept more closely.

4.3.2 The concept of learning styles

The term 'learning styles' is relatively new and first emerged in the 1970s (Robotham, 1999). We are all aware that different people learn in different ways; Boud *et al.*, (1993) contend that different learners' experiences of the same event will vary and that they will "construct (and reconstruct) it differently" (p.11). Honey and Mumford (1992) illustrate this point by describing a scenario with which most people will be familiar. Many of us will have been in a group learning situation in which everyone is supposedly exposed to the same learning experience. However, upon leaving the classroom it is not uncommon for two people who shared that experience to find that they have very different interpretations of the session and diverse levels of understanding. Whilst one person may find a session enjoyable and learn new skills, another may find it boring and inappropriate. The reasons for these differing experiences are that people learn in a variety of ways and are stimulated by different learning activities. For example, some people learn best by listening, whilst others prefer to watch or communicate. These differing ways of learning have become known as 'learning styles'. Therefore, the term 'learning styles' is used to describe individuals' attitudes and behaviours towards learning (Honey and Mumford, 1992).

Though no two people will learn in the same way it is possible to identify certain groups of learners who display similar preferences in the way they learn. Most people are aware that they prefer certain learning activities to others, but few are aware of their learning style. The concept of learning styles emerged from research into individual differences, also known as differential psychology. Differential psychology examines how individual differences affect human behaviour (Jonassen and Grabowski, 1993).

Jonassen and Grabowski (1993) provide a comprehensive introduction to the study of individual differences, this provides a useful basis for this discussion. Individual differences can include intelligence, cognitive styles, and personality, and affect how different people respond to different situations and therefore how they learn. An awareness of individual differences in learners can provide teachers with a better understanding of how learners react to different situations and help them understand some of the difficulties that certain learning situations may engender for some learners. Individual differences encompass a number of dimensions including mental abilities, which make up a person's intelligence. Research into mental abilities includes work on cognitive controls, and cognitive styles, which are considered to be components of personality as they reflect patterns of thinking in learners. Learners develop different patterns of thinking when they engage with the physical, mental and emotional aspects of learning. The ways in which people react to different ways of learning are known as learning styles Jonassen and Grabowski (1993).

People learn in different ways because they have individual differences or learning traits. Jonassen and Grabowski (1993) identify seven groups of learner traits that facilitate student learning:

- general mental abilities (intelligence)
- primary mental abilities
- cognitive controls
- cognitive styles

- learning styles
- personality, and
- prior knowledge.

Intelligence is a complex concept that has different meanings to different people and that is applicable to a variety of situations. Cognitive controls and cognitive styles are related to mental ability. Personality is related to how individuals interact with their environment and the people within that environment. Prior knowledge is not related to a person's ability to know or to learn, or to their preferences, but simply to what they already know. Learning styles, however, are concerned with individual preferences for learning and are not directly connected to cognitive ability, personality or prior knowledge. They are however *related* to cognitive ability in that people frequently prefer to use the mental ability and cognitive controls with which they are most familiar. Therefore, learning styles indicate people's general preferences for the ways in which they process information (Jonassen and Grabowski, 1993).

Learning styles instruments

From the early 1970s onwards a wide variety of instruments for the measurement of learning styles were developed, for example:

- Rezler's Learning Preference Inventory (LPI) – measures the learner's preference for instructional environments (see Marienau and Loesch, 1988).
- Cranfield Learning Style Inventory (CLSI) – a thirty item instrument that measures a number of variables including preferences for: listening, reading, iconics and hands-on-experience (Coggins, 1988).
- Honey and Mumford's Learning Styles Questionnaire – building on Kolb's LSI, Honey & Mumford defined four learning styles: activist, reflector, theorist and pragmatist (Honey and Mumford, 1992).
- Gardner's multiple intelligences – a 70 question multiple intelligences test.

- Ridings Cognitive Styles Analysis, 1991 (see McLoughlin, 1999).
- Felder's Index of Learning Styles – a 44 item questionnaire.
- Soloman's Inventory of Learning Styles – a 28 question inventory (Montgomery, 1995).

In addition to the above Jonassen and Grabowski (1993) identify five learning style instruments that are based on psychological and pedagogical theory and that have been validated "using tests of cognitive ability and styles as benchmarks" (p. 234). These are: Hill's Cognitive Style Mapping; Dunn and Dunn Learning Styles; Grasha-Reichman Learning Styles; Gregorc Learning Styles, and Kolb's LSI (Jonassen and Grabowski, 1993). From these five instruments Kolb's LSI was selected for use in this study. A rationale for this decision, together with an examination of the theory underpinning the instrument, and a discussion of the criticisms of Kolb's LSI are presented next.

4.3.3 Kolb's experiential learning theory

Kolb's Learning Style Inventory (LSI) was selected for use in this study for several reasons, firstly, because it has proven validity and reliability and is based upon sound research in psychology, philosophy, and physiology (Jonassen and Grabowski, 1993). Secondly, the theory is well established and accepted within education (Fowler *et al.*, 2000). Thirdly, the instrument focuses on adults in educational and employment settings (Sims *et al.*, 1989) and is therefore ideally suited to this study. Fourthly, the LSI is easily self administered and therefore appropriate for use with distance learning students. Finally, the LSI Interpretation Booklet (Kolb, 1985) provides learners with feedback on how to identify their strengths and weaknesses and thus increase their learning ability. Before the instrument is discussed in detail the theory upon which it is based is explored.

Kolb (1984) describes the origins of his LSI, which is based on experiential learning theory. The cognitive theorist Vygotsky first propounded the thesis that human beings learn from experience. Based on this premise Dewey, Lewin, and Piaget developed their models of experiential learning. Dewey's model of

learning emphasised the need for learning to be grounded in experience. The Lewinian model of action research and laboratory training stressed the importance of the integration of theory and practice, and Piaget's model of learning and cognitive development described how intelligence is shaped by experience, which occurs as a result of the interaction of the person and the environment. The three models share a number of characteristics, which together form a unique perspective on learning. By stressing the importance of the process of learning, experiential learning theory took the humanistic and cognitive approach that learning is controlled by humans, and not by the environment, this represented a departure from the behaviourist approaches of theorists such as Thorndike, Hull, and Skinner (Kolb, 1984).

Kolb's model of experiential learning integrates the models of Dewey, Lewin, and Piaget and is characterised by the following propositions:

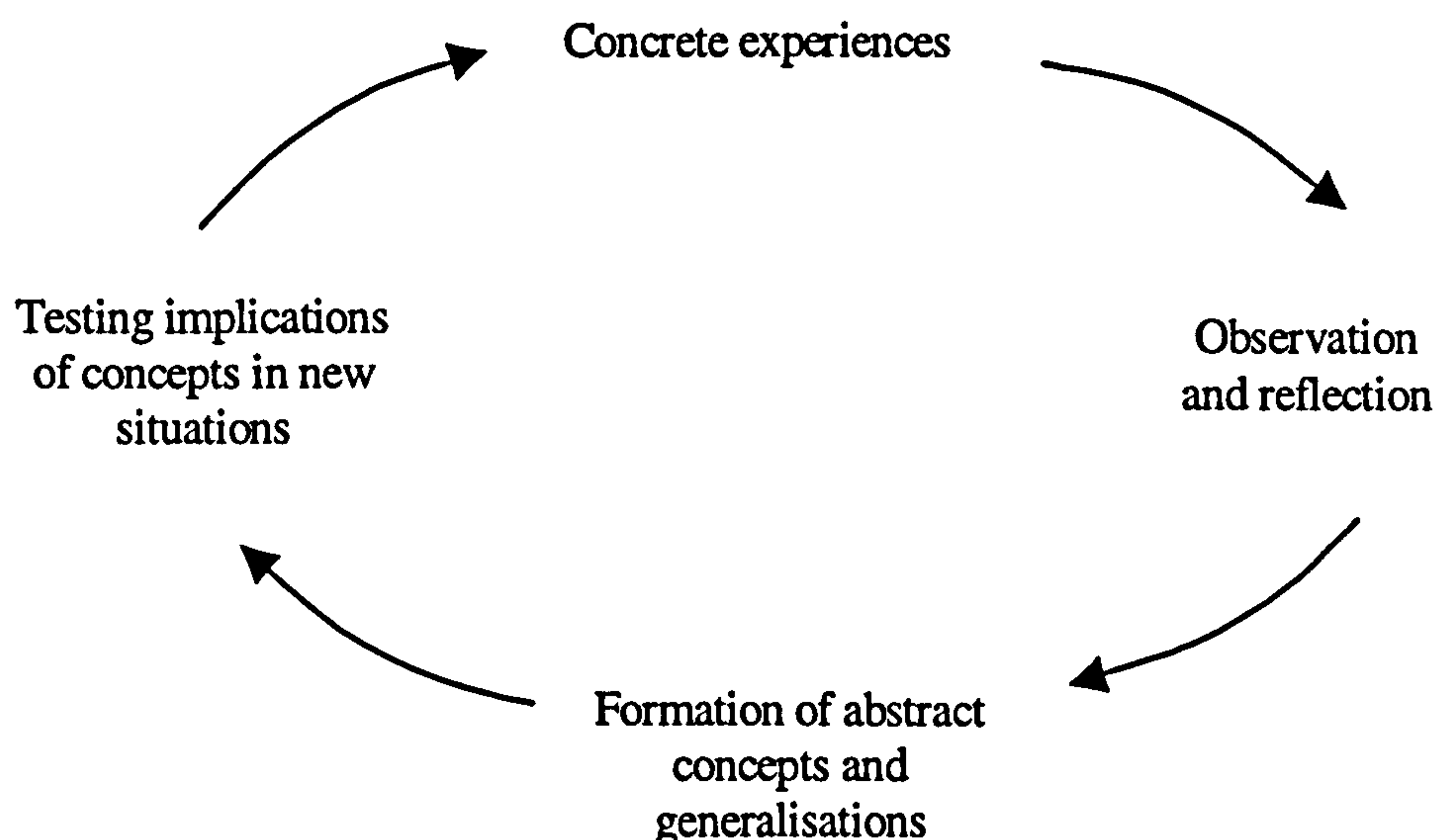
1. Learning is best conceived as a process, not in terms of outcomes.
2. Learning is a continuous process grounded in experience.
3. The process of learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world.
4. Learning is a holistic process of adaptation to the world.
5. Learning involves transactions between the person and the environment.
6. Learning is a process of creating knowledge (Kolb, 1984).

At first sight Kolb's (1984) first and last propositions appear to counteract current thinking in teaching and learning, firstly, because in recent years there has been a focus on outcomes in UK higher education. Secondly, the premise upon which the outcome driven approach is based is that the purpose of learning is to facilitate a change in the learner and that such a change can only be measured in terms of learning outcomes (McNair, 1996). Kolb (1984) contends that a focus on the measurement of outcomes is dependent upon fixed ideas, that is, learning can be assessed by measuring the number of fixed ideas that have been accumulated by the learner. Thus defining learning in terms of outcomes

can in fact be a measurement of the students' failure to modify ideas in the light of experience Kolb (1984). In experiential learning ideas are not immutable but rather constantly formed and reformed through experience, thus learning is conceived as a process rather than in terms of outcomes as in the behaviourist interpretation Kolb (1984).

Kolb (1984) asserts that in order to be effective, learners need four differing abilities, those of concrete experience (CE), reflective observation (RO), abstract conceptualisation (AC), and active experimentation (AE). These four stages represent the process of learning in which people undergo a concrete experience; the experience is then observed and reflected upon; the observations and reflections are assimilated and refined into abstract concepts or generalisations; these are then tested and provide a basis for new experiences. The four stages can be perceived as: feeling (CE), watching (RO), thinking (AC), and doing (AE), and form a learning cycle. Learning is thus a continuous process and the cycle may be commenced at any stage, but the stages should be followed in sequence (Kolb, 1984). The Lewinian experiential learning model shown in Figure 4.1 illustrates this cycle.

Figure 4.1: The Lewinian Experiential Learning Model

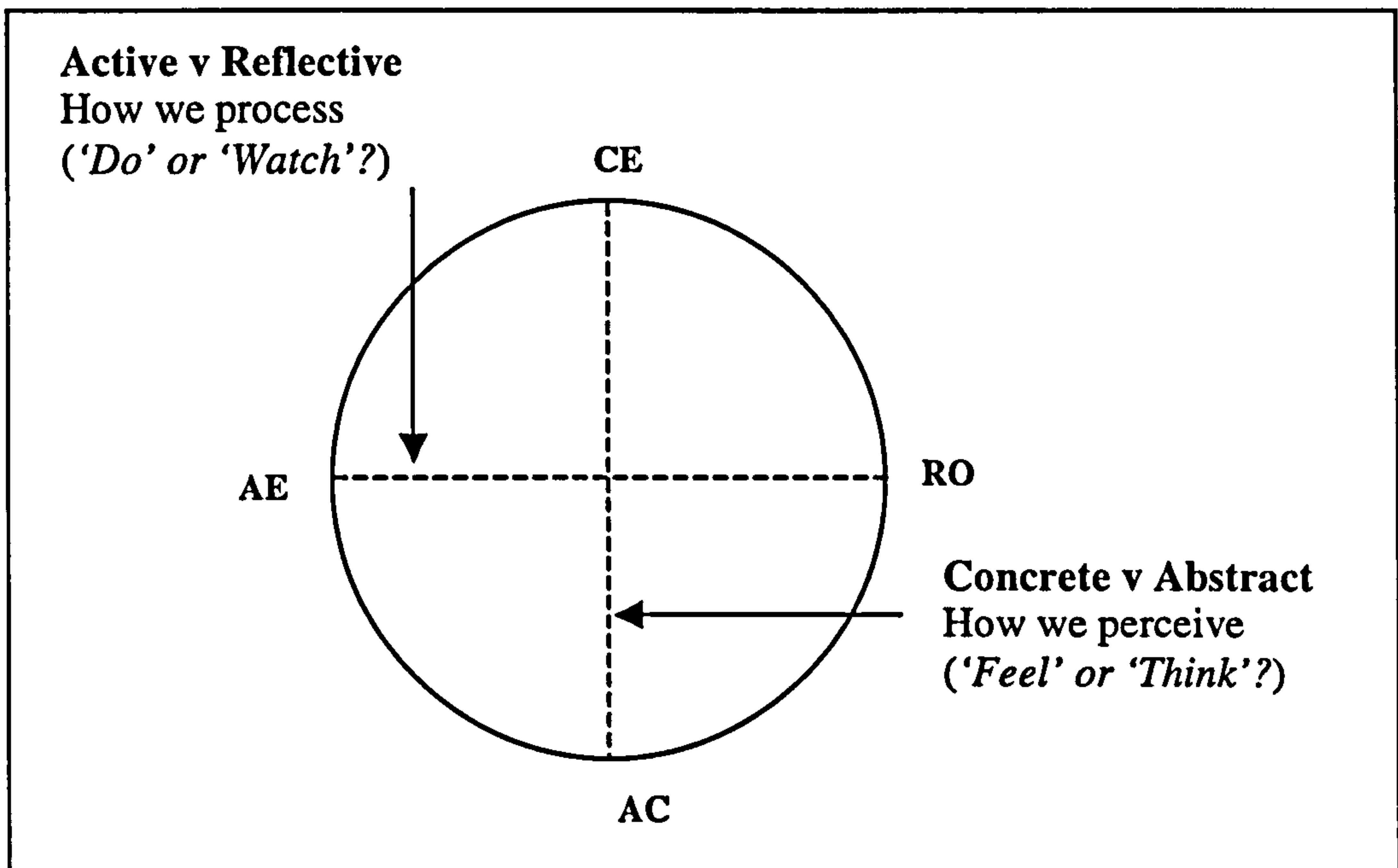


Adapted from Kolb (1984, p. 21).

Kolb's model of experiential learning is further refined by the proposition that learning comprises two processes – apprehension and comprehension. Kolb (1984) contends that a combination of the two provides the following definition of learning:

Learning is the process whereby knowledge is created through the transformation of experience (Kolb, 1984, p. 41).

Kolb (1984) translated the processes of apprehension and comprehension into two basic dimensions: prehension and transformation. Prehension relates to how individuals perceive, and transformation to how individuals process what they perceive. These two bi-polar continuums are shown in Figure 4.2 .

Figure 4.2: The two bi-polar dimensions of Kolb's experiential learning

Derived from Kolb (1984)

The vertical continuum represents how individuals perceive the environment or grasp experiences; concrete experience and abstract conceptualisation are at opposite ends of this continuum. The horizontal continuum represents how individuals process or transform incoming information; active experimentation and reflective observation are at opposite ends of this continuum (Kolb, 1984). The polar opposites on each continuum are of equal value and have both strengths and weaknesses. Individuals' orientations to learning fall at different places along each continuum and indicate preferences for learning (Smith and Kolb, 1986). The forces that determine such preferences include: personality type, educational specialisation, professional career choice, current job role and the person's current task (Smith and Kolb, 1986). Kolb (1985) defines the four basic stages, or modes, as follows:

Concrete experience

This stage focuses on personal involvement with people and experiences. People with an orientation towards concrete experience tend to rely more on feelings than thinking. They are more likely to take an intuitive than systematic, scientific approach to problem solving. The person with this orientation is

generally open-minded and adaptable and functions well in unstructured situations (Kolb, 1984; 1985).

Reflective observation

An orientation towards reflective observation emphasises understanding ideas and situations from different perspectives. People with this orientation like to carefully observe situations before making a judgement. The emphasis here is on reflection as opposed to action. The person with this orientation prefers to rely on his or her own thoughts and feelings before forming opinions (Kolb, 1984; 1985).

Abstract conceptualisation

This stage focuses on using logic, ideas, and concepts. It emphasises thinking as opposed to feeling. People with this orientation tend to take a systematic approach to understanding problems or situations. They value precision and discipline when analysing ideas (Kolb, 1984; 1985).

Active experimentation

An orientation towards active experimentation focuses on actively influencing or changing situations. People with this orientation place an emphasis on doing as opposed to observing. They take a practical approach and like to see results (Kolb, 1984; 1985).

Kolb's LSI measures the extent to which people rely on the four modes described above and identifies, through two combination scores, their preferences for CE or AC on the vertical continuum and for AE or RO on the horizontal continuum, and thus their preferred style of learning. Kolb's LSI is described next.

4.3.4 The Kolb Learning Styles Inventory

Kolb's Learning Style Inventory (LSI) is used to determine individual learning styles. It is a self-administered learning style assessment tool that helps identify learners' strengths and weaknesses (Smith and Kolb, 1986).

The LSI is based on the experiential learning model described above.

Combining the two dimensions of concrete-abstract and active-reflective

produces four quadrants. When a person makes choices between the polar opposites on each continuum he or she falls into one of these four quadrants. That is, in taking in new information, represented by the prehension continuum, people characteristically choose either a concrete (feeling) approach or an abstract (thinking) approach. Similarly, in processing information, represented by the transformation continuum, they choose between an active (doing) approach and a reflective (watching) approach. Table 4.2 shows the processing and perception preferences characterised by each of these learning styles.

Table 4.2: Perceiving and processing information on Kolb's LSI

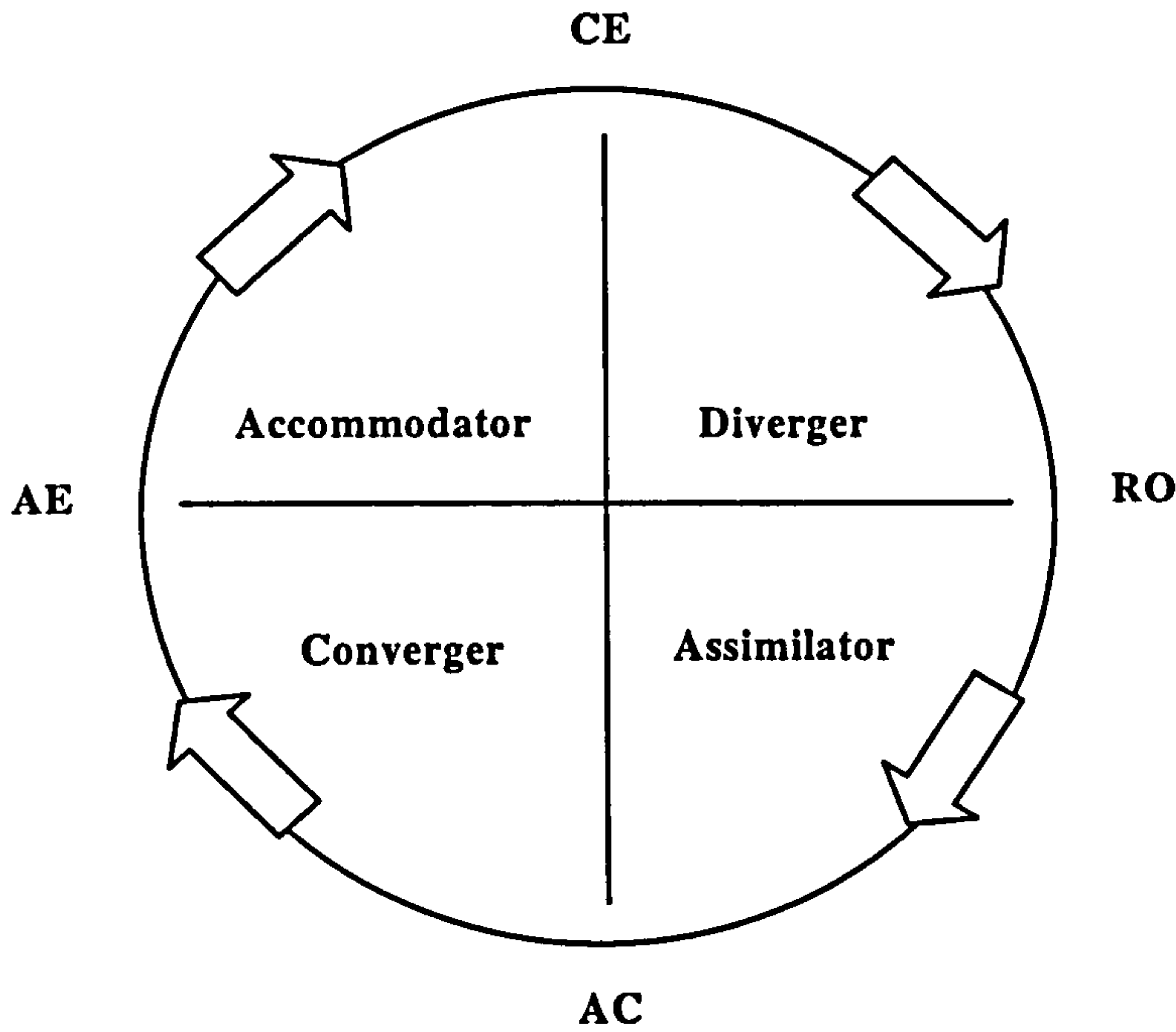
	Processing/Transformation		Perception	
	Active	Passive	Concrete	Abstract
	AE Action/ Extension	RO Thought/ Intention	CE Feeling/ Apprehension	AC Comprehension/ Conceptualising
Diverger		X	X	
Assimilator		X		X
Converger	X			X
Accommodator	X		X	

Source: Jonassen and Grabowski (1993, p. 250).

In making these choices individuals characteristically fall into one of the four quadrants and are thus orientated towards one of the four learning styles identified on Kolb's learning style model shown in Figure 4.3. These are: accommodator, diverger, converger and assimilator.

Figure 4.3 shows the position of the four learning styles on the learning model.

Figure 4.3: Kolb's Learning Styles



The LSI measures the extent to which individuals rely on each of the four stages previously discussed, recognising that learners tend to show a preference for one stage. Effective learners use each stage of the model. Different learners start at different stages of the cycle. Each stage has its strengths, and weaknesses (Kolb, 1985).

Jonassen and Grabowski (1993) provide a useful summary of the strengths and weaknesses characterised by each of Kolb's learning styles, which forms the basis of Table 4.3.

Table 4.3: The characteristics of Kolb's learning styles

Diverger – concrete experience/reflective observation	
Strengths	Weaknesses
ability to assimilate disparate observations into an integrated explanation	less able to make decisions
oriented towards feelings	less oriented towards thinking
imaginative, intuitive	less concern for theories or generalisations
ability to see many perspectives	less systematic or scientific
ability to generate many ideas	
broad cultural interests	
ability to relate to others	
open-minded	
focus is on thoughtful understanding	less able to apply ideas
ability to gather wide-ranging information	
Assimilator – abstract conceptualisation/reflective observation	
Strengths	Weaknesses
sound logic and precision	less focus on people or feelings
theoretical model building	less personal involvement
inductive reasoning	less ability to influence others
ability to assimilate wide-ranging ideas	less able to apply theories/ models and integrate them into logical explanation
focus on thoughtful understanding	not action oriented
ability to create multiple perspectives	less ability to make decisions
takes a systematic and scientific approach	less artistic
analytic, abstract and quantitative tasks	qualitative or concrete tasks
good organiser of information	
good at designing experiments	

Converger – conceptualisation/active experimentation	
Strengths	Weaknesses
ability to problem solve	have narrow interests
ability to make decisions	relatively unemotional
unemotional	less focus on people or feelings
hypothetico-deductive reasoning	close-minded
focused	unimaginative
ability to apply ideas practically	
ability to select single best or correct answer	
sound logic and precisionless	focus on people or feelings
focus on thoughtful understanding	less intuitive understanding
systematic and scientific approach	less artistic
analytic, abstract and quantitative tasks	qualitative or concrete tasks
ability to influence others and situations	
pragmatic	less concerned with absolute "truth"
ability to get things done	less emphasis on observing
technical tasks or problems	social or interpersonal issues
ability to create new ways of thinking and doing	
experimentally oriented	
Accommodator – concrete experience/active experimentation	
Strengths	Weaknesses
action, results oriented	relies on other people for information
carrying out plans	no reliance of own analytic ability
enjoys and seeks new experiences	sometimes impatient
opportunity seeking	less scientific or systematic
risk taking	
adapts to new situations well	perceived as controlling
relies on facts and "present reality"	disregards theory
intuitive, artistic	trial-and-error mode of solving problems
people oriented	
open-minded	
ability to influence and lead others and situations	
pragmatic	less concerned with absolute "truth"
ability to get things done	
personal involvement	

Source: Jonassen and Grabowski (1993, pp. 250-253).

The strengths and weaknesses identified in the above Table helped determine some of the strategies used in the design of the GOLDPhase Virtual Learning Environment and are discussed in Chapter 6.

Criticisms of Kolb's LSI

Whilst Kolb's experiential learning theory and its associated LSI have been widely adopted, especially within higher education, use of the LSI has been the subject of some debate, with concern being expressed regarding its reliability and validity (Allinson and Hayes, 1988).

Freeman and Stumpf (1980) asserted that evidence to support Kolb's learning style theory was weak and that test-retest reliability of the instrument was low. Allinson and Hayes (1990) also questioned the theory underpinning the LSI and its construct and face validity, suggesting Honey and Mumford's Learning Styles Questionnaire (1992) as a preferable alternative. However, these criticisms were levied towards the original version of Kolb's LSI.

Kolb's LSI was revised in 1985 and differs from the original in that it is easier to administer, has clearer instructions, uses simpler language, has a simpler scoring system, and the normative sample has been updated. Moreover, the internal reliability of the test over the original version has been improved (Smith and Kolb, 1986), see Appendix 2.

A possible criticism of the revised (1985) version of the LSI is that the sentence endings for each item are arranged in columns that correspond to each orientation, which could create a bias effect. Whilst acknowledging this criticism Smith and Kolb (1986) argue that the ease of scoring and practicality of the revised instrument outweigh any potential bias.

The revised edition of Kolb's LSI (1985) has also been subjected to scrutiny with studies finding it to possess satisfactory internal consistency but suggesting that the instrument may not be a stable measure of a person's learning style over time (Sims *et al.*, 1986; Corba, 1988). However, a study by Geiger and Pinto (1991) using the revised Kolb LSI found the learning styles of students to be stable over a period of three years.

In view of its improved internal consistency the revised edition of Kolb's LSI (1985) was selected for use in this study. Whilst criticisms of the stability of the instrument as a measure of learning styles over time is acknowledged the issue was not considered to be an area of particular concern within this study as the duration of e-learning programmes are unlikely to exceed a period of three years.

The revised LSI (1985) is a 12-item questionnaire. Each item presents a sentence with four possible endings arranged in columns. Respondents are asked to rank the sentence endings in a way that best describes his or her learning style. Each sentence ending corresponds to one of the four learning orientations. Each column is totalled and the scores are plotted on a diagram to indicate an individual's emphasis on each orientation. The scores are then combined to give the AC-CE and AE-RO scores, which are plotted on a grid. The point of interception determines an individual's learning style (Kolb, 1985; Smith and Kolb, 1986). The instrument can be completed in about ten minutes. The LSI booklet includes supporting information and provides feedback on the strengths and weaknesses of each learning style together with recommendations on how learners can develop their learning skills in each of the four areas.

The following sub-section discusses some ways in which learning styles instruments have previously been applied in educational research.

4.3.5 The application of learning styles theory

Kolb's experiential learning theory suggests methods for structuring learning sessions and full courses around the learning cycle to help maximise student learning.

Though the term experiential learning theory suggests that priority is given to experiential activities this is not the case, as the theory ascribes equal importance to each phase of the learning cycle (Healey and Jenkins, 2000). The model can be used to design learning programmes by including a variety of activities that address all phases of the model (Atherton, 2002). However, the model should not be used to label or stereotype students, but rather to recognise valid differences in approaches to learning (Birkey and Rodman, 1995).

Kolb (1984) asserts that a person's learning style can influence the extent to which they benefit from different learning activities. Students develop a particular preference for learning and favour learning resources that are presented in their preferred style. However, to maximise learning they should use all phases of the learning cycle by attempting to make use of those activities that they would normally avoid and thereby increase their potential for becoming a balanced learner (Kolb, 1984).

A number of studies have explored students' preferences for learning using Kolb's LSI. A study by Kolb and Fry (1975) found that accommodators preferred unstructured learning environments and liked peer interaction, whilst assimilators preferred a structured environment and liked following directions. Carrier *et al.*, (1988) examined students' perceptions of note taking and found that accommodators and divergers did not take note taking seriously, whilst convergers and assimilators took copious notes. Others (Matthews and Hamby, 1995; Philbin *et al.*, 1995) have explored learning difference by gender.

Eickmann *et al.*, (2002) found significant differences between the teaching and learning approaches used in art courses and management courses. In the courses studied the curriculum for art students took a recursive approach using demonstration, practice and production, whilst the management curriculum took a discursive approach that was largely text driven. The two teaching approaches contrasted, in that the management course focussed on *telling* through theory, whilst the art course focussed on *showing* by incorporating both theory and practice. The learning styles of members of the two groups of students were assessed using Kolb's LSI. The results showed that the learning styles of the art students were concentrated in the upper northern regions of Kolb's learning style model, whereas the learning styles of the management students were concentrated in the lower southern regions. The study concluded that a more integrated learning environment might benefit management students by helping them to develop interpersonal skills that would compliment their analytic skills. Eickmann *et al.*, attribute the text driven approach taken in the management course to the discipline's scientific roots of economics, mathematics and behavioural science. The study illustrates two points, firstly, the way in which

subject content can be focused towards specific modes of learning according to the background of the course designer. Secondly, how those with specific learning styles favour certain modes of learning. These factors highlight the implications of learning styles theory for both teaching and learning (Eickmann *et al.*, 2002).

Few studies have examined the implications of learning styles for e-learning, though some have explored the use of ICT in relation to learning styles, using a variety of learning styles measures.

Fowler *et al.*, (2000) examined the learning styles of software engineering students in order to establish a methodology that utilises learner preferences to support the construction of knowledge. The study used Kolb's LSI and Felder and Solomon's Index of Learning Styles and concluded that staff and students need to be aware of their learning styles and staff need to apply the knowledge to the teaching of the course.

Using Kolb's LSI, Terrell (2002) found that students taking online courses were primarily convergers and assimilators. Diaz and Cartnal (1999) compared the learning preferences of two distance online health education classes with an equivalent attended class using Grasha-Riechmann Student Learning Styles Scales. The findings showed that online students were more independent than attending students and that the learning styles of the two groups differed.

Using Jung's theory of psychological types with civil engineering and construction management students, Davison *et al.*, (1999) found that the value derived from educational software varied according to the learning style of the individual. Dewar and Whittington (2000) used the Myers-Briggs Indicator (MBRI®) to explore the different ways in which adult learners coped in the online environment. The study concluded that the application of learning styles theory to the online environment could help identify appropriate tools for different groups of learners. Carver *et al.*, (1999) found that addressing differing student learning styles through the use of hypermedia courseware allowed students more control over their learning and improved the performance of many

students. The strategy used allowed learners to follow a course of learning best suited to their individual style, rather than that prescribed by the tutors.

Three main themes emerge from these studies, firstly, course designers appear to be influenced by the way in which they were taught and may not provide adequate learning opportunities for all learner types. Secondly, different learner types may be better suited to online learning. Finally, the use of ICT can provide learners with flexible options for adaptive learning.

This section has shown that teaching and learning in virtual learning environments differs from conventional environments where the tutor is able to observe the learner and learners can interact directly with the tutor. This shift in the responsibility for learning demands a more autonomous approach to learning. However, online learning is a relatively new field and little is known about how students utilise and perceive virtual learning environments. Knowledge of students' learning styles might inform a variety of issues, such as, how people search for information and resources; how they interact with the online learning environment; how they organise their study time and physical learning environment; the differing ways in which they respond to CMC, and whether learning styles impact distance e-learning retention rates.

The concept of learning styles theory utilising Kolb's LSI is therefore presented as a method for helping gain a greater understanding of the needs of e-learners and thus in identifying appropriate methods of teaching and learning. Kolb's LSI was selected for its proven validity and reliability and for its sound theoretical base. The instrument can be easily self-administered and provides feedback on how learners can improve their learning ability.

Whilst educational research into learning styles has been abundant over the last three decades the bulk has focussed primarily on traditional learning environments. Few studies to date have focussed on distance virtual learning environments and fewer still have utilised Kolb's LSI. Consequently, little information is available to suggest how learners with differing learning styles perceive online learning. It therefore follows that this is an important area worthy of investigation.

Conclusions

The purpose of this chapter was to provide an understanding of learning theory, its historical context and background. The previous chapter reviewed the literature related to e-learning, which revealed gaps in the research thus defining the purpose of this study. Two of the areas identified as having previously been neglected in distance e-learning are adult learning and individual learning styles, both of which are underpinned by learning theory. In order to provide a theoretical base from which to explore these areas this chapter has thus examined the development of learning theory throughout the twentieth century, explored the concept of andragogy – a theory of adult learning, and discussed learning styles theory.

This review of learning theory firstly illustrated the way in which learning theories have developed and differing views have emerged. Two basic views of learning theory were presented, the behaviourist and the cognitive. These two basic positions differ in that a major thesis of behaviourism is that learning is based on the study of overt behaviour that can be seen and measured, whilst cognitivism focuses on learning as an internal process that takes place within the brain. In the behaviourist model the tutor controls the learning environment and learners take a passive role. The behaviourist model dominated education in the first half of the twentieth century. Cognitivism emerged in the second half of the twentieth century and is based on thought processes rather than behaviour. Constructivism, a cognitive perspective of learning that places an emphasis on the learner and the learner's ability to gather information and build his or her own knowledge base, rather than upon the tutor, also focuses upon the active, rather than passive learner. Section one highlighted that both behaviouristic and cognitive approaches to learning are of value and can be used in both traditional and e-learning environments. Whilst the cognitive approach is more learner than teacher centred, no single method can meet the needs of all learning situations.

Most of the theories of learning discussed in section one were derived from research that focussed on learning in childhood. Section two, however, focussed on learning in adulthood and presented the concept of andragogy, a theory of adult learning that offers an alternative to the pedagogical model, which has

traditionally been applied to the teaching of both adults and children. Adults frequently display different characteristics to those of children, such as self-directedness and self-motivation. They also have a wider range of experience to share with their peers. The tutor, therefore, needs to create a learning environment that is conducive to adult learning, whilst considering that some adults will respond better to the pedagogical model. Having presented the background and emergence of andragogy and discussed its theoretical underpinnings and some of the criticisms of the theory, section two presented a rationale for applying the model in distance e-learning, where the learner has wider opportunities for developing and exercising learner autonomy. However, the andragogical approach to learning may not suit all individuals. This review of the literature related to andragogy helped determine the approach taken in developing the VLE for the GOLDPhase pilot course, where a mix of pedagogical and andragogical strategies were used. These strategies are discussed in Chapter 6, which presents the design and structure of the GOLDPhase VLE.

Students who study at a distance via e-learning usually work in isolation, unobserved by the tutor, hence little is known about their study habits or how they utilise VLEs. Section three discussed learning styles theory, focussing on Kolb's LSI and suggested that learning styles theory may help tutors to gain a greater understanding of the student perspective of distance e-learning and thus better identify the specific needs of e-learners. Attention was also drawn to the way in which raising students' awareness of their learning styles can help them to maximise their potential as learners.

This review of traditional learning theory, andragogy, and learning styles theory has thus provided a sound theoretical base from which to examine the third and fourth questions that guide this study:

- What andragogical issues arise from the study?
- What are the students' learning style preferences and what issues arise from these?

The next chapter presents the research methodology used in this study and explains how the research questions, the design of the GOLDPhase VLE, the research strategy, and the methods of investigation, were linked to generate data that would answer the four questions that guided the study.

Chapter 5

Approach and Methodology

Chapters 2, 3 and 4 identified the purpose of this study and the research questions that guided it. This chapter sets out the theoretical framework and outlines the stages of research. The steps that were taken in order to address the research questions are described in detail. The methods of data collection are presented and explained. This is followed by an explanation of the procedures used for data analysis. General and theoretical issues influencing data collection are also discussed and considered.

This study focused on a group of students studying modules from the University of Salford's MSc OSH via the Internet. At the beginning of the study no online version of the course existed. To facilitate the investigation I designed and created the GOLDPhase virtual learning environment (VLE), as described in the next chapter. The VLE was primarily designed to provide students with access to the materials and resources necessary to support their learning. However, the design of the VLE, the research questions and the research methodology, were closely entwined.

Note:

Figure 5.2 shows a conceptual map of the methodology used to answer the research questions that guided this study. The map is provided as a foldout sheet so that it can be easily referred to throughout the chapter.

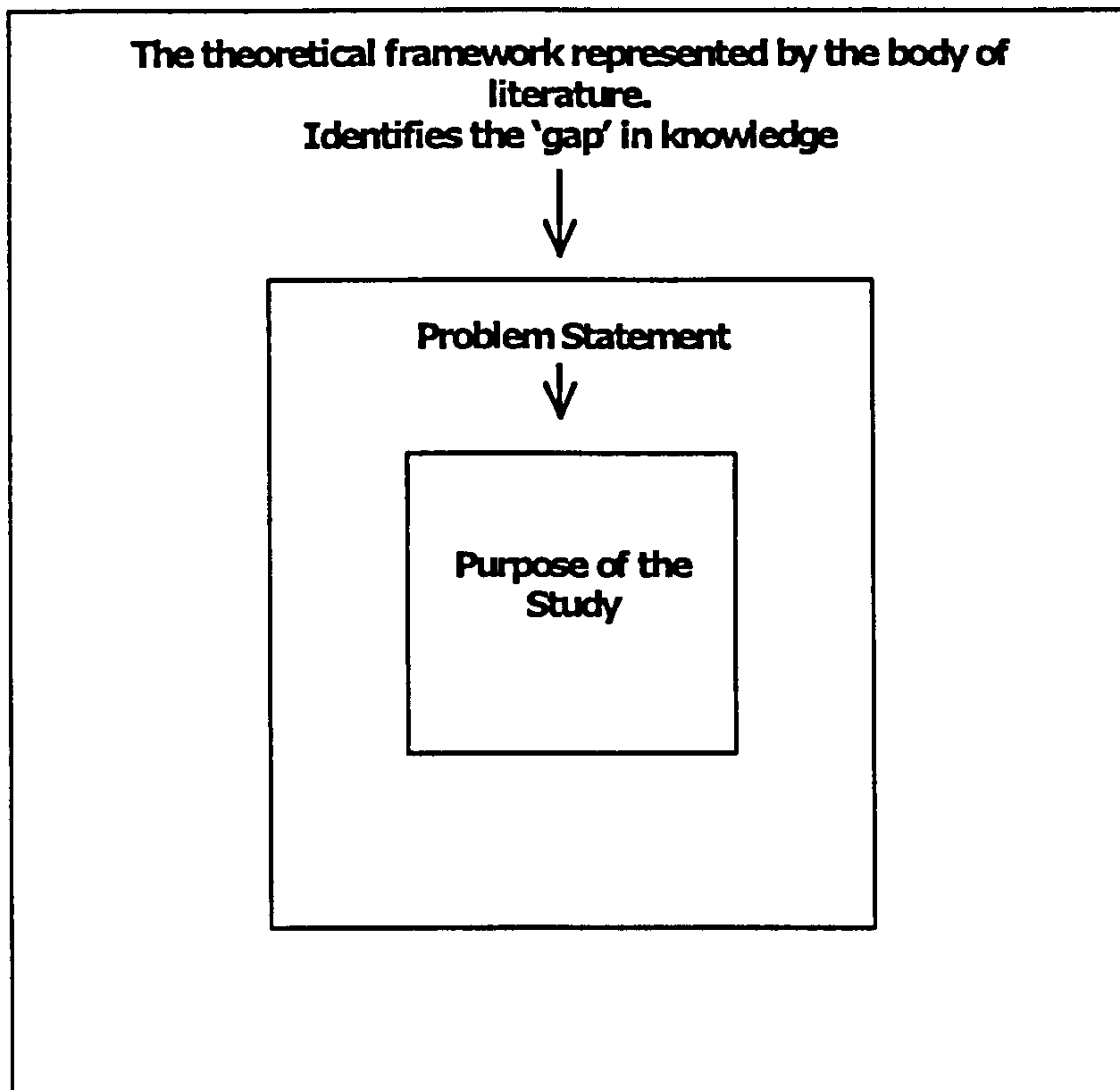
5.1 The theoretical framework of the study

Setting out the categories that comprise a study help the researcher to develop a theoretical framework that specifies the boundaries of the study (Miles and Huberman, 1994). The theoretical framework is also referred to as the conceptual framework. Miles and Huberman (1994) offer the following definition of a conceptual framework:

A conceptual framework explains, either graphically or in narrative form, the main things to be studied – the key factors, constructs or variables – and the presumed relationships among them. Frameworks can be rudimentary or elaborate, theory-driven or commonsensical, descriptive or causal (Miles and Huberman, 1994, p. 18).

Miles and Huberman (1994) provide examples of theoretical frameworks and suggestions for their formulation. Their suggestions for bounding the territory of the conceptual framework have usefully informed this study and are discussed later in this chapter. However, Merriam (1998) addresses the specific issue of case study design. Her conceptualisation of a theoretical framework encapsulates many of the stages and procedures followed in the design of this investigation; therefore her work is drawn upon in describing the theoretical framework used here.

In building the theoretical framework for this study I firstly drew upon the literature in the field of education. The literature search helped identify the research problem, which in turn determined the purpose of the study. Having determined the purpose of the study I then developed a set of research questions that reflected the most important aspects for investigation. These questions then guided the inquiry and determined how the data were to be collected. Merriam (1998) emphasises that the research questions that guide the study should not be confused with *the* research question that gave rise to the study, that is, the purpose statement. She describes the theoretical framework as comprising three interlocking frames that focus in towards the purpose statement. Figure 5.1 shows my conceptualisation of Merriam's narrative.

Figure 5.1: Scaffolding for theoretical framework

The outer frame represents the theoretical framework, or the body of literature to which the study is related. This identified the gap in knowledge. The second frame draws on the information from the larger frame in order to define the problem. Having identified the problem it is possible to state the precise purpose of the study, which is stated in the innermost frame. The three frames are firmly lodged within one another, thus focussing into the purpose (or aim) of the study (Merriam, 1998).

The theoretical framework is formed from the orientation brought to the study by the researcher. In this case that orientation is education and information technology. However, the theoretical framework also influenced the way in which I collected, analysed and interpreted the data (Merriam, 1998).

5.1.1 Purpose of the study

The purpose and objectives of the study and the research questions that emerged from them are stated in the conclusion to Chapter 3. The purpose statement and the research questions are restated here to set this chapter in context. The overall purpose of the study was:

to facilitate an understanding of how students experience distance e-learning when studying modules from the University of Salford's MSc/P.G. Diploma in Occupational Safety and Health

and to consider the issues that arise from the study and the lessons to be learned from them. I was interested in capturing the students' overall experiences of distance e-learning and in exploring how they perceived and utilised this new way of learning. Having identified the purpose, or aim, of the investigation a number of objectives were derived, as set out in Chapter 3. From these objectives the following four questions emerged:

1. How do the students integrate distance e-learning into their domestic and working lives?
2. What are the students' experiences of the following elements of distance e-learning:
 - The virtual learning environment
 - Learning materials
 - Information
 - Resources
 - Communication
 - Assessment
3. What andragogical issues arise from the study?
4. What are the students' learning style preferences and what issues arise from these?

5.1.2 Conceptualisation of the study

The strategy designed to research these questions was that of a single case study of a group of occupational safety and health professionals studying modules from the University of Salford's MSc/Postgraduate Diploma in Occupational Safety and Health in a virtual learning environment called GOLDPhase. The major methodology employed to collect the data used to answer the questions in the study was qualitative. However, to provide more than one perspective on the phenomena being studied a quantitative methodology was also employed in a secondary role. Using both qualitative and quantitative methods enhanced the validity of the study. Figure 5.2 shows a conceptual map of the methodology used to research the questions.

The map provides an overview of the study design using a series of interrelated blocks. The purpose of the investigation is stated at the top of the map and leads into the methodology block. Emanating from the methodology block are the literature search block, which helped inform the study, and the research strategy and methods of inquiry blocks. The research questions are displayed down the centre of the map. Each of the methods employed was designed to inform one or more of the research questions. The left-hand side of the map shows the qualitative methods used to research the questions and the right-hand side displays the quantitative methods. The question, or questions, that each method was designed to inform are shown in the blocks displayed between the relevant method and the research questions, thus showing a pathway between the research questions and the possible sources of evidence (Yin, 1994). The methodology, therefore, informed the research questions and in turn the case study itself, thus informing the findings of the study. The aim of the map is to provide the reader with an overview of the case study design and facilitate an understanding of the methodology discussed in this chapter.

5.1.3 Time plan

The study was undertaken over a period of three years. The initial year was primarily spent in the literature search; observing the part-time day release MSc OSH classes, in order to determine the pedagogical and andragogical approaches to be taken in designing the VLE; setting up a framework for the study and exploring avenues for obtaining a cohort. In the first half of the second year I designed and developed the Web-based VLE and gathered the cohort. The GOLDPhase pilot course took place during the second half of the second year and the first half of the third year and included a seven-month period when the cohort studied in the VLE. Interviewing, data gathering, data organisation and data analysis commenced at the beginning of the case study period and continued throughout the study.

This section has set out the theoretical framework of this study by defining its orientation as being grounded in education and information technology. The overall purpose and objectives of the study have been presented and four initial questions, which guided the study, have been identified. The conceptual map in Figure 5.2 provides an overview of the design of the study. It is presented as a foldout sheet so that the reader may use it as a point of reference throughout this chapter.

The next section discusses the broader context of scientific inquiry.

5.2 The philosophical orientation of the study

This section continues to place the study in context by identifying its philosophical orientation within empirical research. The investigation took a largely qualitative approach using a case study strategy. To clearly delineate the philosophical orientation of the study this section places both qualitative research and case study strategy in context.

Qualitative and quantitative approaches to research

Burns (2000) defines research as 'a systematic investigation to find answers to a problem'. In seeking answers such a systematic investigation usually takes one of two routes, a) the scientific or positivistic route, or b) the naturalistic, or

interpretive route (Miles and Huberman, 1994; Burns, 2000). These differing ways of viewing social reality use different methods of interpretation (Burns, 2000; Cohen *et al.*, 2000). The scientific approach employs quantitative methods and assumes objectivity, whereas the naturalistic approach employs qualitative methods and is subjective, focussing on the experience of individuals within specific contexts (Merriam, 1998; Burns, 2000; Cohen *et al.*, 2000). Simply put, in quantitative studies the emphasis is on data in the form of numbers whilst in qualitative studies the emphasis is usually on data in the form of words (Miles and Huberman, 1994; Punch, 1998).

The scientific or positivist approach uses quantitative methods and emphasises the "measurement and analysis of causal relationships between variables, not processes" (Denzin and Lincoln, 2000, p. 8). Advocates of quantitative research claim that by strictly adhering to scientific principles their research is undertaken within a value-free framework, which leads to unbiased research findings (Denzin and Lincoln, 2000). Positivists contend that the world is objective and that reality can be captured and understood (Denzin and Lincoln, 2000). Quantitative research is usually based on deductive reasoning in which the researcher develops a hypothesis which is then tested (Tesch, 1990). Robson (1993) identifies five sequential steps that quantitative research usually follows. A synopsis of these steps is set out below:

1. Formulate a hypothesis,
2. indicate how the variables are to be measured and propose a relationship between two variables,
3. test the hypothesis,
4. examine the outcome, which may confirm the theory or indicate the need for adaptation, and
5. modify the theory in the light of the findings, verify the revised theory by returning to the first step and repeat the cycle (Robson, 1993, p. 19).

As the above stages illustrate, quantitative research follows a set of procedures in a linear sequence starting with a hypothesis. In contrast, qualitative research is hypothesis generating, as opposed to hypothesis testing, and theories often emerge from the data collection rather than prior to it (Robson, 1993).

Furthermore, the procedures followed in qualitative research are rarely divided into separate stages but are of a more integrated and holistic nature (Robson, 1993). Quantitative research is thus considered to be more straightforward than its qualitative counterpart (Punch, 1998).

Opponents of positivism reject the belief that human behaviour is determined by universal laws, arguing that an understanding of the world is more accurately conveyed through human interpretations obtained through taking a naturalistic, or qualitative approach to research (Cohen *et al.*, 2000). Bryman (1988) usefully highlights the main differences between quantitative and qualitative research, as shown in Table 5.1.

Table 5.1: Differences between quantitative and qualitative research

	Quantitative	Qualitative
Role of qualitative research	Preparatory	Means to exploration of actors' interpretations
Relationship between researcher and subject	Distant	Close
Researcher's stance in relation to subject	Outsider	Insider
Relationship between theory/concepts and research	Confirmation	Emergent
Research strategy	Structured	Unstructured
Scope of findings	Nomothetic	Idiographic
Image of social reality	Static and external to actor	Processual and socially constructed by actor
Nature of data	Hard, reliable	Rich, deep

Source: adapted from Bryman (1988, p. 94).

As the table shows, qualitative research used to be viewed as a prelude to quantitative research, but as the former became more acceptable, and disillusionment with the latter increased, qualitative research became a method in its own right (Bryman, 1988).

The terms nomothetic and idiographic describe the extent to which findings can be generalised. A nomothetic approach, typical of quantitative research, seeks findings that are applicable regardless of time and location; an idiographic approach, typical of qualitative research, seeks findings that relate to a specific situation at a specific time (Bryman, 1988).

This study took a qualitative approach, but encompassed some quantitative methods. However, rather than focus more closely on qualitative research at this point, it is more appropriate to next discuss how the strategy for this study was selected. Therefore, the nature of qualitative research will be discussed in more detail later in this chapter.

5.2.1 Selecting a research strategy

Having identified this study as taking a qualitative approach, this section now sets the study in context by identifying the selected research strategy.

A major consideration of any research project is how the project should be designed in order to answer the research questions (Robson, 1993). This study used a case study strategy. However, following the advice of Robson, alternative strategies were carefully considered before the case study strategy was finally selected. There are three main traditional research strategies that contrast with each other, these are: experimentation, surveys, and case studies (Robson, 1993; Gomm *et al.*, 2000). The traditional view has been that certain strategies are only appropriate for certain types of inquiries: experimentation for explanatory studies, surveys for descriptive studies, and case studies for exploratory studies. Whilst this assertion provides a useful guideline, both Robson (1993) and Yin (1994) challenge this view, believing that each strategy can be applied to either explanatory, descriptive or exploratory studies. Both writers cite three factors that may more usefully determine the selection of a research strategy. Firstly, the type of research question being asked, secondly, the degree of control the researcher wishes to have over events, and finally whether the focus of the study is on current or past events (Robson, 1993). Table 5.2 sets out these conditions in relation to each of the three main strategies under discussion.

Table 5.2: Appropriate research strategies for different situations

Strategy	Form of research question	Requires control over behavioural events?	Focuses on contemporary events?
Experiment	How, why	Yes	Yes
Survey	Who, what, where, how many, how much	No	Yes
Case Study	How, why	No	Yes

Adapted from Yin (1994).

NB: Yin's table includes archival analysis and histories. These have been omitted since they are not relevant to this discussion.

Each of the three strategies was therefore examined by taking account of these three considerations; the implications and issues surrounding each are discussed below.

Experimentation

Experiments seek causal explanations and are commonly associated with scientific research. However, the method is not confined to the sciences and is sometimes used in exploratory studies (Yin, 1994). Experimentation involves measuring the effects of manipulating one variable on other variables (Robson, 1993). The purpose of experiments is to closely examine the effects of certain factors in isolation to others (Denscombe, 1998). In the social sciences experimentation typically involves taking samples of individuals from known populations and subjecting them to different conditions by changing one or more variables (Robson, 1993). Experiments are most often considered appropriate for explanatory studies which seek to provide explanations of certain situations or problems (Robson, 1993; Yin, 1994).

Whilst experimentation strategy is appropriate for focussing on contemporary events this method was not considered appropriate for this study. One of the advantages of experiments is that another researcher can usually replicate them using the same procedures (Denscombe, 1998). This would be inappropriate in the context of this study, as in 1997 when the study was designed the research area, that is, online learning had not established a body of research that could be used as the basis of an experimental study. Furthermore, the research under discussion was of an exploratory nature and therefore less suited to

experimentation. Moreover, experimentation usually requires control over behavioural events, which is inappropriate in the context of this study where emergent issues were sought. For these reasons experimentation was not considered to be an appropriate strategy for this study.

Surveys

Surveys are generally used to collect information from a specific sector (or sectors) of the population (Robson, 1993). They tend to be used to gather relatively small amounts of information from large groups, usually seek quantitative information, and are used for descriptive studies rather than exploratory or explanatory ones (Robson, 1993). The focus is therefore upon statistics rather than individuals. As this study was concerned with a specific group and was not seeking a sample from which to make generalisations about a wider population (Robson, 1993), surveys were not considered appropriate.

Case studies

A case study approach is most often used to help gain an understanding of intricate social phenomena and is most appropriate in situations where behaviours cannot be controlled (Yin, 1994). Case studies frequently encompass a variety of data collection techniques, a strategy that helps the researcher to gain the viewpoint of the participants involved (Tellis, 1997).

Robson (1993) provides the following definition of case study research:

Case study is a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence (Robson, 1993, p. 5).

Robson highlights certain points within this definition that typify case study research. Case study research is a strategy not a method, however the strategy may encompass various methods, for example, interviews or analysis of documents. Case studies are concerned with research in the broad sense and may include evaluation. They relate to the particular and study a specific case or cases. Case studies focus on a "phenomenon in context", however, the "boundary between the phenomenon and its context is not always clear" (Robson, 1993, p. 5).

The conceptualisations of case study research described by Robson (1993), Yin (1994) and Tellis (1997), are appropriate to this study. Firstly, because the purpose of the study was to gain an understanding of an intricate social phenomenon, relying to a large extent upon observation and the experiences of the participants, as opposed to theory based upon scientific conclusions. Secondly, the phenomenon under investigation, that is, using the Internet for distance education, was undoubtedly contemporary in nature as it utilised emerging technologies. Thirdly, the study made use of multiple sources of evidence drawn from a variety of sources, including both qualitative and quantitative data; these sources are discussed more fully later in this chapter. Finally, case study research allows the case itself to stand alone and be considered worthy of study within its own right, not as a representative sample from the wider population (Stake, 1995).

After careful consideration of each strategy and reference to the research questions I decided that a case study strategy was the most appropriate in the context of this study.

5.2.2 Differentiating between qualitative research and the case study strategy

Having identified the philosophical orientation of this study as being qualitative and the selected strategy as a case study, it is perhaps appropriate to differentiate between the two, as the terms 'case study' and 'qualitative research' are sometimes used interchangeably, they are not however synonymous (Merriam, 1998).

The concept of qualitative research is difficult to define and no universally accepted definition of the approach is available (Mason, 1996). Denzin and Lincoln (1998) see qualitative research as "a field of inquiry in its own right" that "crosscuts disciplines, fields and subject matter" (p. 2).

Merriam (1998, p. 3) describes qualitative research as:

an umbrella concept covering several forms of inquiry that help us understand the explain the meaning of social phenomena with as little disruption of the natural setting as possible.

Qualitative research is therefore an overarching concept rather than a strategy or method.

Case study, on the other hand, is a research strategy in the same way that experiments, surveys or archival analysis are strategies (Robson, 1993; Yin, 1994; Merriam, 1998). In turn strategies employ methods of investigation, or as Robson describes them 'techniques'. The techniques used must be appropriate for the questions being asked (Robson, 1993) and in a case study may take a quantitative or qualitative approach (Yin, 1994), though for case studies in education the latter is most often used (Merriam, 1998), as in this study. This study therefore took a qualitative approach using a case study strategy.

This section has discussed the broader context of scientific enquiry by exploring the different approaches of quantitative and quantitative research methods and thereby identifying the philosophical orientation of this study as being qualitative. Three traditional research strategies have been examined: experimentation, surveys, and case studies and the reasons for selecting a case study strategy have been presented.

Having placed both qualitative research and the case study strategy in context, and differentiated between the two, it is now appropriate take a closer look at each concept. The next section therefore examines qualitative research in more detail. This is followed by a discussion of the case study strategy. Following these two discussions the topics of qualitative research and case study design will be drawn together to introduce the qualitative case study that is the focus of this study.

5.3 The nature of qualitative research

In the previous section the broader context of scientific enquiry was explored by highlighting the main differences between quantitative and qualitative research. This section now focuses more closely on the essence of qualitative research.

As identified above, qualitative research is an 'umbrella' concept rather than a strategy or method (Denscombe, 1998; Merriam, 1998). Qualitative research can employ a number of strategies and those strategies may use quantitative

methods (Robson, 1993). Therefore, qualitative research encompasses a range of procedures for facilitating an understanding of the meaning of social phenomena (Merriam, 1998).

Merriam (1998) sets out some of the aims of qualitative research. All qualitative research is based on the philosophical assumption that "reality is constructed by individuals interacting within their social worlds" (Merriam, 1998, p. 6). Rather than concentrating on component parts, as in quantitative research, qualitative research explores how constituent parts operate as a whole. It aims to understand situations rather than predict them (Merriam, 1998). In pursuit of these aims qualitative research shares a number of key characteristics. Several writers (Miles and Huberman, 1994; Bogdan and Biklen, 1998; Denscombe, 1998; Merriam, 1998; Punch, 1998; Burns, 2000) identify what they consider such characteristics to be. This author perceives these characteristics as falling into seven main categories as discussed below.

5.3.1 Characteristics of qualitative research

A naturalistic approach

Punch (1998) asserts that a fundamental characteristic of qualitative research is its naturalistic approach, evidenced by a preference for studying events and phenomena in their natural settings. The term 'naturalistic' is usually applied to qualitative research in education because, in order to observe behaviour, the researcher frequents the setting where the events in which he or she is interested naturally occur (Bogdan and Biklen, 1998). Observing events in this way enables the researcher to become familiar with the circumstances in which data emerged (Bogdan and Biklen, 1998).

Small-scale studies

Qualitative studies most often focus on small groups rather than large ones (Denscombe, 1998; Merriam, 1998). This is because qualitative studies are usually in-depth and richly descriptive, thus the analysis of data takes longer than the analysis of quantitative data (Denscombe, 1998). The procedures followed for selecting participants in a qualitative study are most often purposeful rather than random.

Gaining the perspectives of those being studied

In qualitative research the researcher aims to understand the phenomenon under investigation from the perspective of the participants, not that of the researcher (Miles and Huberman, 1994; Merriam, 1998; Cohen *et al.*, 2000). This is known as the emic, or insider's view as opposed to the etic or outsider's view (Merriam, 1998). Gaining the insider's view is achieved through 'verstehen' - empathetic understanding of human interaction (Miles and Huberman, 1994; Bogdan and Biklen, 1998), where the researcher aims to see through the eyes of the people he or she is studying. Therefore, the task of the qualitative researcher is to capture what people say and do in order to interpret their view of the world (Burns, 2000).

Engaging in fieldwork

Achieving verstehen usually requires fieldwork, which enables the researcher to observe behaviour in its natural setting through intense contact with those being studied (Bryman, 1988; Miles and Huberman, 1994; Merriam, 1998). However, Bryman (1988) points out that this does not necessarily demand long periods of observation, but may be achieved in other ways, for example through unstructured interviews.

Researcher as primary instrument for data collection and analysis

The qualitative researcher aims to gain a holistic view of the study (Miles and Huberman, 1994; Denscombe, 1998). Though a variety of techniques may be used for data collection and analysis these are merely tools used to assist the qualitative researcher, who remains at the heart of the study and aims to experience the phenomenon through listening, observing, encountering, reflecting and understanding (Piantanida and Garman, 1999). As such, the qualitative researcher is usually the primary instrument for data collection and analysis (Miles and Huberman, 1994; Merriam, 1998; Piantanida and Garman, 1999).

Inductive research strategy

Qualitative research primarily employs an inductive strategy in analysing data (Bogdan and Biklen, 1998; Merriam, 1998). Rather than striving to prove or

disprove a hypothesis, as in quantitative research, qualitative research builds theories, concepts and hypotheses (Bogdan and Biklen, 1998; Merriam, 1998). Accordingly, qualitative studies are frequently conducted in areas where little theory exists and there is a need to explain a new phenomenon (Merriam, 1998).

The nature of qualitative reports

The report of a qualitative study is richly descriptive and mostly uses words and pictures rather than numbers (Miles and Huberman, 1994; Bogdan and Biklen, 1998; Denscombe, 1998; Merriam, 1998). The data used is drawn from a variety of sources, and may include, interview transcripts, photographs, videotapes, documents and official records (Bogdan and Biklen, 1998). Qualitative reports often include quotations to illustrate and substantiate a particular view or situation (Bogdan and Biklen, 1998).

A helpful method for aiding the conceptualisation of qualitative research is to draw a comparison with quantitative research. Merriam (1998) provides a table showing such comparisons, the table usefully summarises the characteristics of both approaches. This table differs, however, from Table 5.1 above, in that the former provides an abstract overview of the main *differences between the two approaches*, whereas Table 5.3, displayed below, highlights the *main characteristics of each approach*. In addition, the points of comparison used in Table 5.3 usefully relate to the stages generally followed in PhD research.

Table 5.3: Main characteristics of qualitative and quantitative research

Point of comparison	Quantitative Research	Qualitative Research
Focus of research	Quantity (how much, how many)	Quality (nature, essence)
Philosophical roots	Positivism, logical empiricism	Phenomenology, symbolic interactionism
Associated phrases	Experimental, empirical, statistical	Fieldwork, ethnographic, naturalistic, grounded, constructivist
Goal of investigation	Prediction, control, description, confirmation, hypothesis testing	Understanding, description, discovery, meaning, hypothesis generating.
Design characteristics	Predetermined, structured	Flexible, evolving, emergent
Sample	Large, random, representative	Small, non-random, purposeful, theoretical
Data collection	Inanimate instruments, (scales, tests, surveys, questionnaires, computers)	Researcher as primary instrument, interviews, observations, documents
Mode of analysis	Deductive (by statistical methods)	Inductive (by researcher)
Findings	Precise, numerical	Comprehensive, holistic, expansive, richly descriptive

Source: Adapted from Merriam (1998, p. 9).

5.3.2 Approaches to qualitative research

As discussed earlier qualitative research is a fairly generic term for the kind of research that shares the characteristics discussed above. Within qualitative research a number of variations exist. Various writers have devised differing typologies of these, yet there appears to be no general consensus as to which are the key types (Merriam, 1998). However, in education certain approaches are more prevalent than others.

Merriam (1998) cites five approaches to qualitative research that are prevalent in education: the basic qualitative study; ethnography; phenomenology; grounded theory, and case study. Case study research can encompass any of the four other approaches. The basic qualitative study is not appropriate to this investigation as in education this approach does not usually focus on case studies that are single bounded units, as in this case study; moreover, such studies are usually grounded in psychology. Neither is ethnography, which studies different

cultures within society, appropriate. The two remaining approaches have however been used in this study. The case study has been guided by phenomenology and tenets of grounded theory have been used in the analysis of data. Therefore, three of the five educational approaches cited by Merriam as being pertinent to education have been used in conjunction here: phenomenology, grounded theory and case study (Merriam, 1998). Grounded theory is appropriately discussed in section 5.7.2, which describes the methods of analysis used in this study, and phenomenology is discussed in the following sub-section.

Phenomenology

Phenomenology, believed to have first been propounded by Edmund Husserl (Tesch, 1990; Cohen *et al.*, 2000; Gubrium and Holstein, 2000), is a philosophy, rather than a research strategy (Tesch, 1990). In a phenomenological study the researcher aims to capture the viewpoint of those who have experienced a situation (Bogdan and Biklen, 1998; Merriam, 1998). Whilst there are a variety of approaches to qualitative research, all, to a greater or lesser extent, share this aim. However, in taking a phenomenological approach the researcher puts aside, or brackets his or her own pre-conceptions so that he or she may accurately convey the experiences of others (Tesch, 1990; Merriam, 1998). In so doing the researcher aims to identify the essences of a phenomenon (Patton 1990, in Merriam 1998), for example the essence of being a distance learner, or the essence of being observed in an online environment. In pursuit of this aim phenomenological researchers gather extensive and in-depth descriptions from the study's participants (Tesch, 1990). These are subjected to intensive examination as "the researcher immerses her/himself in the data" in order to understand how the participants perceive a particular phenomenon and to allow the researcher to identify any emerging themes (Tesch, 1990, p. 93).

5.3.3 Why qualitative research is appropriate for this study

The aim of this study was to gain an understanding of students' experiences of distance e-learning. Taking a qualitative approach to the study afforded the means for achieving this aim. Bryman (1988) provides the following definition of qualitative research:

...an approach to the study of the social world which seeks to describe and analyse the culture and behaviour of humans and their groups from the point of view of those being studied (p. 46).

In order to meet the aim of this study, which focussed on a specific group, in a particular situation, at a given time, I needed to gain an understanding of the social world that the participants inhabited. Bryman's definition of qualitative research depicts the required approach.

Gaining an understanding of students' experiences of distance e-learning demands close contact with, and observation of, the study's participants. This approach was feasible with the small group that formed the cohort and was better suited to a qualitative approach. Had I been interested to discover how many people engage in distance e-learning, or the number of higher education institutions that offer this mode of learning, then a quantitative approach would have been more appropriate; however, this was not the case in this study.

Furthermore, it is unlikely that a quantitative approach would have facilitated the holistic view of distance e-learning depicted by this study's aim. Taking a holistic view of e-learning allowed me to examine a number of components within the phenomenon and then to explore how these components relate to each other to form the whole (Merriam, 1998). Moreover, because e-learning is a relatively new area I did not wish to enter the study with any pre-assumptions, preferring to discern emerging themes rather than test a hypothesis, to understand rather than predict.

Three approaches indicative of qualitative research: a case study strategy, guided by a phenomenological approach to understanding meaning, using methods of grounded theory for data analysis, were therefore used in this study. All three are appropriate to educational research (Merriam, 1998).

This section has taken a closer look at the nature of qualitative research by examining its main characteristics and differing approaches. Five approaches to qualitative research prevalent in education have been identified. Three of these: case study, phenomenology and grounded research are identified as being pertinent to this study. As grounded theory and case study are discussed elsewhere in this chapter the concept of phenomenology has been paid greater attention here. Finally, a rationale has been made for taking a qualitative

approach in this investigation. The next section focuses on the case study strategy.

5.4 Case study strategy

Earlier in this chapter qualitative research and the case study strategy were set in context and a differentiation was made between the two. The previous section examined qualitative research in detail. It is now appropriate to explore case study research in more depth.

A case study strategy was selected after careful consideration of the alternatives, as detailed in section 5.2.1 above. Merriam (1998) draws attention to the purpose of undertaking case study research:

A case study design is employed to gain an in-depth understanding of the situation and meaning for those involved. The interest is in process rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation. Insights gleaned from case studies can directly influence policy, practice, and future research (p. 19).

Case study research is frequently surrounded by confusion, much of this confusion stems from a lack of definition as to what exactly constitutes a case study (Merriam, 1998). An attempt to resolve some of this confusion has been made earlier in this chapter by differentiating between qualitative research and the case study strategy. Merriam (1998) contends that further confusion arises when the boundaries of a case study are not clearly defined. If limitations cannot be set on the number of people to be studied, the timeframe for the study, and the scope of data collection, then the investigation does not qualify as a case study (Merriam, 1998). The boundaries of this case study are clearly laid out both in section 5.5.3 below and in Chapter 6, which sets out the context of the study.

A further defining feature of case study research is that the strategy can employ a variety of data gathering techniques and is not confined to any specific method or methods (Merriam, 1998).

5.4.1 Characteristics of case study research

Merriam (1998) describes qualitative case studies as having three defining features; they are particularistic, descriptive, and heuristic. They are

particularistic as they focus on a specific event or phenomenon. The case is deemed important for what it can reveal about the study itself rather than for what it may reveal about other cases. Case study design is therefore especially applicable in investigations that take a holistic view of how people deal with specific situations. Case studies are descriptive as in the final report the researcher uses rich description in order to convey the essence of the study. And case studies are heuristic in that they help the reader to gain an understanding of the phenomenon under investigation and provide insights into new meaning (Merriam, 1998).

All research designs have their strengths and weaknesses. Many of the weaknesses can be overcome by selecting the appropriate strategy for the research problem (Merriam, 1998). For example, if the aim of a study was to seek a sample from which to make generalisations about a wider population and the study used experimentation then the study would highlight the weaknesses of experimentation, as a survey strategy would have been more appropriate. Similarly, if a case study is used in the wrong context then its limitations will be highlighted. For the purpose of this study the strengths of the case study strategy outweighed the limitations.

In some instances the strengths of a case study strategy, discussed above, can present a limitation (Merriam, 1998). An example is the particular strength of case study research to provide the opportunity for in-depth study of a specific group or phenomenon. However, in some circumstances the time and money required for such in-depth analysis may not be available to the researcher (Merriam, 1998). This study was a full-time funded PhD research project and though time and money were finite these issues were perhaps not as critical as in some small-scale projects, therefore the issues of time and funding did not prevent the selection of a case study approach.

A further example of the strength of case study research is that the researcher, as the primary instrument of data collection and analysis, is able to gain a holistic view of the study. However, in addition to interviewing and observation skills such a task requires sensitivity and integrity on the part of the researcher (Merriam, 1998).

The question of researcher bias is a further area of concern in case study research. It is not uncommon in educational research for those conducting the study to be in a position of power over those who participate (Merriam, 1998). This was not the case in this study. Though the focus of the study, the MSc OSH at the University of Salford, was pre-selected, I had complete autonomy in the design and conduct of this investigation. I had no previous connections with the university and was therefore completely independent, neither tutor, nor student. I consider that this stance enabled me to gain the trust of both the students who took part in the study, and their course tutor, and therefore minimised researcher bias.

I am aware, however, that in conducting a qualitative study it can be difficult to entirely eliminate researcher bias as individuals carry their own pre-conceptions and attitudes. Being conscious of this issue I strived to incorporate strategies that would reduce any biases I was unaware of. One strategy was to transcribe interview tapes verbatim. This prevented me from selecting only those issues that I deemed important or wanted to see (Bogdan and Biklen, 1998) and allowed all the data to be carried forward to the analysis stage. A further strategy was that in examining the data I strived to remain objective, putting aside any pre-conceptions I may have had about the students' experiences of distance e-learning, thus allowing the data to speak for itself. I believe that my decision to take a phenomenological approach in which the researcher brackets his or her own pre-conceptions heightened my awareness of this issue and helped me to put aside any subjectivity.

5.4.2 Generalisability of case study research

A frequent concern with regard to case study research is the extent to which the findings from a single case study can be generalised to other cases. This important issue of external validity has, in the past, constituted a 'major barrier' (Yin, 1994) to those contemplating the case study approach and is a somewhat controversial issue within qualitative research.

Those who consider it important that their findings should be generalisable to other cases take a variety of approaches in aspiring to that goal. One method, known as empirical generalisation (Merriam, 1998), is to use sampling and select

a case or cases that are typical or representative of other cases. A second approach is to conduct an intense case study and then carry out a larger number of less intense studies in order to demonstrate the non-idiosyncratic nature of the original study (Bogdan and Biklen, 1998). Others take the view that if they carefully document the procedures followed during the case study, then determining how the findings can be applied more generally is someone else's concern (Bogdan and Biklen, 1998). A further approach is for a case to be examined by more than one researcher. The justification for taking a team approach is that a team is more likely to uncover different facets of the study. However, this does not fully address the problem of generalising the findings to other cases (Bryman, 1988).

There is, however, a widely held view that criticisms of the ability of case study research to generalise to the wider population are inappropriate as they are based on a misunderstanding of the aims of case study research. Bryman, 1988; Yin, 1994; Stake, 1995; Mason, 1996; Merriam, 1998 and Burns, 2000 share the view that case study research is more appropriate to theoretical generalisations than empirical generalisations. To explore this issue further the views of three of these writers, Yin, Bryman and Stake are examined in greater detail.

Yin (1994) argues that critics mistakenly contrast case study research to survey research. This is inappropriate as the two strategies use different methods of generalisation. Survey research uses statistical generalisation in which the findings from a sample population are extrapolated to the wider population. Case study research uses analytic generalisation in which the researcher aims to generalise the findings from a single case study to broader theory. Therefore, a comparison between the two strategies is not valid (Yin, 1994).

Bryman (1988) also considers that taking a survey approach to case study research shows a misconception of the nature of qualitative research. He bases this view on two factors. Firstly, he points out that survey research tends to draw samples from within a single location rather than nationally, whereas case studies usually include a wide range of people, therefore the analogy between the two is not as critical as it may at first appear. Secondly, in tune with Yin, Bryman argues that case study findings should be generalised to theoretical

propositions, rather than to populations, and cites the grounded theory approach of Glaser and Strauss (1967) as an exemplary method for accomplishing this. Bryman also observes that qualitative research that uses unstructured interviews may be less open to criticism about generalisation because the respondents are generally drawn from a wide social and geographical area (Bryman, 1988).

Stake (1995) argues that the aim of case study research is particularisation, not generalisation. A particular case is chosen so that the researcher comes to understand that case, not in order to understand other cases. Therefore a case is not chosen as a representative of the wider population. Taking a similar stance to Yin, Stake contends that concern with the extent to which the findings from one study can be generalised to others is borne out of quantitative research methods that seek to produce grand theory. He therefore suggests a different approach using what he terms as 'petite generalisations' and 'naturalistic generalisations' (Stake, 1995).

Petite generalisations are made within cases. As a case is studied certain instances or responses repeat themselves and generalisations will be drawn. As further observations are made and additional data were collected these generalisations are refined. Such generalisations occur throughout the study. Though petite generalisations can be drawn within individual cases they are not necessarily applicable to other cases (Stake, 1995).

Naturalistic generalisations are formed from both personal and vicarious experience. People read about a case because it is of interest and they can learn a great deal that is general from a single case. In reading the case they add to their existing knowledge of other cases. In so doing they increase their overall understanding of such cases. This enables them to form naturalistic generalisations from their cumulative knowledge and experience (Stake, 1995).

Empirical generalisation has not been used in this study; hence it is not asserted that the findings from this study will be generalisable to other case studies. The case was concerned rather with theoretical generalisation of the type proposed by Yin, Bryman and Stake. The study was particularistic and focused on the way in which a particular group experienced the phenomenon of online learning and

sought "petite generalisations" (Stake 1995) through the process of grounded theory. In explaining the process of grounded theory Glaser and Strauss (1967) and Strauss and Corbin (1998) use the term 'substantive' to describe theories that relate to a specific group and place.

Though the study does not seek generalisation to other cases it is considered that the case may have wider resonance within higher education, as there may be some areas of commonality between this case and others, therefore, the findings may be generalisable to *some* other settings. As distance e-learning is in its infancy it is also hoped that the case will increase overall understanding in this area and contribute to others' naturalistic generalisations (Stake, 1995), thus adding to the growing body of knowledge in this area.

One of the strengths of the case study strategy is that it lends itself to the type of qualitative data gathering and data analysis techniques necessary for examining complex situations where the researcher seeks to illuminate and understand people's experiences. This makes the case study strategy ideally suited to studying 'educational innovations' (Merriam, 1998, p. 41).

Having discussed both qualitative research and case study strategy in detail the next section will bring the two together and present the design of the case study that is the subject of this study.

5.5 The design of this case study

Yin (1994) describes research design as 'an action plan' in which the researcher considers the most appropriate methods for linking the data that will be collected to the research questions asked, and in turn to the conclusions drawn from the study. The 'action plan' for this study considered:

- the study's questions,
- its units of analysis,
- how the data would be linked to the questions, and
- how the findings should be interpreted (Yin, 1994).

The latter two of these four stages are concerned with methods of data collection and of data analysis and are addressed under the appropriate section headings later in this chapter. The procedures used in defining the study's questions and its units of analysis are described below.

5.5.1 Formulating the research questions

A perennial problem facing researchers is whether to start out with a firm hypothesis or an open set of research questions. Opinions on this dilemma differ and the strategy adopted is dependent upon the type of research being pursued. One view is that research should commence with a hypothesis. Yin (1994) takes this view and suggests that key questions should be formulated from which propositions can be developed. At the other end of the continuum Glaser and Strauss (1967) advocate approaching a study with no pre-assumptions in an attempt to generate grounded theory. Miles and Huberman (1994) suggest that a hypothesis should be the outcome of case study research. This study lies about half way along the continuum between a firm hypothesis and an open approach. The study began with a two very general research questions based on enhancements and barriers to learning. These were 'How can the Internet enhance distance learning?' and 'What barriers does the Internet engender for distance learning?'. As the study progressed I gained a deeper understanding of the issues surrounding online learning and was able to set a number of objectives and from these objectives develop a more meaningful set of research questions. This was an iterative process in which the questions moved from the general to the particular (Miles and Huberman, 1994), culminating in a set of related questions that addressed the overall aim of the research (Mason, 1996). To revisit the questions see Figure 5.2 on the foldout sheet.

The questions that emerged from the objectives of this study were '*how*' and '*what*' type questions. Yin (1994) asserts that '*how*' and '*why*' type questions, which are explanatory, are best suited to case study research of this type, which focuses on contemporary events that do not require control over behaviour. However, Yin further asserts that '*what*' questions also have a place in case study research that seeks to explore a particular phenomenon (Yin, 1994). Therefore, in the context of this study the choice of '*how*' and '*what*', rather than '*how*' and

'why' questions can be justified, as the study sought to explore, describe, and explain students' experiences of e-learning at a distance.

5.5.2 Unit of analysis

Case studies can be distinguished from other kinds of qualitative research in that they focus on either a single unit or a bounded system (Miles and Huberman, 1994; Yin, 1994). This case study used a single case strategy.

Rationale for a single case study

Case study research can focus on a single case or encompass multiple cases. Whilst multiple case studies provide opportunities for cross case analysis they do not always fulfil the criteria required for specific types of case studies (Yin, 1994).

Yin contends that certain conditions exist where a single case study, such as this, is most appropriate, citing three such situations. The first is that where the researcher wishes to test an existing theory and the study can contribute towards theory building and possibly inform further research within a specific field. The second is where a single case is so unique that the researcher takes the opportunity to conduct an in-depth study at the time that the phenomenon is encountered, for example in the case of a rare medical condition. The third is the use of a single case study for a 'revelatory case'. In this third condition the researcher has access to a situation that has not been observed and studied previously. The 'revelatory case' is not necessarily unique, indeed similar cases may exist in other locations. The key issue is that the researcher has access to the case and can investigate issues not previously subjected to research. In these circumstances the case is worthy of investigation as the descriptive information alone can be of a revelatory nature (Yin, 1994).

This case matches the third situation identified by Yin. Whilst the phenomenon of distance e-learning was not unique at the commencement of this study, it was, and still is, in its infancy. In 1997 online courses were being developed in countries across the world, particularly in the USA. Some UK universities had started to develop online courses at postgraduate level, however none were found that focussed on the subject area of occupational safety and health.

Designing and creating a custom built VLE, adapting existing materials for online delivery and selecting a cohort provided the conditions that enabled the study to take place. These conditions allowed me to meet the students, observe their progress and learn about their experiences. Therefore, I was able to conduct an in-depth investigation into distance e-learning for students studying modules from the MSc OSH at the University of Salford. Though other similar cases of distance e-learning may have existed in other locations, this particular case was previously inaccessible for scientific investigation as the conditions under which the investigation took place did not previously exist, therefore the case had not been previously observed and studied. These conditions therefore provided a rationale for conducting a single case study as they matched those of a 'revelatory case' as described by Yin (1994).

5.5.3 Defining the case

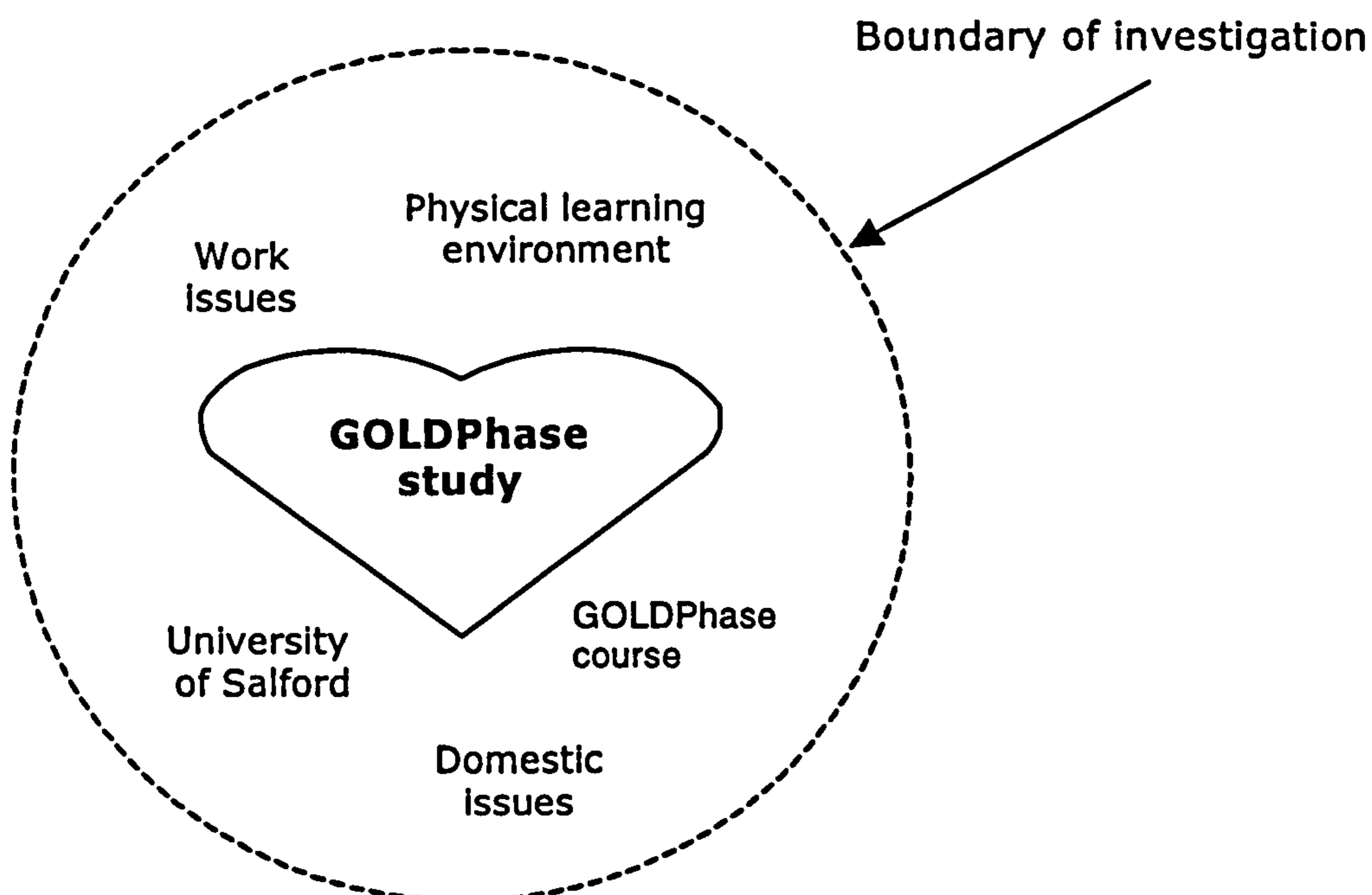
Having provided a rationale for developing a single case study design it is now important to clearly define the case by specifying its boundaries (Miles and Huberman, 1994; Yin, 1994). Yin asserts that a single case may be holistic or have embedded units, known as an embedded case study. An embedded case study will have more than one unit of analysis. A holistic case study examines the overall nature of the phenomenon under investigation and is appropriate where no sub units are evident. A single case may be a person, an event, a programme, an organisation or an entity. In an embedded case study the subunits may be individual people or individual programs, organisations or entities (Yin, 1994).

Consideration was given to designing this single case study as an embedded case study with the GOLDPhase study as the major unit and the students forming the smaller units of analysis. However, upon exploring case study research in more detail this method of design was dismissed. Yin (1994) warns that placing an emphasis on subunits can mean that the wider holistic aspects of the study can be ignored and consequently the focus of the study may shift. Though the individuals involved in this study were key informants, and as such of vital importance, this is not a study of individuals, but of distance e-learning. Therefore, defining the students as embedded units was not considered

appropriate. Furthermore, the study did not employ different data collection techniques for each student, or each area of investigation, but took a holistic approach across the study by examining the global nature of the phenomenon (Yin 1994).

Therefore this single case study took a holistic approach with the GOLDPhase study as the unit of analysis, this is illustrated in Figure 5.3.

Figure 5.3: Boundaries of the unit of analysis



Derived from Miles and Huberman (1994, p. 25).

The heart of the case was the GOLDPhase study and its bounded context included the GOLDPhase pilot course and those factors that impacted on the learning experience. Such factors included the students' virtual and physical learning environments, their working and domestic lives and the University of Salford. This bounds the territory and clearly defines the focus of the case study and the boundaries to which investigations were limited (Miles and Huberman, 1994).

This section has drawn together the discussions on qualitative research and case study research, presented earlier in this chapter, to present the design of this case study. The procedures followed in designing the study's questions have been

presented. The case study's unit of analysis has been identified as a single case study and the boundaries of the case have been clearly stated. Having set out the theoretical underpinnings of this study the discussion will now present the methods of data collection.

5.6 Methods of data collection

This section presents the data collection methods used to provide data to investigate the research questions that guided this study.

The overall approach to this study was qualitative, however, quantitative data collection techniques were also used. The discussion of these techniques has not been separated, as this would create a false impression of the way in which the study was conducted. For example, in some instances the collection of qualitative and quantitative data was entwined within one instrument, the online questionnaires being an example of this. The discussion therefore takes a linear format that leads the reader through the stages of the inquiry and facilitates a better understanding of the milieu in which the study was conducted and in which the students responded. This approach more closely reflects the holistic nature of this study. Nevertheless, both quantitative and qualitative methods are clearly identified and explained. This section thus begins with a discussion of the benefits of combining qualitative and quantitative data collection methods.

5.6.1 Combining quantitative and qualitative methods of data collection

All research methods have their strengths and weaknesses, using a multi-method approach can help overcome some of the weaknesses (Robson, 1993). The boundaries between qualitative and quantitative research are more blurred than text books on the subject lead us to believe. As Denscombe (1998) points out, in reality the two approaches "are not mutually exclusive" (p. 174) and may be used in combination, as no single methodology can address all issues (Burns, 2000). Good research tends to encompass elements of both approaches; it is the degree to which the research relies upon one or the other that determines the overall approach (Denscombe, 1998).

The choice of research design must be appropriate to the subject under investigation (Robson, 1993). As discussed earlier in this chapter the selection of a case study strategy does not necessarily mean that quantitative methods of data collection are excluded (Yin, 1994). Methods of data collection are more appropriately determined by the research questions that the subsequent data is likely to inform and can, therefore, make exclusive use of either qualitative or quantitative evidence, or may include both (Yin, 1994). The major methodology employed to collect the data used to answer the questions in this thesis was qualitative. However, in order to provide more than one perspective on the phenomena being studied a quantitative methodology was employed in a secondary role. Using mixed of methods of data collection also allows for triangulation of data and helps to increase the reliability and validity of the study.

Jones (1997) suggests that research which aims to examine the cognitive, affective and behavioural components of a study can benefit from using a mixed methods approach to the research, using quantitative methods to measure the behavioural elements and qualitative methods to measure the cognitive and affective elements. Whilst I believe that a qualitative approach, rather than a mixed methods approach, was the most suitable for this study, elements of the approach suggested by Jones were adopted. Quantitative methods were used to measure behavioural components, for example how the students used the learning environment, and their measurable attitudes towards pre-determined items. The findings from the quantitative methods helped determine overt behaviour and informed the case study at a descriptive level. Whilst analysis at this level can provide a simple comparison between students it fails to provide in-depth analysis at an explanatory level or reveal underlying meanings of students' experiences or behaviours. Furthermore, quantitative methods only measure variables at a specific point in time. As the aim of this study was to gain an understanding of participants' views of distance e-learning over a period of time, the quantitative element of the study, though of value, therefore played a lesser role. The qualitative methods helped determine the cognitive and affective elements within the study, thus providing thick description and therefore constituted the major methodology employed (Jones, 1997).

5.6.2 Triangulation of data

The concept of triangulation in qualitative research is used to convey that facts have been established through reference to more than one source of information (Bogdan and Biklen, 1998). Denscombe (1998) points out that using different data collection methods to gather data about the same thing provides differing perspectives and that comparing and contrasting these perspectives provides a deeper understanding of the topic. A further advantage of using multiple methods is that it enables the researcher to check the findings from one source against the findings from alternative sources (Denscombe, 1998). Miles and Huberman (1994) contend that the strength of triangulation lies in selecting data sources that compliment each other.

There is however some criticism regarding the use of the term triangulation due to its vagueness. Bogdan and Biklen contend that the term "confuses more than it clarifies" (p. 104), arguing that where triangulation has been appropriately applied there is little need to expound the point as it will speak for itself. I consider this to be the case in this study where I believe the methods of data collection and analysis described throughout this chapter adequately address the issue of triangulation.

The remainder of this section describes both the quantitative and qualitative methods used in this study.

5.6.3 Observation and participation

Data collection began early in the study through observation of students studying the MSc OSH. These early observations helped determine the path the research was to take. Student observation was ongoing throughout the study. Students pursuing the MSc OSH via three different pathways were observed: the paper-based distance learning group, the part-time attending group and those students who took part in the GOLDPhase pilot course. The purpose in observing the first two aforementioned groups was to help determine the pedagogical and andragogical design of the VLE, as described in section 6.4.2 of the next chapter.

Further opportunities for observation were facilitated by the Reflective Questions (RQs) and Self Assessment Questions (SAQs) incorporated within the

learning materials. Observation of the responses to those questions that requested the submission of an online form, or contributions to the Discussion Group, provided an indication of the students' rates of progress through the course. This was not, however, an entirely accurate measure of their progress, as some may have delayed sending their replies and progressed further than their responses indicated. The use of RQs and SAQs is discussed in detail in the next chapter.

The qualitative data gathered from observing the GOLDPhase group informed Research Questions 1, 3, and 4 (see Figure 5.2 on the foldout sheet).

5.6.4 In-depth interviews

During the GOLDPhase pilot course I conducted in-depth face-to-face interviews with each of the thirteen students. The interviews were semi-structured using an interview guide with pre-set questions (see Appendix 3). I interviewed the students in their homes or workplaces. All the students fully cooperated in the interviews, indeed they appeared to welcome the visit and the opportunity to discuss their experiences of online learning.

Two of the three students who continued with the MSc OSH beyond the GOLDPhase pilot course took part in a further interview after they had transferred to the paper-based version of the course. Therefore, a total of fifteen in-depth face-to-face interviews were conducted.

The three students who continued with their studies had the unique experience of studying the course in three distance learning formats: the GOLDPhase online custom designed VLE, the paper-based distance learning workbooks and an online managed learning environment (MLE). Therefore, the purpose of the second interviews was firstly to find out how their experiences as e-learners compared to those as traditional paper-based distance learners, and secondly to gain an understanding of their overall perspectives of distance learning. Both

interviews were in-depth and each was individually prepared. The issues discussed were drawn from a wide range of data gathered prior to, during, and after the GOLDPhase pilot course, covering a period of eighteen months and drew upon:

- The first interview with the student
- E-mails to and from the student
- Their responses to the online questionnaires
- Records of telephone conversations
- Extracts from their reflective diaries
- Their postings to the Discussion Group and Online Symposium
- Their examination and assignment results
- The results of their Kolb Learning Style Inventory

I examined the above documents in detail prior to the second interviews and selected certain issues for discussion. These second interviews were more focussed than the first. The students knew me well by this time and were relaxed in my company, therefore, I was able probe deeper without the fear of alienating them. As these second interviews were highly personalised they were not piloted.

Capturing the data

I recorded all fifteen interviews on tape, which allowed me the opportunity during interviews to concentrate on listening to the students, to probe further and to observe facial expressions and visual gestures, rather than hurriedly taking down notes (Burns, 2000). Permission to record the interviews and take notes was sought at the beginning of each interview.

Respondent validation

Each student was sent a transcript of his or her interview for respondent validation (Bryman, 1988). They were asked to read the transcript and to sign and return a verification statement if they agreed that it was a fair and accurate record of the interview, or to contact me if they had any concerns. All the transcripts were returned with the verification statements signed. Some students made minor alterations that were taken into account.

The qualitative and quantitative data gathered from the fifteen interviews informed all four Research Questions (see Figure 5.2 on the foldout sheet).

5.6.5 Gathering documents

Reflective diaries

Members of the GOLDPhase cohort were asked to keep reflective diaries throughout the study, in which to record their thoughts and experiences as online distance learners. Reflective diaries can provide a substitute for observation in circumstances where direct observation is not possible (Robson, 1993).

Moreover, they can help us gain an understanding of students' past experiences, which can illuminate the present and help us to address specific issues in the future (Powell, 1985). To encourage the students to freely express their views in their own style, no format for the diaries was set. Guidelines were however posted on the GOLDPhase course Notice Board.

Miscellaneous documents

The study generated a large volume of miscellaneous documents. To ease data collection and analysis these were divided into three main categories: 'contact', 'contributions', and 'dialogue'. Table 5.4 shows the documents included in each category.

Table 5.4: Categorisation of miscellaneous student documents for analysis

Category	Documents
Contact	Emails to and from students. Records of telephone conversations with students. Postal correspondence (excluding general administrative documents).
Contributions	Contributions to the following areas in the GOLDPhase VLE: <ul style="list-style-type: none"> • Introductions on the Notice Board. • Frequently Asked Questions (FAQs). • The 'Building site'. • Web links for the Resource Centre.
Dialogue	General postings to the Discussion Group (non RQ and SAQ related). General postings to the Online Symposium (non RQ and SAQ related).

Telephone calls were frequently received from members of the cohort. The initial explanation given for such calls was most often to clarify some minor point. However, the conversation usually digressed to reveal issues of prime concern to the student. Following these conversations my hand written notes were recorded on a pro-forma document and retained for analysis. Details of each document were then recorded in a database.

The qualitative and quantitative data gathered from the analysis of documents informed all four Research Questions (see Figure 5.2 on the foldout sheet).

5.6.6 Student assessment

In common with most courses of this type, the assessment strategy consisted of both formative and summative assessments.

Formative assessment was of two main types, Reflective Questions (RQs) and Self Assessment Questions (SAQs). A large proportion of these questions requested student responses. The responses took a variety of formats: postings to the Discussion Group and Online Symposium, emails, online forms, and

multiple-choice submission forms. Each response was retained for qualitative analysis and the details recorded in the database.

Summative assessment took the form of one written assignment and one examination for each module. In order to pass Modules 1 and 2 members of the cohort were required to successfully complete the assignment and examination for each. The results of the assessments helped determine whether the online students could achieve results comparable to the part-time attending students who undertook the same assignments and examinations during the same semester.

The quantitative data gathered from the assignments and examinations results informed Research Question 2 (see Figure 5.2 on the foldout sheet).

5.6.7 Post course workshop

Debriefing, or programme evaluation is frequently undertaken in education to aid critical reflection, both at individual and group level, and can be achieved through a set of simple questions, for example, 'What happened?', 'How did the participants feel?', 'What does it mean?' (Pearson and Smith, 1985). This method was used in the post course workshop where members of the GOLDPhase cohort engaged in reflection based around three simple questions as discussed below.

The purpose of the workshop was to encourage the students to freely express their opinions and share their experiences of distance e-learning in a face-to-face environment. The aim was to stimulate their thinking in order to generate and capture data that may not have surfaced through previous one-to-one data collection techniques. The workshop took the form of three 'brainstorming' sessions in which the students were asked to generate their ideas about (i) what they liked about the course, (ii), what they disliked about the course, and (iii) how it could be improved. The workshop allowed for both individual feedback

and group discussion. It was designed in this way so that the opinions of more dominant members of the group should not overshadow those of other members.

The data from the workshop were later entered into separate tables showing the students' 'likes', 'dislikes', and 'suggestions for improvement'. Examination of the data in each category identified a number of issues that I considered worthy of further exploration; therefore, the issues raised generated many of the questions posed in the subsequent online questionnaires.

The qualitative data gathered from the post course workshop informed all four Research Questions (see Figure 5.2 on the foldout sheet).

5.6.8 Online questionnaires

The next stage of data collection took the form of six online questionnaires that sought the students' opinions of the different elements of the GOLDPhase VLE and their perceptions of distance e-learning. The questionnaires were placed in a purpose built Web site that was linked to the GOLDPhase learning environment. This Web site and the questionnaires can be viewed by selecting the 'default' icon in the 'Evaluation' folder on the CD-ROM that accompanies this thesis (see Appendix 1).

The questionnaires were targeted towards the nine students who had completed the online pilot course as they had experienced all phases of the study.

Attempting to elicit the participation of the four students who had withdrawn was considered inappropriate as they left halfway through or earlier; therefore too long a period of time had elapsed.

An advantage of questionnaires is that they can be used to gather information without the researcher being present (Cohen *et al.*, 2000), therefore they are economical to administer and eliminate the possibility of respondents being affected by the researcher's presence (Denscombe, 1998). Face-to-face

interviews had already been utilised as a data collection method, therefore the use of questionnaires added a further dimension to the study. The questionnaires were self-administered via the Internet and World Wide Web.

Rationale for gathering questionnaire data via the Internet

As the study's cohort had recently completed the GOLDPhase pilot course all members were fully conversant with Internet technologies. Therefore, using the Internet as a medium for distributing the questionnaires and collecting the subsequent data did not present a problem. The method did however provide a number of advantages, from both a practical and theoretical perspective.

The questionnaires were easily accessible to the students either from their home or workplace; therefore respondents were free to choose where and when to complete them. The questionnaires were housed within one Web site but displayed on separate pages, which meant that the students did not have to return them all at once. Had the questionnaires been sent by post respondents would have been faced with the option of completing one long questionnaire or returning a series of six separately. Once the online questionnaires had been completed they could be returned instantaneously, thus reducing the possibility of them being forgotten or mislaid. Mistakes could be easily rectified prior to returning the forms.

The questionnaires were less open to respondent error, for example, where closed items required only one answer to be selected the radio buttons were validated to ensure that only one option could be selected, an approach that is not feasible when administering paper questionnaires. Using the Internet allowed me to break down what was originally intended as one questionnaire into six manageable segments that could be delivered en bloc and returned piecemeal. All of these factors strengthened the validity of the questionnaires.

Designing the questionnaires

Procedures normally followed in developing paper questionnaires were applied to the online questionnaires. However, designing online questionnaires necessitated the consideration of a number of additional technical issues to ensure that they yielded accurate and valid data. The ways in which I addressed

these conventional and technical issues are discussed throughout the rest of this sub-section.

In developing the questionnaires I considered the respondents' role by paying attention to the following issues. Firstly, clear instructions on how to complete the questionnaires, conventionally provided in the covering letter, were given on both the Web site Homepage and individual questionnaires. To help respondents distinguish the instructions from the questions the former were given in italics. Due consideration was given to the length of each questionnaire so as not to unduly intrude on the respondents' time (Cohen *et al.*, 2000). Care was taken in the wording of the questions to ensure that they were not offensive or intrusive (Cohen *et al.*, 2000). Where possible the wording of the questions was kept simple and straightforward and questions referring to specific issues were grouped together to aid understanding (Robson, 1993).

In designing the questions I drew heavily on the advice of Race (1998). Some questions, that is, items eight, twenty-seven and twenty eight in questionnaire 1 and items thirteen, fourteen and fifteen in questionnaire 6 were taken directly from Race's work as the wording was appropriate to the context of this study. I particularly liked the direct approach used in the wording of his questions and believed that this would help elicit the information required for this study.

The online questionnaire forms were customised to ensure that all the questions had been answered prior to submission. Respondents received a confirmation form to allow them to check their answers. All respondents were later sent an email acknowledging their responses and thanking them for taking the time to complete the questionnaires. This substituted the conventional 'thank you' letter normally sent by post.

The above has addressed the overall approach taken in designing the online questionnaires. The following discussion examines the development of the questionnaires paying specific attention to the question items used.

Item types

As this was the final method used to gather data from those who completed the online course (the comparison questionnaire discussed in the next sub-section only being directed towards the three students who continued with the MSc/PG Dip), the questions to be asked required careful consideration.

Following the students' visits to Salford I attempted to identify any gaps in the data through reference to the research questions and examination of the data gathered from the aforementioned post course workshop. This process helped me to identify the focus of the questionnaires. This period of time also allowed the students the opportunity to assimilate and consolidate their experiences before responding to the questionnaires.

The original intention was to administer a single questionnaire, however, after considering its purpose and aims it was evident that this would be unwieldy and overwhelming for respondents to complete. Therefore, the aims were divided into six main categories. The categories were related to the research questions that guide the study, thus providing the topic areas for the six questionnaires. The first four related to different aspects of the GOLDPhase pilot course:

- Questionnaire 1 – the Virtual Learning Environment
- Questionnaire 2 – Learning Materials
- Questionnaire 3 – Communication
- Questionnaire 4 – Information and Resources

Questionnaire 5 sought data related to the students' personal experiences as e-learners and the sixth inquired about their overall experiences as distance e-learners.

Each questionnaire aimed to inform one or more of the research questions. Figure 5.2 on the foldout sheet near the beginning of this chapter illustrates the research questions informed by each questionnaire.

Having moved from the general purpose to a more specific set of categories about which I wished to gather data (Cohen *et al.*, 2000) I then generated a number of questions to which I required answers in each category. The questions were then developed and scrutinised.

Three types of items are generally used in questionnaires: closed, open and scale (Robson, 1993; Burns, 2000). All three were used here. One of the disadvantages of questionnaires is that respondents may become bored and disinterested and fall into the pattern of selecting the same response to each question in a repetitive manner (Cohen *et al.*, 2000), this may be especially true in the online environment. To help avoid this pattern of behaviour, and encourage the respondents to carefully consider each item, I varied the item types. Table 5.5 shows the number of items of each type used in each of the questionnaires and therefore illustrates the approach taken.

Table 5.5: Items used in the online questionnaires, by type and quantity

Questionnaire	Item type					Total # of items
	Closed			Likert	Open	
	Yes/No alternative	Select 1 only from 2 or more fixed alternatives	Select 1 or more from a list of fixed alternatives			
1. Virtual Learning Environment	1	3	0	18	0	22
2. Learning Materials	0	11	1	40	0	52
3. Communication	0	1	0	36	0	37
4. Information & Resources	3	14	0	29	0	46
5. Self	1	2	2	0	3	8
6. Overall	2	19	0	0	5	26
Total	7	50	3	123	8	191

A total of 191 items were used in the six questionnaires. Sub lettering was used; therefore some questions comprised more than one item.

The final questionnaire included a sub section comprising three questions related to the questionnaires themselves. These were included to check whether the respondents encountered any difficulties in completing the forms. Any such difficulties could then be explored further before data analysis took place.

The differing item types used in the questionnaires are discussed below.

Closed items

Closed items present a number of fixed alternatives for respondents to choose from (Robson, 1993; Denscombe, 1998). The sixty closed items were used in three ways. Seven provided a simple yes/no alternative; fifty offered a range of response options from which only one item could be selected and three offered a list of alternatives from which one or more items could be selected.

Scale items

Likert scales were used to measure the students' attitudes towards various elements of online learning. One hundred and twenty-three Likert questions were used. The purpose of attitude scales is to gain an insight into what people feel and think about something (Robson, 1993). Many people enjoy completing Likert scales because they appear interesting and respondents are therefore encouraged to take part and to carefully consider their answers (Robson, 1993).

In developing the Likert scale a number of statements were constructed, all of which were either favourable or unfavourable in direction (Judd *et al.*, 1991). Response categories were then decided upon. A four point Likert scale with the categories 'strongly agree', 'agree', 'disagree', and 'strongly disagree' was used. Issues in designing a Likert scale include the number of categories to be included and whether there should be an odd or even number of categories. There is disagreement on whether or not a middle point should be included in Likert scales. Including a middle point allows for the finer grading of analysis but can obscure the direction in which some people lean as they may opt for the neutral option each time (Robson 1993). On the other hand excluding a middle point

forces respondents to take a stance one way or the other and therefore can obscure ambivalence (Nowlis *et al.*, 2000). These issues were carefully considered. However, due to the small number of respondents it was decided that in this study a four point Likert scale was most appropriate as it would avoid the temptation of respondents selecting the middle answer each time, which could have rendered the data difficult to interpret (Oppenheim, 1992).

A mixture of positive and negatively worded statements was used. This strategy was employed to help overcome two problems highlighted by Oppenheim (1992) as being prevalent in completing attitude scales. The first is the problem of 'social desirability', where respondents agree to those items they perceive as being socially desirable. The second is that of 'acquiescence', where respondents prefer to agree than disagree. Both positive and negatively worded statements were therefore included to alert the respondents to the fact that each question needed to be read carefully and thus discourage them from consistently selecting the same option without due consideration of the question.

Open items

Open items allow respondents to answer in their own way without providing any fixed alternatives (Robson, 1993; Denscombe, 1998). This type of item was used in questionnaires 5 'Self' and 6 'Overall'. The first five open items were used in conjunction with a closed question in order to uncover the reasons for the respondent's answer to the closed question. For example, question seven in questionnaire 6 asked: 'Did you encounter any obstacles to using the Internet for study?' and provided a yes/no alternative. Respondents who selected 'yes' were then asked to respond to question eight: 'What were the obstacles you encountered?' and question nine: 'What could have been done to help remove these obstacles?' for which text boxes were provided to enable respondents to type in their answers. The three remaining open questions were used singly for responses to three simple statements: 'What would you like us to stop doing?', 'What would you like us to start doing?' and 'What would you like us to continue doing?'.

Qualitative data

As with any data collection technique questionnaires have their drawbacks. Robson (1993) warns that data obtained from questionnaires can be superficial, as respondents are frequently required to fit their answers into pre-determined boxes with no opportunity for comment. The use of open questions as discussed above helped alleviate this concern, but this style did not lend itself to all the questions. Therefore, the problem was further addressed by providing 'free text response boxes' at the end of each section, thus allowing respondents the opportunity to add comments, make suggestions or raise any points they felt had been omitted from the relevant section or questionnaire. This strategy would be inappropriate where questionnaires are sent to large numbers of people, due to the volume of qualitative data that would be generated, and is best suited to studies that have small numbers and therefore less responses to analyse (Robson, 1993; Cohen *et al.*, 2000), as in this study. The free text response boxes facilitated the type of qualitative data usually obtained from open questions and unstructured interviews, thus yielding a richer response from the questionnaires (Burns, 2000). A total of nineteen free text response boxes were distributed throughout the six questionnaires.

Piloting the on-line questionnaires

The questionnaires were both pre-tested and pilot tested before they were made available to the target audience. Once I had designed and constructed them I placed them in the GOLDPhase evaluation Web site and pre-tested, (i) their technological stability, (ii) that the forms returned the data to the correct file on my computer, (iii) that datum was returned for each field, (iv) that the data was returned in a legible format, and finally that each form included the name of the respondent.

Two members of the cohort, Christine and Chris, who had withdrawn from the online phase of the study, but were still willing to contribute to the investigation, agreed to pilot test the questionnaires. A pilot test page with instructions for the pilot testers and a feedback form was included in the Web site. This page can be viewed by selecting 'Pilot test page' from the Evaluation Homepage on the accompanying CD-ROM (see Appendix 1). The results of the pilot test

questionnaire did not reveal any problems. Data from the two pilot tests were not included in the final data analysis.

The qualitative and quantitative data gathered from online questionnaires 1, 2, 3 and 4 informed Research Questions 2, 3 and 4.

The qualitative and quantitative data gathered from online questionnaires 5 and 6 informed Research Question 1. (See Figure 5.2 on the foldout sheet).

5.6.9 Kolb's Learning Styles Inventory

Kolb's Learning-Style Inventory (LSI) was used to assess the students' individual learning styles. The Kolb LSI is a self-scoring inventory provided in individual booklets together with explanatory notes. Section 4.3.4 in Chapter 4 described the instrument in greater detail. The Kolb LSIs were purchased specifically for this study and were used with two groups of students studying the MSc OSH, the paper-based distance learning group and the GOLDPhase cohort.

The two groups shared certain characteristics in that both comprised occupational health and safety professionals studying the MSc OSH via distance learning. The purpose in undertaking the Kolb LSI session with the first group was to identify the mix of learning styles within the group and to gain an understanding of how those with differing learning styles approached learning situations. I also wanted to stimulate discussion about whether members of the group considered that their experiences as occupational safety and health professionals influenced their styles of learning. Moreover, the session provided the opportunity for me to test the effectiveness of the Individual Feedback Sheet (see Appendix 4), which was later used with the GOLDPhase cohort. The session was also designed to benefit the students by providing them with the opportunity to gain a deeper understanding of how they learn.

The paper-based distance learning group

Fourteen students from the MSc OSH paper-based distance learning group attended a two-day research methods seminar at the university, which provided me with the opportunity to present the learning styles session. Smith and Kolb (1986) suggest a format for presenting the concept of learning styles in educational or management training sessions and the session was guided by this format.

The objectives of the session were:

- (Knowledge) To help participants increase their understanding of their learning process.
- (Attitude) To heighten participants' awareness of their particular learning styles, and to appreciate the differences between learning styles.
- (Skills) To enable participants to assess their learning strengths and weaknesses.
To enable participants to set learning goals, both in and out of the classroom, to promote self-development and growth.

(Smith and Kolb, 1986, p. 31).

I began the session by introducing the concept of learning styles and explaining Kolb's LSI. The students then self-administered the Kolb LSI, identified their learning styles and completed the Individual Feedback Sheets. The feedback sheets then formed the basis for small group discussion with each group later reporting back to the whole group. The feedback sheet was adapted from Smith and Kolb (1986) and sought the students' views on their approaches to learning. The feedback sheet was modified following the paper-based distance learning group seminar. The style and layout of the questions were changed to aid data analysis and the wording of some of the questions was adapted to make them applicable to distance e-learning.

The GOLDPhase cohort

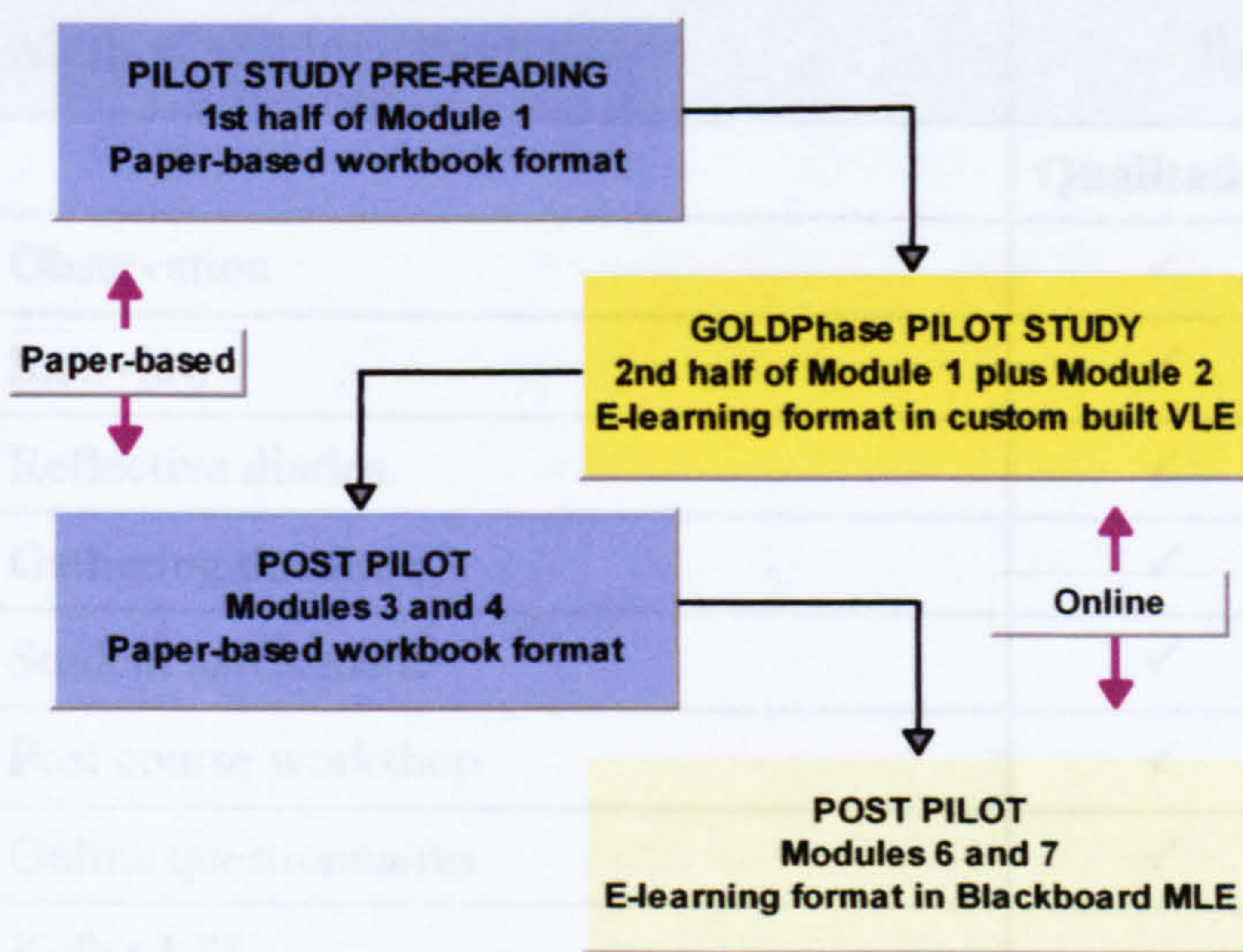
All members of the GOLDPhase cohort completed the Kolb LSI. I decided that this should be completed at the end of the study, as the information that accompanied it described the typical characteristics of the different learner types.

I believed that this information, if provided earlier, could influence the students' attitudes and behaviours throughout the study, whether consciously or subconsciously. Administering the instrument at the end of the study would prevent a scenario in which the students would 'act out' their given learning style, albeit unwittingly, during the online phase of the study.

The quantitative data gathered from administering the Kolb LSIs and the qualitative data gathered from the Individual Feedback Sheets informed Research Question 4, (see Figure 5.2 on the foldout sheet).

5.6.10 Comparison questionnaire

In February 2001 the three students who continued with the MSc OSH beyond the pilot study completed a comparison questionnaire (see Appendix 5). Though the planned data collection for this study had finished, I decided to include the additional questionnaire because I believed these three students were in a position to add a further dimension to the study. In common with the rest of the GOLDPhase cohort they started the course by studying Blocks 1 to 6 of Module 1 in the paper-based workbook format. Then they studied one and a half modules online in GOLDPhase, followed by two further modules in the paper-based workbook format and finally the remaining two taught modules online in Blackboard, a commercial managed learning environment (MLE). Figure 5.4 illustrates this pattern of study.

Figure 5.4: Distance learning modes of study

Note: Modules 5 and 8 are non-taught research modules

The comparison questionnaire was the final stage of data collection in this study.

The qualitative data gathered from the comparison questionnaire informed Research Question 2 (see Figure 5.2 on the foldout sheet).

5.6.11 Summary of data collection methods

A variety of methods of investigation have been used in this study, primarily qualitative, but also quantitative. Table 5.6 summarises the methods yielding qualitative and or quantitative data.

Table 5.6: Summary of qualitative and quantitative data collection methods

Method of data collection	Type of data	
	Qualitative	Quantitative
Observation	✓	
Interviews	✓	✓
Reflective diaries	✓	
Gathering documents	✓	
Student assessment	✓	✓
Post course workshop	✓	
Online questionnaires	✓	✓
Kolb's LSI		✓
Individual Feedback sheets on learning styles	✓	
Comparison questionnaire	✓	

In summary, ten data collection techniques were employed in this study. Six yielded qualitative data, one yielded quantitative data and three yielded a combination of the two methods.

5.7 Methods of analysis

This section explains how the data gathered from the qualitative and quantitative methods, identified in the previous section, were analysed and synthesised.

5.7.1 Organising and managing the data

One of the challenges in a case study is the management and organisation of data (Merriam, 1998). Case study research frequently draws data from disparate sources, yielding a high volume of documents. Attention to data management is, therefore, particularly important to ensure that data are easily retrievable. Yin (1994) describes the process of data organisation and management in case study research as the 'development of a case study database'. The case study database helps establish a chain of evidence, thus increasing the reliability of the case study (Yin, 1994).

Accurate record keeping was an integral part of this study and facilitated the analysis of both qualitative and quantitative data. The study generated a large volume of information, both paper-based and electronic. To prevent the case study from becoming unwieldy I used two strategies to record and track the data. The first was to create an Access database to record all electronic and paper-based documents. The second was a Computer Aided Qualitative Data Analysis Software (CAQDAS) program that aided the data analysis process. The way in which CAQDAS was used in this study is discussed later in this section. The way in which the Access database was utilised is discussed next.

Case study database

The Access database enabled me to record all the information related to the case study and to readily locate materials stored in a range of programs. It also allowed me to organise the data records in a variety of formats, including chronological and alphabetical order, and to extract specific data sets. For example, one table recorded contributions to the Discussion Group and could be interrogated to show postings by specific students, by date, or by subject. Similar tables were used for other aspects of the study. The database therefore provided a unique record of the events that took place throughout the study and an audit trail for the writing of this thesis. Though the database stored a large amount of quantitative data, its purpose was not specifically to use that data for quantitative analysis, but rather to facilitate data organisation and management. Each entry in the database was allocated a unique code that corresponded to the relevant document or event. A pro-forma was created for each student and used as a checklist to ensure that all the data for each participant were transferred to the CAQDAS program.

5.7.2 Grounded theory

The topic of grounded theory has been touched upon in section 5.3 of this chapter, where approaches to qualitative research were discussed. The grounded theory approach to data analysis was used in this study therefore the concept is further explained here.

Glaser and Strauss (1967) put forward their concept of grounded theory as they believed that too great an emphasis was placed on the verification of existing theories rather than on discovering new ones. In grounded theory theoretical propositions are developed out of the data through a process of inductive reasoning, moving from the particular to the general (Mason, 1996). The grounded theory approach is characteristically taken by researchers who aim to build substantive theory, that is theory that applies to a specific group and place, as in this study, rather than formal or 'grand' theory (Merriam, 1998).

The concept of grounded theory was influenced by phenomenology, which advocates putting aside pre-conceptions about a phenomenon in order to allow the phenomenon to speak for itself (Tesch, 1990). Glaser and Strauss (1967) adapted this concept to the process of data analysis by advocating that rather than starting out with a hypothesis or theory, the researcher should reverse the process by entering the field with an open mind in order to discover emerging theory or patterns from the data. They describe the role of theory in sociology as:

...a strategy for handling data in research, providing modes of conceptualisation for describing and explaining (Glaser and Strauss, 1967, p. 3).

Glaser and Strauss (1967) describe grounded theory as comprising three main elements: conceptual categories, their conceptual properties, and propositions. A category represents a 'conceptual element' of the theory. The properties (or subcategories) are dimensions, or descriptions of the categories. Propositions are the suggested links between categories and their properties and between the categories themselves (Glaser and Strauss, 1967). Grounded theory is thus a style of qualitative research (Strauss, 1987) that generates theory or themes from the data using the constant comparative method.

The method of grounded theory was ideally suited to this study, as the subject area, that of distance e-learning, is in its infancy and at the present time little theory exists that may be tested. The grounded theory approach therefore helped identify a number of themes that emerged from the study. This approach to data analysis was undertaken with the assistance of a CAQDAS program. The

grounded theory procedures followed and the way in which the software was utilised are closely entwined and are appropriately discussed together next.

Using CAQDAS to aid grounded theory

Computer Assisted Qualitative Data Analysis Software (CAQDAS) is the term generally used in the UK for computer programs that facilitate qualitative data analysis. Software programs for the analysis of qualitative data help the researcher to code segments of text, store the segments together and retrieve and display them for further analysis (Miles and Huberman, 1994). The capabilities of CAQDAS packages vary from simple code-and-retrieve techniques, to software that supports the writing of contextual memos and aids concept building (Richards and Richards, 1998).

CAQDAS programs provide researchers with an alternative to the traditional methods of using highlighters, scissors, glue and index cards to sort and analyse data (Tesch, 1990). The software assists these processes by helping to organise the data, it does not however analyse the data for the researcher (Fielding, 1994). Therefore, CAQDAS differs from quantitative analysis programs such as Statistical Package for the Social Sciences (SPSS) that perform the actual analysis, that is, the calculation of the statistics. In using CAQDAS the researcher still has to do the thinking.

Rationale for selecting NVivo

A range of CAQDAS programs is available, examples include: AQUAD, AnSWR, ATLAS, DECISION EXPLORER, The Ethnograph, HyperRESEARCH, QSR NUD*IST, QSR NVivo, and Qualrus. QSR NVivo was selected for use in this study.

In this study I wanted to provide descriptive narrative to facilitate an understanding of the investigation. However, I also wanted to segment the data according to the research questions, whilst at the same time identifying emerging themes across the data. NVivo supports category construction, an approach that can be applied whether working 'down' from theory or 'up' from the data, as in the grounded theory approach taken here, therefore NVivo met the methodological stance taken in this study.

An important aspect of NVivo is that it supports fine grain analysis. This feature addresses problems experienced with earlier CAQDAS software, for example, NUD*IST 4 (Welsh, 2002), where a paragraph is the minimum unit of text that can be coded, an approach more appropriate in large-scale projects that are most often analysed at a broader level due to the high volume of data. In NVivo a single character is the minimum unit of analysis, though in this study the smallest unit of text coded was generally a sentence. The ability to code discrete units of text is especially useful in small-scale projects, such as this study, where the data set is drawn from fewer participants and finer grain analysis is more appropriate.

The study amassed a wide range of qualitative data from a variety of sources. Meta-data, that is information about the data, was usefully stored in the aforementioned database, thus enabling me to record, organise, and track the data at a higher level whilst providing an overview of the study's events. The Access database did not however, enable me to directly access the data itself and work closely with it. On the other hand, NVivo stored the data and provided access to it, more importantly it facilitated data analysis and the identification of themes. The Access database and the NVivo project database therefore complimented one another whilst performing different functions.

How NVivo was used in this study

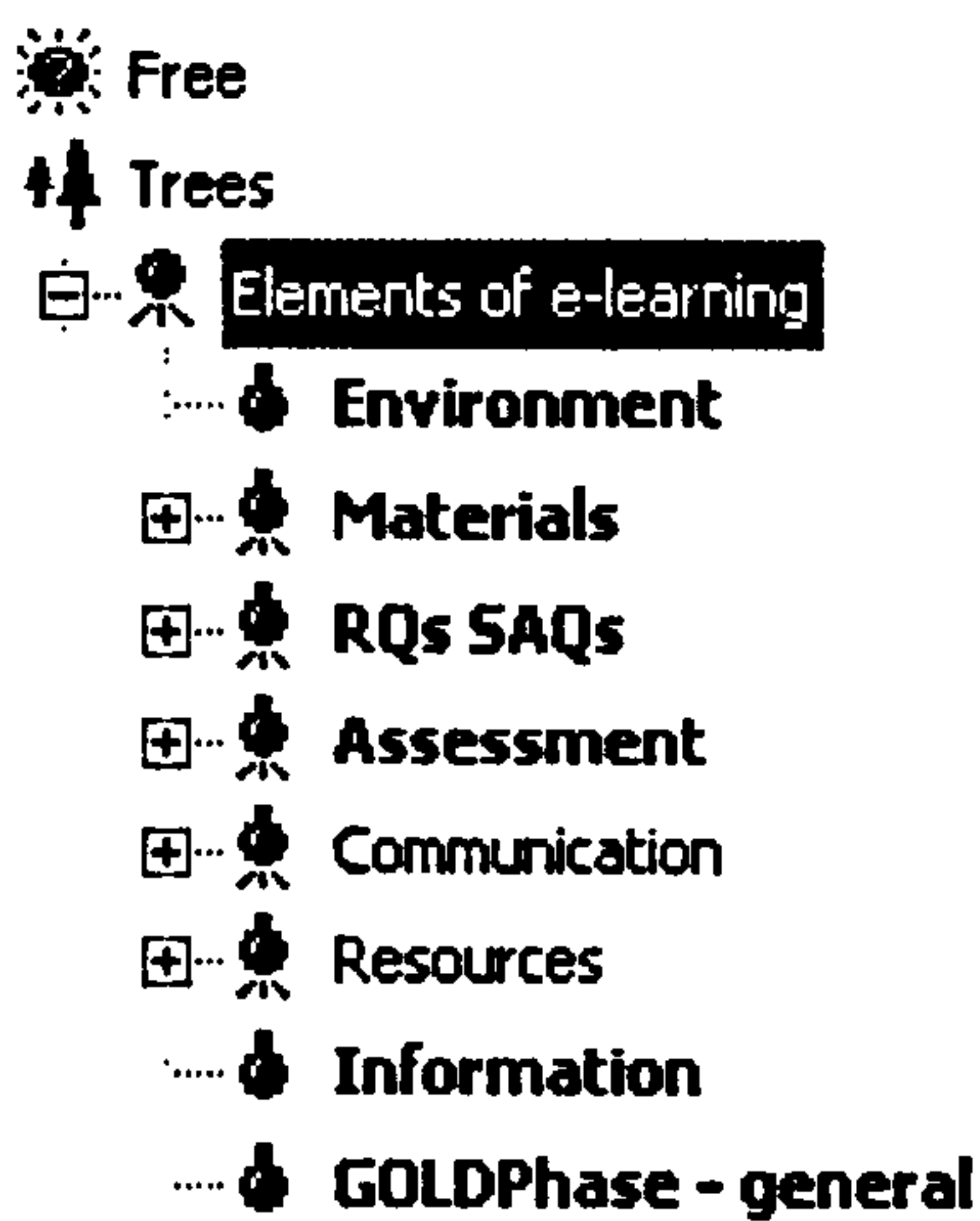
The NVivo software was acquired at the end of the GOLDPhase pilot study. Thus the first stage in setting up the NVivo project was to introduce the relevant documents. Seven hundred and seventeen documents were imported into the project. These included researcher notes, interview transcripts, reflective diaries, emails, and qualitative data from the online questionnaires. Having inserted the documents into the project the next step was to commence coding the data.

I initially organised the data into 'housekeeping' categories using broad brush coding (Bazeley and Richards, 2000), which is similar to the 'open coding' technique described by Glaser and Strauss (1967). The housekeeping categories were organised according to the questions that guided the study. In NVivo the term 'node' is used to describe the 'container' that holds the coding. For example, a node labelled 'lack of interest' would gather together all the data coded by that

label. Nodes can be created in one of three areas: free, trees, and cases. Free nodes are not arranged in any particular order and are most often used for emergent ideas. Tree nodes are used to arrange hierarchical categories or 'trees' to introduce structure or order. Case nodes are used to gather information of a particular type and facilitate searches.

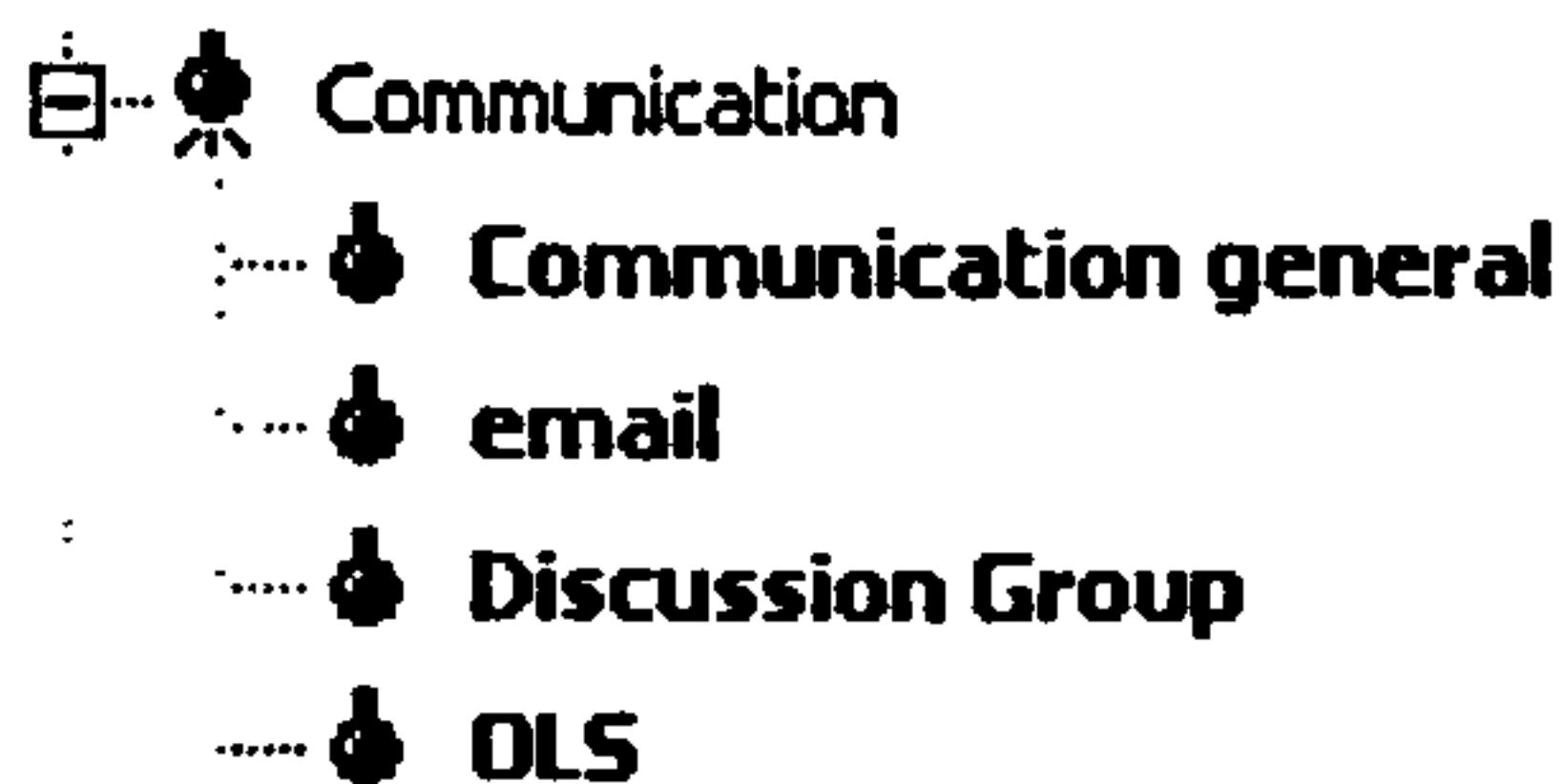
The nodes created in the broad brush coding stage were initially created as free nodes, however, as finer grading was applied and the number of nodes increased I re-arranged these into trees as shown in Figure 5.5.

Figure 5.5: Structuring nodes into trees in NVivo



The above figure illustrates the 'elements of e-learning' tree. The branches on the tree can be expanded and collapsed to show the node's 'children'. This technique is illustrated in Figure 5.6, which displays the children of the parent node 'communication'.

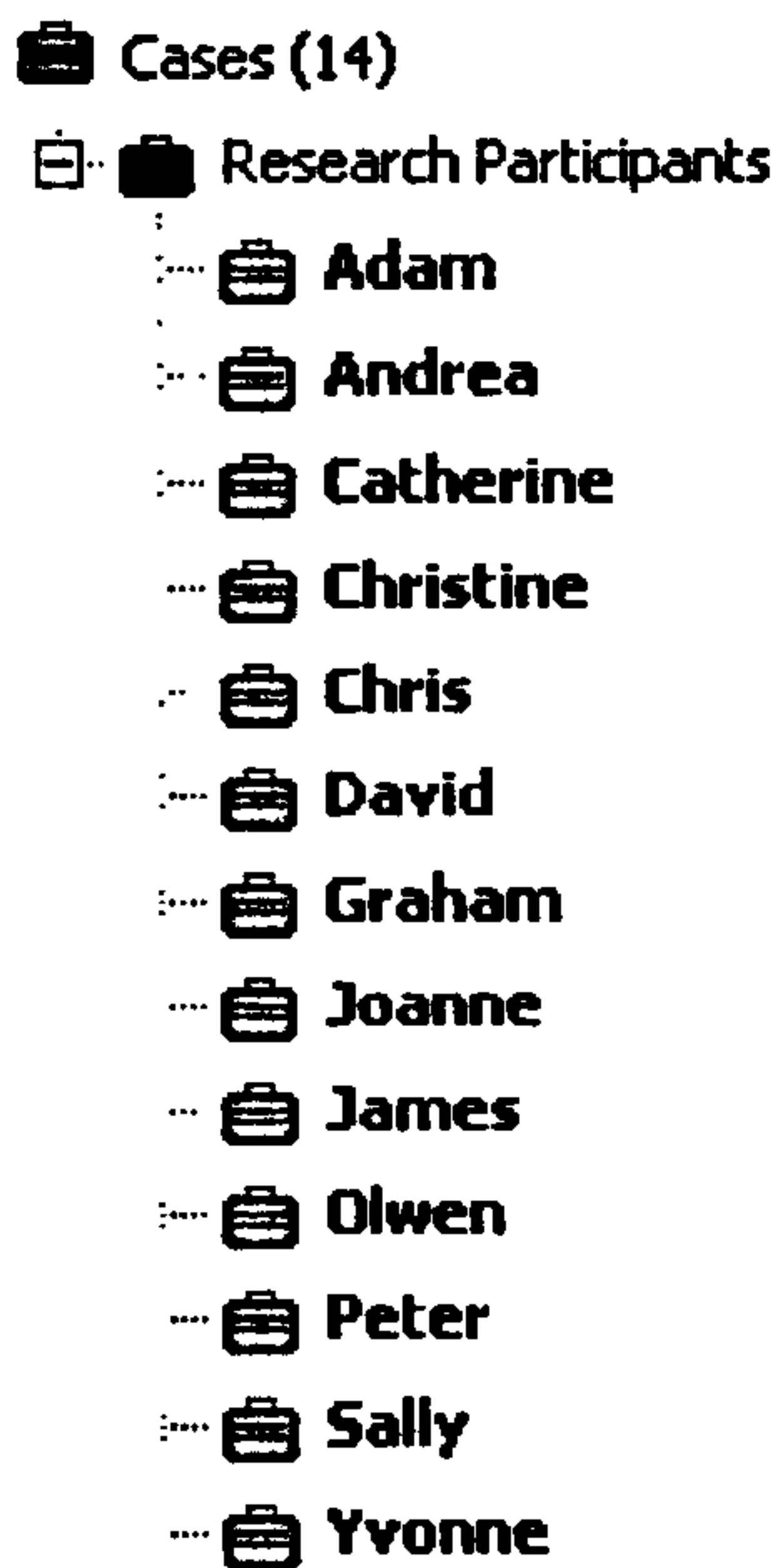
Figure 5.6: Expanding tree nodes in NVivo



The trees grouped the housekeeping nodes together, thus giving structure to both the nodes and the data. The coding for each node could then be viewed within one document.

I also created a case node for each student and then coded each document at the appropriate case node. Figure 5.7 shows the case node tree.

Figure 5.7: Creating cases in NVivo



Gathering the data into case nodes in this way enabled me to assemble all the information for each student into one location. Each case node could be opened in the node browser for examination or further coding.

Having introduced some structure to the data via the trees and the case nodes, I then re-examined the nodes, this time taking a more analytical approach, using what Strauss and Corbin (1998) term as 'microanalysis', with the aim of uncovering new concepts within the data. Following the advice of Lofland and Lofland (1995), I approached this task by reading through the text word by word and line by line whilst asking a series of questions, in what Merriam (1998) describes as a 'virtual conversation' with myself. For example, 'What is this about?', 'What is the issue here?' 'How do they feel about it?'. 'What does it mean?' This strategy produced conceptual categories and properties that cut across the data, rather than segmenting it into housekeeping groups, and employed multiple coding of data extracts where necessary.

The system was constantly refined, where large amounts of data were gathered within one node the data was re-examined to see if any subdivisions existed. Similarly, codes with few data extracts were explored to see if they should be

merged under a more meaningful code. The data was thus arranged and re-arranged in a variety of ways until patterns began to surface.

Over time a number of strong themes appeared to be emerging from the data. At this stage I used the 'sets' tool to help identify those aspects of e-learning to which these related. The 'set' tool enabled me to gather nodes from the free nodes, or any of the tree nodes, into separate groups. This works in a similar way to shortcuts in Windows applications, thus the nodes gathered into sets remained in their original position. I then used these sets to conduct various forms of intersect searches with other nodes, or groups of nodes. For example, groups of conceptual nodes, such as 'anxiety', 'inhibition', and 'lack of confidence' were intersected with the 'housekeeping' nodes, such as 'learning materials' or 'information' to discover the relationships and patterns in the data.

Reflections on using NVivo

The most difficult aspect of using NVivo in this study was deciding which conceptual labels to apply to the categories and identifying the emerging themes. Whilst NVivo assisted the development of the data analysis process it did not as such 'produce' the results. At one stage I found that the number of codes proliferated very quickly and believe that this was due to the ease of coding on screen. This presented a problem, as I had to re-examine the data and distil the coding. Furthermore, I believe the software caused me to fixate on the codes themselves and consider that this may have delayed me from seeing the big picture. Seidel (1998) discusses this issue, likening the codes to jigsaw pieces, warning that focussing too deeply on the codes risks 'finding the pieces but losing the phenomena' and that the important issue is discerning how the pieces fit together (Seidel, 1998). I consider that fixating on the coding system was a major drawback in using CAQDAS.

Having explained how NVivo aided the process of grounded theory, the extent to which the principles of the approach were adhered to is discussed next.

The principles of grounded theory

Whilst some of the principles of grounded theory were adhered to in this study, others were not. In keeping with the principles of grounded theory I did not start

with a hypothesis. On the other hand I did not enter the study without prior knowledge of the literature related to distance education and e-learning, which was a slight departure from the grounded theory approach.

I further deviated from the principles of grounded theory in that all the data were gathered prior to analysis. A better approach would have been to code the data as it was collected, as recommended by Glaser and Stauss (1967). This would have allowed me to explore the data in depth and construct theories as the data unfolded. This approach was not, however, possible due to the volume of information amassed and time constraints. However data analysis of an informal nature was ongoing throughout the study. For example, certain occurrences or similarities in interviews or behaviour were noted. Thus allowing me to gain a 'feel' for the data prior to formal analysis.

One approach to grounded theory that I did follow closely was that of seeking emergent issues from the data. Though the housekeeping categories pre-existed, in that they related to the research questions, these groupings were purely of an organisational nature. The important categories, that is, the conceptual ones, emerged from the data itself.

5.7.3 Analysing quantitative data

To help determine relationships between the data some simple statistical analysis was carried out. However, as the maximum number of respondents was thirteen, due to the overall qualitative nature of this study, only descriptive statistical analysis was utilised.

Responses to the four point Likert scales with the categories 'strongly agree', 'agree', 'disagree', and 'strongly disagree' were grouped to show the total responses to each category. Remaining quantitative data were analysed using a frequency count to record individual responses to each question.

This section has explained how qualitative and quantitative data, emanating from the data collection methods described in section 5.6, were recorded and managed in order to facilitate and support the data analysis. The grounded theory

approach to data analysis has been examined and the way in which CAQDAS aided the process has been discussed.

5.8 Key challenges and dilemmas

As with any empirical study a number of challenges and dilemmas were experienced during the course of this investigation. The key issues and the methods used for resolving them are discussed here.

5.8.1 Defining roles

The course leader's role in the pilot online course phase of the study was of a rather delicate nature as she was placed in an unusual position, which could perhaps be described as a 'conflict of interest'. This was because of her dual role. As my academic supervisor she did not wish to exert any undue influence on how I designed and conducted the online study. However, as course leader the students would naturally expect her to take an active part in the day to day running of the course. The problem was resolved in the following way. As researcher, I undertook the design and construction of the GOLDPhase VLE. Liaison with my supervisor was restricted to queries related to the course content, for which she was consulted in her role as course leader. For example, I sought her advice regarding the appropriate range of options for inclusion in on-line multiple-choice questions, and to ascertain whether certain hyperlinks inserted for revision purposes were appropriate. I carried out the day-to-day course related administrative tasks, such as collating the responses to RQs and SAQs, responding to queries, updating the online learning environment, liaising with students and responding to technical queries. If students had subject related queries these were passed on to the course leader who dealt with them in the appropriate manner.

Hara and Kling (1999) assert that when qualitative studies of online courses are conducted by the course tutor then the study's data are not very reliable because students are likely to aim to please the tutor. In this case the course tutor was not conducting the research herself. However, she was supervising it and was therefore less detached than had she been supervising research based on a course that she did not teach. Therefore, to allow me the freedom to conduct the

research, and in order to maintain a more objective stance, she decided to assume a lower profile within the course than would normally be the case. Due to these unusual circumstances the course leader did not facilitate the online discussion groups. However, she guided the students by posting messages to the whole group via the GOLDPhase Discussion Group and Online Symposium, and through marking assignments.

Though the course leader was not involved in the day-to-day running of the course she demonstrated her commitment to the use of information technology through the use of email, the Discussion Group, and by using electronic marking in the form of annotations when marking assignments. In some instances educators may subscribe to the concept of integrating technology into their courses but lack the technical skills and knowledge required to implement such an initiative (Baylen and Tyler, 1998). This was not the case here as the course tutor was already an advocate for using information technology.

5.8.2 Establishing rapport with the study's participants

Establishing rapport with the study's participants can sometimes present problems for researchers. I was fortunate to enjoy good relations with the participants in this study. However, one incident did cause me to reconsider my approach. Denzin and Lincoln (1998) discuss the sensitive issue of how as researchers we should present ourselves. Do we approach an interview dressed as a researcher as student, or as one fellow professional visiting another? The issue is of great importance as it can influence how respondents view us. This can have an impact on the relationship that develops between the researcher and the respondent, and in turn affect the success of data collection.

In my role as researcher in this study I travelled to interview the students who took part. Some visits were to people's homes, others to their place of work. In my role as researcher interviewer I had to decide how I should appropriately present myself. When visiting a student's place of work I chose to dress fairly smartly and when visiting in their home dressed more casually. On one occasion when travelling to conduct an interview, in what I assumed to be a student's workplace, I made an error of judgement by choosing to dress formally. I had not realised that in this instance the home and workplace were one. It was

immediately obvious that my appearance created a barrier between us and I feel that I failed to establish the same level of rapport with this student as I did with the others. This was a salutary lesson as I consider that this first impression had a lasting affect on our relationship. Nevertheless, it highlights the importance of gaining rapport with those we are studying.

5.8.3 Conducting face to face interviews

A further challenge in this study was the time consuming nature of conducting face-to-face interviews with members of the cohort. This was exacerbated by the geographical dispersion of the cohort. Robson (1993) warns that the process of undertaking face-to-face interviews can be an extremely time consuming and costly exercise which includes question preparation, arranging visits, travelling, conducting interviews, transcribing interview notes and interview tapes, and the subsequent analysis of data. Transcription time alone is a demanding task.

Robson estimates that a one-hour tape takes ten hours to transcribe. This study yielded over twenty hours of interview tapes and the transcription process was extremely time consuming. However, I consider this to have been a worthwhile exercise as it yielded rich data that would otherwise have been inaccessible to the study.

5.8.4 Gathering round the clock computer generated data

One of the advantages of this study was that, with the exception of the interviews and the post course workshop, no decision had to be made about the time of day or place in which to collect data, as is the case when studying the traditional classroom environment. The study yielded data twenty-four hours a day, seven days a week via the Internet to the Web server on my desk. Whilst visiting a classroom can yield differing data according to the time of year or day (Bogdan and Biklen, 1998) this was not the case with the online environment. However, this presented its own challenges in that I had to remain ever vigilant to ensure that each event was captured and retained for analysis.

5.8.5 Choosing whether to select key informants

As with all qualitative research a number of decisions had to be made during the course of this study. One such decision was whether or not to include all

members of the cohort in the analysis and final report or whether to focus on a number of key informants. I decided against the latter approach, believing that all members of the cohort, including those who withdrew, were able to contribute to the study. However, whilst the views of all informants have been gathered some members of the cohort were more talkative and insightful than others, yielding richer data. Thus, some have received greater attention than their counterparts in the write-up of this case study (Bogdan and Biklen, 1998).

5.8.6 Ethical issues

Ethical issues were considered before and throughout the study. Written consent to use data obtained from the study was obtained from each member of the cohort prior to the commencement of the study. All the students were informed of their right to withdraw from the study at any stage or to refuse to take part in any particular aspect.

This section has discussed a number of challenges and dilemmas encountered during the course of the investigation and described the methods used for overcoming these.

Conclusions

In conclusion, this chapter has set out the theoretical framework of this study. The overall purpose and objectives of the study have been identified and the initial questions that guided the study have been stated.

The broader context of scientific enquiry was then explored and the philosophical orientation of the study has been identified as being qualitative. Three research strategies were considered and a rationale was made for selecting a case study strategy. A differentiation has been made between qualitative research and case study strategy. This was followed by a closer examination of each approach.

Presenting the design of the qualitative case study that is the subject of this study then brought the topics of qualitative research and the case study approach together. The case has been defined as a single intrinsic case study that takes a holistic approach. The heart of the case study has been identified as the

GOLDPhase study and the boundaries of investigation have been clearly delineated.

Having set out the theoretical underpinnings of the study the methods of data collection were presented and the approaches taken in administering each method have been discussed in detail.

The chapter then provided an overview of the methods used to analyse the data; and the grounded theory approach was discussed in some detail. This was followed by a discussion of the challenges and dilemmas faced during the course of the study and how such issues were approached. The chapter concludes by providing assurances that ethical matters were carefully considered throughout the study.

The next chapter sets this study in context by introducing the MSc in Occupational Safety and Health, which was the focus of this study, and presenting the design and construction of the GOLDPhase VLE, which facilitated the students' e-learning.

Chapter 6

Context: The GOLDPhase Study

This chapter describes the context in which this case study of distance e-learning took place. The focus of the study was the MSc/Postgraduate Diploma in Occupational Safety and Health (MSc OSH) at the University of Salford. The chapter also presents the GOLDPhase (GEMISIS Online Distance Learning Pilot Health and Safety Environment) online pilot course, which was based on the MSc OSH, and forms a major component of this study. This information is necessary to 'set the scene' so that the reader can become acquainted with the context in which this study took place and gain an understanding of how the course was adapted for online delivery.

Section one sets out the programme of the MSc OSH including its aims and objectives, structure, and modes of delivery. This is followed in section two by an explanation of how the cohort for the study was gathered and the selection criteria that were used. The third section presents and describes the learning materials that the students studied and provides a rationale for their selection. Section four details the preparation that was undertaken for the design and construction of the GOLDPhase VLE and section five presents the rationale behind its design. Section six provides an overview of the environment, which comprised Study Areas and Support Areas. These Study Areas and Support Areas are presented in turn in sections seven and eight, together with an explanation of the strategies employed. Section nine explains how Reflective Questions and Self Assessment Questions were combined with technological tools to facilitate formative assessment. The final section sets out the timescale of the pilot study. The chapter as a whole aims to provide the reader with an understanding of how the GOLDPhase VLE was designed and developed to facilitate this study.

A copy of the GOLDPhase VLE is provided on the accompanying CD-ROM (see Appendix 1). The reader may wish to refer to this at various points

throughout this chapter as it provides the opportunity to view the areas discussed in greater detail.

6.1 The MSc/Postgraduate Diploma in Occupational Safety and Health

This section sets out the aims and objectives of the MSc OSH, and presents its structure and modes of study.

Occupational safety and health (OSH) is the study of the effects of work, in its broadest sense, on the well-being of man, both individually and as part of a community. Historically the multi-disciplinary nature of this subject has led to a somewhat reductionist approach in some areas of education, eg. the separate study of safety technology, occupational hygiene and reliability engineering. These topics do indeed stand alone as specialist disciplines with their own professional practitioners and researchers. However, although a student, researcher or practitioner in OSH requires an overview of these specialist topics s/he also needs other skills and a different level of understanding. This extends not only to the medical and technical aspects of the effects of work, but also to how social and technological changes in work may be regulated by society and managed by industry. Postgraduate study, with its emphasis upon investigation and application of concepts is an ideal medium for education in this field (University of Salford, 1998, p. 4).

The MSc OSH offered by the University of Salford began in 1993. The course has undergone slight changes since this study commenced, for example, in some modules examinations have been replaced by written coursework. However, the aims and objectives of the course and the structure of the modules remain the same. The following relates to the MSc OSH at the time of the GOLDPhase pilot course, that is, April 1998 to March 1999.

6.1.1 Aims and objectives of the course

The aims and objectives of the course are set out below:

The aims of the course are to provide an opportunity for postgraduate study in OSH for students from a diversity of subject backgrounds and to help those students achieve the skills and understanding necessary to practise OSH effectively. In particular the course aims to enable students to cope with rapid technological and organisational change through promoting an understanding of relevant concepts. Those students who go

on to write the MSc dissertation will also further develop their existing research skills and participate in meaningful research in the field of OSH.

In particular, the objectives of the course are that, by the end of the students' period of study they should be able to demonstrate;

- an increased depth of knowledge and understanding in the areas of risk assessment, occupational safety and occupational health in a contemporary context;
- an increased understanding of the regulation of OSH by industry itself and by the State;
- the ability to apply concepts arising from the study to actual cases and to effectively communicate that application by written and verbal means, and
- the ability to analyse and evaluate relevant research literature and produce reports and papers which effectively communicate that analysis.

In addition, those students who complete the MSc will be able to demonstrate the ability to carry out independent research and successfully complete a dissertation (University of Salford, 1998, p. 5).

6.1.2 Structure of the course

The MSc OSH has a linear structure and does not include any optional modules. To complete the Postgraduate Diploma there are six taught modules rated at fifteen Credit Accumulation and Transfer (CATs) points each and a thirty credit literature review. Completion of the MSc requires an additional sixty credit dissertation. Therefore, the MSc comprises fifty per cent traditional taught materials and fifty per cent student centred research. Table 6.1 shows an outline of the programme structure.

Table 6.1: Structure of the MSc/P.G. Dip Occupational Safety and Health

Module	Title	Method	Credit Value	Total
1	Setting the Context	Taught	15	
2	Risk: Nature and Assessment	Taught	15	
3	Occupational Health	Taught	15	
4	Occupational Safety	Taught	15	
5	Literature Review	Student Research	30	
6	State Regulation	Taught	15	
7	Self Regulation	Taught	15	120 – step off point for P.G. Dip.
8	MSc Dissertation	Student Research	60	180 – MSc

Descriptions of all eight modules are provided in Appendix 6.

Methods of assessment

At the time of this study assessment included one written piece of course work comprising up to 3,000 words and one seen three-hour examination per module, each module being separately assessed.

6.1.3 Modes of study

Prior to this study the MSc OSH was offered in two modes of study: part-time attendance one day per week and paper-based distance learning.

Part-time attendance

At the time of this investigation the usual mode of study for the MSc OSH was by part-time attendance. The postgraduate diploma by part-time attendance takes sixteen months to complete, with a further minimum of eight months and a maximum of twenty months to gain the MSc. The entry point is September each year. Each module spans fifteen weeks, including examination and revision time. Part-time attending students study two modules per fifteen week period, including examination and revision time (University of Salford, 1998).

Paper-based distance learning

The distance learning version of the course commenced in February 1997 and uses paper-based workbooks sent through the postal system. Distance learning students are required to attend the university in order to sit examinations. Non-mandatory study schools are also provided for distance learners. The postgraduate diploma by distance learning takes thirty-two months to complete, with a further maximum of twenty months to gain the MSc. The course has two entry points per year, February and September. Distance learning students study one module per fifteen week period, which also includes examination and revision time (University of Salford, 1998).

6.2 Gathering the cohort for the study

In order to conduct this investigation I required a cohort of students to study modules from the MSc OSH via the Internet. Considerable thought was given to how the cohort should be obtained. Members of the cohort would need to have both a commitment to study and an understanding of occupational safety and health issues. Ideally they would be occupational safety and health professionals who wished to pursue their subject at postgraduate level and who were not averse to the concept of distance learning, or to using online technologies. Whilst students from either the part-time attending or distance learning paper-based groups would have made ideal subjects, it was considered unethical to approach them as they had already embarked on their courses and may have perceived involvement in the pilot study as disruptive to their learning. Hence, an alternative method for obtaining the cohort was sought.

In the summer of 1997 advertisements for the distance learning route had been placed in the Institute of Occupational Safety and Health's professional journal, the Safety and Health Practitioner, in order to attract students for the February 1998 intake. The advertisements generated over two hundred enquires resulting in twelve student registrations. Those who enquired about the course but had not enrolled provided an ideal group from which to draw the desired cohort for the online study and this was the avenue I pursued.

6.2.1 The selection procedure

A cohort of twelve to fifteen students was required for the study. Standard entry requirements for the course are a good honours degree, or an ordinary degree or Higher National Diploma or Certificate, plus relevant experience. For a number of reasons it was considered important that participants on the pilot study should meet these requirements. Firstly, students who formed the cohort were registered through the university's Postgraduate Office and had full postgraduate status within the university. Secondly, those who successfully completed and passed Modules 1 and 2 were allowed to progress to the full MSc OSH programme if they so wished. Finally, standard entry requirements were considered necessary to ensure the reliability and validity of this study.

In December 1997 I wrote to two hundred and nineteen people who had responded to the advertisement in the *Safety and Health Practitioner*, informing them that the MSc OSH was to be the focus of a research project into distance e-learning. Brief details of the proposed pilot study were included together with an inquiry form so that those who wished to take part could register their interest. Thirty-nine people responded. All thirty-nine were sent application forms, of which twenty-five were returned. Eleven of these were unable to meet the minimum entry requirements and were therefore rejected. The fourteen who met the specified criteria were offered places. One subsequently rejected the offer due to pressure of work in her employment. Thirteen participants thus formed the cohort for the online study. All thirteen were occupational safety and health professionals who possessed the necessary qualifications and wished to study online at a distance. Descriptive data about the students who made up the cohort is provided in the next chapter, which discusses the findings of the first question that guided this study.

6.2.2 Providing an incentive to participate

Studying at Master's level requires a high degree of personal commitment and can be extremely demanding in terms of time and financial resources. The majority of those who pursue the MSc OSH are in full-time employment and have family commitments. Therefore, it seemed unreasonable to expect participants to expend a great deal of time and effort studying modules at

Master's level that would not yield an academic qualification, nor the opportunity to utilise any credits gained. Moreover, this would have placed the students in a simulated rather than a real environment and if the students had felt themselves to be in a 'false' situation this may have impacted the reliability and validity of the study. For these reasons, and to help ensure completion of, and commitment to, the study, it was considered appropriate to offer members of the cohort a suitable incentive to take part.

Following discussions with Professor James Powell, then Director of the Graduate School and Chairman of the Steering Group for GEMISIS, it was agreed that members of the cohort would be able to study Modules 1 and 2 of the MSc OSH free of charge. The agreement was that members of the cohort would be enrolled as postgraduates at the University of Salford and would not be charged registration fees, course fees, or examination fees for the two modules studied on the GOLDPhase pilot course. This pilot course included study materials, tutorial support and assessment. Students who successfully completed the examinations and coursework for Modules 1 and 2 were awarded the full thirty credit points. In order to achieve the full credits, students were required to attend the relevant examinations at the University of Salford in January 1999. Those who attained the full credit points and wished to register for the rest of the course were exempt from studying Modules 1 and 2 and also received the appropriate reduction in the normal full course fees. Students participating in the pilot study were not committed to registering for the full course. In return they were expected to contribute to the research into online learning, which included completing questionnaires and participating in interviews (details of these instruments were provided in Chapter 5).

The next section details the learning materials that were selected from the MSc OSH for inclusion in the GOLDPhase VLE and provides a rationale for the choice that was made.

6.3 Learning materials for the GOLDPhase pilot course

In order to conduct the case study I designed and constructed the GOLDPhase virtual learning environment (VLE). The VLE enabled the cohort to participate in a pilot course by studying two modules from the MSc OSH online. These were: Module 1 – 'Setting the Context', and Module 2 – 'Risk: Nature and Assessment'. These two modules were the natural choice for the pilot course for a number of reasons. Firstly, the MSc OSH runs in a linear fashion with Module 1 laying the foundation for the course. Secondly, at the time of the pilot course 'risk' was a topical issue in health and safety as legislation was increasingly including specific requirements for risk assessment, for example, legislation related to visual display units, manual handling and chemical risk, therefore Module 2 was of particular value to members of the cohort. Thirdly, the two modules are very different in their approach and content. Module 1 is sociological in nature, whilst Module 2 is more technical and includes mathematics. It was therefore considered that the two modules would provide a good contrast. Finally, and most importantly, those students who successfully completed Modules 1 and 2 on the pilot course, and wished to continue by transferring to the paper-based distance learning route, would be afforded equal opportunities with their subsequent peers. Modules 1 and 2, in common with the other four taught modules, are self-contained and therefore provided all members of the cohort with the equivalent of two 'short courses' that in themselves were of value to those working in occupational safety and health, regardless of whether or not they wished to continue with the course. The content of these two modules is laid out below.

6.3.1 Module 1: 'Setting the Context'

Module 1 provides an introduction to some central issues in Occupational Safety and Health. The module description is as follows:

This programme of study is essentially of the effects of "work" in its broadest sense, on the physical and emotional well being of individuals. Views of what constitute acceptable effects vary over time as functions of social and economic conditions. By addressing historical and current

attitudes, policies and social structures, this module sets the context of the rest of the study. It also examines the results of current research into the size of the problem of occupational injury and ill health, as well as theories of accident causation, systems failure and the role of human error (University of Salford, 1998, p. 11).

The module is made up of ten blocks of study. Blocks 1 - 6 inclusive were provided as pre-study materials and Blocks 7, 8, 9 and 10 were included in the GOLDPhase VLE. Table 6.2 shows the topics covered by each block.

Table 6.2: Module 1 Study Blocks

Subject	Block
Pre-study blocks	
Historical context	1
The Development of Regulation	2
Occupational Injury and Ill Health – the Size of the Problem	3
Self Regulation	4
Occupational Safety and Health – an International Comparison	5
An Introduction to Occupational Health	6
Online study blocks	
An Introduction to Human Error and Human Behaviour	7
Accident Causation 1	8
Accident Causation 2	9
Accident Causation 3	10

Pre-study: Blocks 1 to 6

The original intention, prior to the agreement that secured the remission of fees from the postgraduate office, was that the cohort would study only the last four blocks of Module 1 and all of Module 2. This was because the last four blocks of the first module focus on accident causation and thus prepare the ground for the second module on risk. However, successful completion of the module assignments and examinations necessitates studying the entire module.

Therefore, in order that the students could gain maximum advantage from the course it was essential that they should study all ten blocks of Module 1. The first six blocks were therefore provided in a linear format for the students to study prior to the online pilot course. This strategy enabled those with no prior experience of paper-based distance learning to contrast their experiences with those subsequently gained in the VLE. The opportunity that this situation provided in fact yielded some rich data.

Blocks 7 to 10

The four remaining blocks of Module 1 were included in the GOLDPhase VLE along with the eight blocks that constituted Module 2.

6.3.2 Module 2: 'Risk: Nature and Assessment'

Module 2 covers the subject of risk, as set out in the module description below.

This module aims to provide the student with an understanding and appreciation of the nature of risk and its subjective and objective elements. The measurement of human and mechanical systems reliability forms an appreciable part of this module, particularly with regard to probability and the estimation of low-level risks. The design of error tolerant systems of work is also studied (University of Salford, 1998, p. 11).

The module comprises eight blocks of study, as shown in Table 6.3

Table 6.3: Module 2 Study Blocks

Subject	Block
An introduction to risk	1
Risk perception	2
Measurement and money	3
Road safety: A comparative study	4
Risk in society: How far can we see?	5
An introduction to probability (1)	6
An introduction to probability (2)	7
Risk analysis techniques	8

6.3.3 The Piper Alpha Case Study

In order to illuminate the course materials the MSc OSH incorporates an in-depth study of the case of the fire and explosion on the Piper Alpha oil platform on 6th July 1988. The case is referred to at various points throughout the course to illustrate issues raised in the course materials. Attending students are shown a video recording of a Channel 4 programme that discusses the Piper Alpha disaster⁵. The paper-based distance learning students are sent a workbook of the Piper Alpha Case Study and loaned a copy of the video. The Piper Alpha Case Study is introduced in Block 8 of Module 1. Therefore, those sections of the Case Study workbook relevant to Modules 1 and 2 were also adapted for online delivery and included in the VLE. Members of the GOLDPhase cohort were provided with a copy of the video.

The students who comprised the GOLDPhase cohort thus studied the first two modules of the MSc OSH, as these modules offered the maximum scope for further study. The first six blocks of Module 1 were studied in a paper-based format and the remaining four blocks, together with Module 2, were studied in the GOLDPhase VLE.

The next section describes the steps that I took to help inform the design of the GOLDPhase VLE.

6.4 Preparation for designing the GOLDPhase VLE

To facilitate this study I designed and created the GOLDPhase VLE. The learning environment was designed and created in the twelve-week period in which the cohort was undertaking background reading and studying the first six blocks of Module 1. During the same period Blocks 7, 8, 9 and 10 of Module 1 were adapted and added to the VLE. Module 2 was adapted and uploaded on an ongoing basis during the first few weeks of the online phase. In preparation for this task the following procedures were undertaken.

⁵ Permission to show the recording was covered by the University's Educational Recording Agency (ERA) licence.

6.4.1 Gaining technical knowledge

Higher education is increasingly making use of managed learning environments (MLEs), such as Lotus Learning Space, Blackboard, and WebCT. I decided that MLEs would not be used in this study as the research focused on educational issues rather than technological ones. Whilst utilising a MLE would have simplified the preparation phase of the research, and saved considerable time, I was concerned that the use of such a platform may result in the students focussing on the technology rather than upon the content being presented. Moreover, I did not want the research to turn into an evaluation of the learning environment itself. An example of this is the study by Zariski and Styles (2000) of the perceptions of a group of undergraduate law students studying via the Internet. The authors report that the students were unduly preoccupied with the system, which detracted from their learning, with a number of students commenting that they learned a lot about information technology but little about the unit being studied (Zariski and Styles, 2000).

I thus decided that the VLE would be custom built to meet the specific needs of the MSc OSH students. As I had no previous experience of Web building and authoring I undertook two online courses with Manchester Metropolitan University: Advanced Internet Training level 3 and Hypertext Mark-up Language (HTML) level 2. These courses served two purposes; firstly they increased my knowledge of Internet tools and HTML, secondly they provided me with the opportunity to empathise with the perspective of the e-learner.

6.4.2 Student observation

To help determine the pedagogical and andragogical design of the GOLDPhase VLE groups of students studying via paper-based distance learning and part-time attendance were observed.

Paper-based distance learning group

The first cohort of students to study the MSc OSH via paper-based distance learning began their studies in February 1997. In October of the same year the group attended the university to sit their examinations. Following the examinations four of the five students attended an informal session to provide

feedback on Module 2, which they had just completed, and on their experiences of the first six months of the course. As this group of students was the first to study the MSc OSH by distance learning, and had used the workbooks that I was to adapt for online delivery, I was interested in hearing their experiences of using these materials and therefore observed this session. The session highlighted a number of problems that I believed could be partially alleviated in the online learning environment. These are discussed under the following five points:

1. **Statistics** – difficulties were experienced with the concepts of quantitative approaches to risk assessment presented in the last three blocks of Module 2. Three main areas of concern were highlighted, firstly, the students found the statistics difficult to follow and felt that they needed to revise their basic knowledge of mathematics and statistics in order to follow the module. Secondly, they would have liked more examples to work from. Thirdly, as the solutions to the problems were provided at the end of the workbook they were tempted to look at the answers before working through the problems for themselves.
2. **Case study** – the Piper Alpha Case Study was provided as a separate document. At various points in the module workbooks the students were directed to refer to specific sections of the Case Study. They found this confusing and the Case Study difficult to follow. They also considered that the Case Study was introduced at too later a stage within the materials. One or two students suggested that it would have been beneficial to have it at the beginning of their studies, as this would have enabled them to identify relevant issues in advance and thus relate these to the appropriate parts of the learning materials.
3. **Clearer signalling** – the students reported that they would have liked the learning materials to include clearer signalling of the resources they were likely to require within each block. For example, two students worked away from home and took the workbooks with them. Hence, they found it frustrating if unexpectedly directed to additional reading or a previous workbook that they had not taken with them.

4. **Additional resources** – there was considered to be insufficient information within the workbooks to enable students to draw their own conclusions about qualitative and quantitative methods of risk assessment. However, they found it difficult to locate additional resources to support their studies and would have appreciated further guidance about what to look for and where to find it.
5. **Making connections** – difficulty was experienced in pulling the blocks together and gaining an overview of the modules. Students would have liked the links between the blocks to be more clearly stated. It was also pointed out that the time scale between studying Modules 1 and 2 (six months from beginning to end) made it difficult to relate the modules to one other, again they would have liked to have seen more connections made between the two.

The ways in which these five issues were addressed in the GOLDPhase VLE are discussed later in this chapter.

Part-time attending group

The second method of observation that helped inform the design of the GOLDPhase VLE was my attendance of the MSc OSH classes where I took the role of participant observer.

Participant observation of the attending group differed significantly from observation of the distance learning feedback session discussed above, where the specific purpose was to evaluate the learning materials. Participant observation within the attending classes facilitated the emergence of a far wider range of issues. Whilst the distance learning feedback session identified issues that could be improved upon, in contrast, the part-time attended sessions rather drew attention to some of the strengths of classroom teaching in this particular course, which caused me to ponder how such strategies could be incorporated within the VLE.

Observation revealed that each taught session mirrored one or two blocks from the relevant module in the distance learning workbooks. Having recognised this my time in the classroom was spent observing and noting the following points:

- the topics covered
- the teaching strategies used to convey each topic
- the students' learning strategies, for example, note taking, listening, questioning
- the level of dialogue and interaction that took place.

The teaching strategies employed were entered into a pro-forma and later compared to those used for the same block(s) in the distance learning workbooks. This method provided an overview of the teaching strategies typically used in each mode of delivery. The purpose, rather than comparing like with like, was to identify how the strengths of each mode of delivery could be incorporated within the VLE. A total of fifteen sessions, taught by five different tutors were observed.

The following lists those strategies that appeared to enhance classroom learning:

1. The tutors' references to past lectures helped to set the current lecture in context. Similarly, references to forthcoming sessions, for example: "Peter will tell you more about this in a couple of weeks" appeared to whet the students' appetites for future sessions.
2. Tutors gained the students' ideas through dialogue before revealing their own thoughts, allowing them to identify any misunderstandings and encouraging wider discussion.
3. Significant issues in texts were highlighted and discussed. For example, on one occasion the tutor read out parts of Thomas Babington Macaulay's speech to the House of Commons on 22nd May 1846. This allowed her to highlight the most important elements and provide further explanation.

4. Dialogue played a significant role in these classes. It was interesting to note that the transition from formal delivery to informal discussion was signalled by visual cues. For example, one tutor always stood at the front of the class whilst delivering the materials but sat on a table to the left when initiating discussion. This more relaxed approach prompted participation from the group, whilst her return to the centre of the room indicated closure on the discussion and a return to the formal lecture. Whether or not this was a conscious act on the part of the tutor was unclear.

Some of the strategies described above are difficult to replicate in the paper-based distance learning situation. For example, finding out what students think before presenting materials and engaging them in dialogue. However, several can be adapted and used to enhance distance learning in the VLE, as discussed later in this chapter.

Whilst classroom observation of the part-time traditional classes identified a number of advantages to face-to-face teaching, it also highlighted the following drawbacks:

1. A large proportion of the students appeared to be unduly engaged in taking verbatim lecture notes. It was noticeable that those who took this approach were less likely to engage in classroom discussion, whilst those who sat and listened were better able to discuss the issues. The lack of involvement in discussion by the note takers can probably be attributed to their focus on the note taking process, which allowed them less thinking time and hence less time in which to assimilate the information being conveyed.
2. During two sessions the noise from the adjacent classroom was unacceptably high due to a video or film being presented. The level of noise distracted the MSc students' attention away from the lecture.
3. In one session the tutor apologised for her lack of preparation, which was due to her being asked to cover the class at short notice because of the absence of a colleague.

4. In one group, classroom discussion was regularly dominated by one student, to the obvious irritation of the rest of the class.
5. On a number of occasions the students pretended to understand concepts that they had clearly not grasped. An example of this was those sessions that included statistics. I observed the scenario where the tutor wrote a formula on the blackboard, explained the concept and then asked if everyone understood. The class enthusiastically nodded in agreement, but when the tutor turned to the blackboard some members of the group showed a puzzled expression and shrugged their shoulders at each other.

Whilst the difficulties described above are frequent classroom occurrences, it was hoped that some could be alleviated in the distance online environment. For example, students do not have to take lecture notes, as these are already available; distance learners often have a greater degree of control over the level of noise in their own environment than in the classroom; distance learning lecture notes have to be prepared well in advance, thus one group of students is unlikely to be disadvantaged due to the disparity of lectures, and students who dominate online discussions can be more easily disregarded than in the classroom.

The ways in which the findings from observation of these groups informed the design of the GOLDPhase VLE are presented later in this chapter.

6.5 Rationale for the design of the GOLDPhase VLE

This section describes the principles that guided the design of the GOLDPhase VLE. The first part explains how the questions that guided this study, formulated from the review of the literature, influenced the design of the VLE. The second part describes those factors that influenced the teaching and learning strategies employed within the VLE.

6.5.1 The questions that guided this study

The students' participation in the online phase of the pilot course, which was facilitated by the GOLDPhase VLE, generated data that helped answer the four

questions that guided this study, as set out in the conclusion of Chapter 3. The methods used to generate such data have been described in detail in Chapter 5. This sub-section focuses on Question 2 and explains how the elements of learning identified in that question helped determine the design and layout of the GOLDPhase VLE.

Chapter 3 revealed that little is known about how students utilise and interact with VLEs and the differing elements within them. Identifying this gap in the literature helped formulate the second question that guided this study, that is:

What are the students' experiences of the following elements of distance e-learning:

- The virtual learning environment
- Learning materials
- Information
- Resources
- Communication
- Assessment

In order to generate data that would help answer this question these elements of distance e-learning were used as the foundation for the design of the GOLDPhase VLE. The first of these six, the VLE, was accommodated by both the medium of the Internet in general, and the GOLDPhase VLE in particular. To accommodate the next four elements the GOLDPhase VLE was divided into Study and Support Areas. The Study Areas comprised the learning materials and the Support Areas comprised Information, Resources and Communication. Data related to the sixth element of Question 2, that is, assessment, was drawn from formative and summative assessment undertaken by the students, with a large proportion of the formative assessment being contained within the learning materials in the form of RQs and SAQs. The Study and Support Areas and their contents are described in detail later in this chapter. Firstly, to help the reader conceptualise the VLE, the hierarchical structure is presented as a flow chart in Figure 6.1 below.

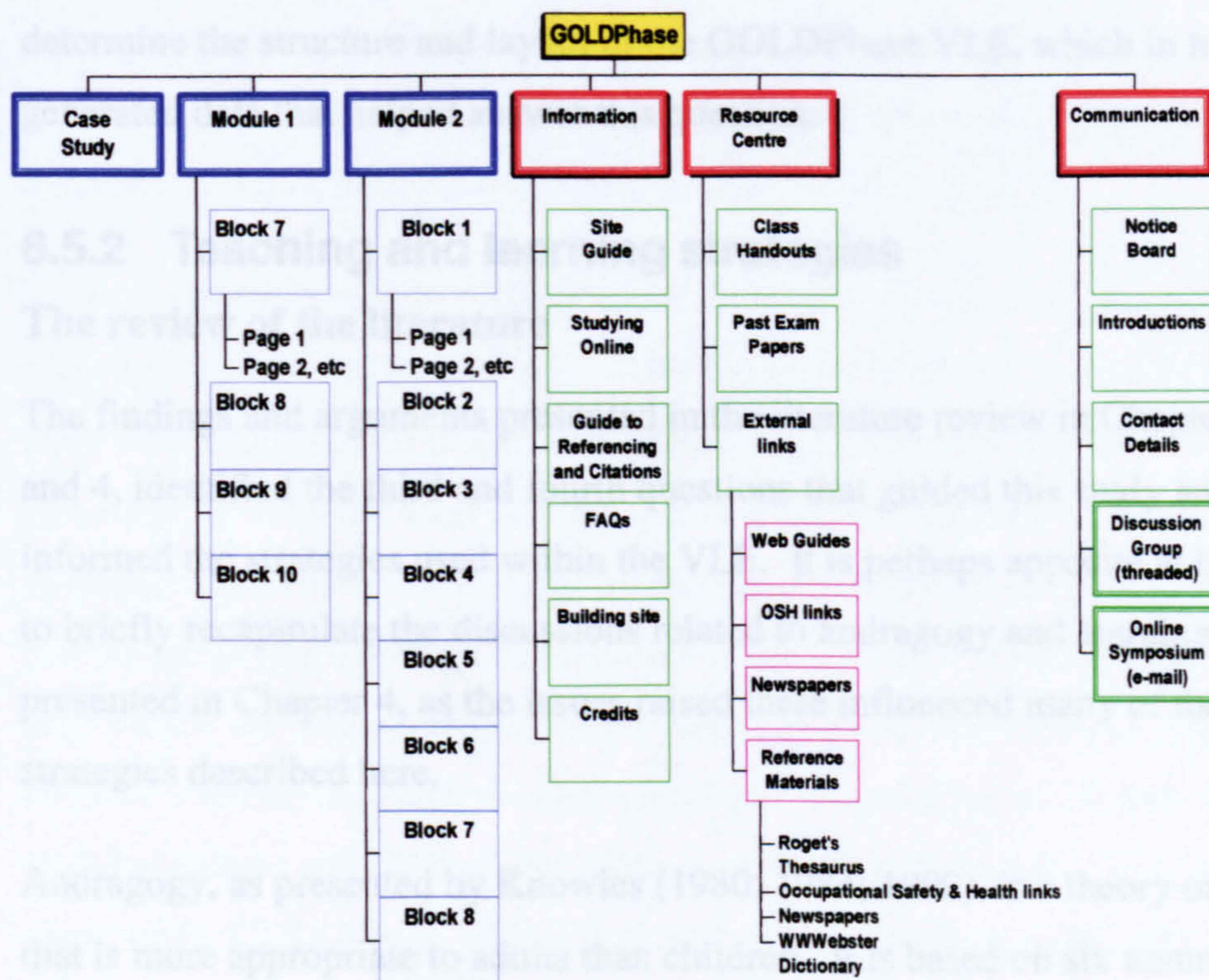
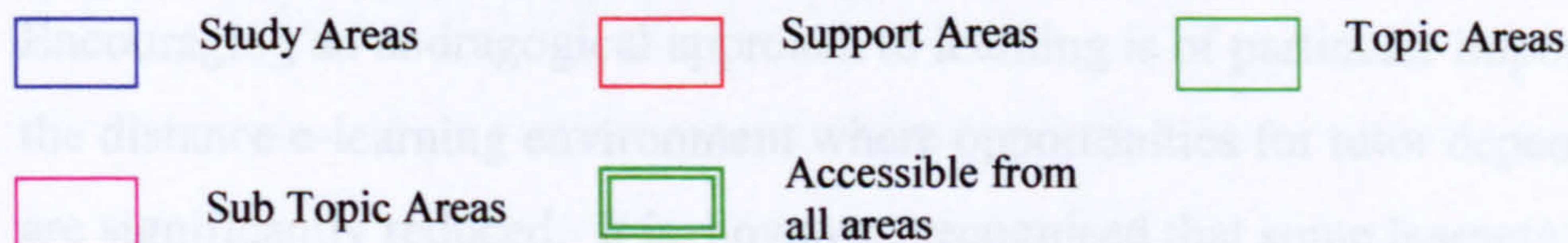
Figure 6.1: Hierarchical structure of the GOLDPhase VLE**Key**

Figure 6.1 illustrates the layout of the GOLDPhase VLE in a linear format. The site was designed to provide a logical and intuitive structure that could be easily navigated. The environment was built on a hierarchical basis with the Homepage providing access to the broad categories, that is the Study and Support Areas, which in turn contained links to the next level down. The Topic Areas contained links to sub topics, and in some instances external sites. The Study Areas, shown in blue on the figure, comprised the learning materials element. The Support Areas, shown in red, comprised the Information, Resources, and Communications elements.

Thus, the elements identified in the second question that guided this study helped determine the structure and layout of the GOLDPhase VLE, which in turn generated data that helped answer this question.

6.5.2 Teaching and learning strategies

The review of the literature

The findings and arguments presented in the literature review in Chapters 2, 3 and 4, identified the third and fourth questions that guided this study and further informed the strategies used within the VLE. It is perhaps apposite at this point to briefly recapitulate the discussions related to andragogy and learning styles presented in Chapter 4, as the issues raised there influenced many of the strategies described here.

Andragogy, as presented by Knowles (1980; 1984; 1990), is a theory of learning that is more appropriate to adults than children. It is based on six assumptions of how learning in adulthood differs to learning in childhood (as presented in Table 4.1). All six assumptions were considered in the design of the VLE.

Encouraging an andragogical approach to learning is of particular importance in the distance e-learning environment where opportunities for tutor dependency are significantly reduced. It is, however, recognised that some learners are unable to exercise self-autonomy and consequently have difficulty in responding to an andragogical approach, therefore, both pedagogical and andragogical strategies were applied as appropriate.

Chapter 4 also explored the concept of learning styles focussing on Kolb's (1985) Learning Styles Inventory (LSI). This provided insights into how learning styles theory can be used to improve learning. Whilst learners tend to show a preference for one of the four learning styles on Kolb's LSI, learning is most effective when all phases of the learning cycle are used. Therefore, the GOLDPhase VLE incorporated activities that addressed all four phases. This approach aimed to (i) accommodate students with differing learning styles, and (ii) provide opportunities for them to develop their strengths in other areas by engaging in tasks that they would normally avoid, thus improving their skills in those areas and increasing their potential for becoming balanced learners. The

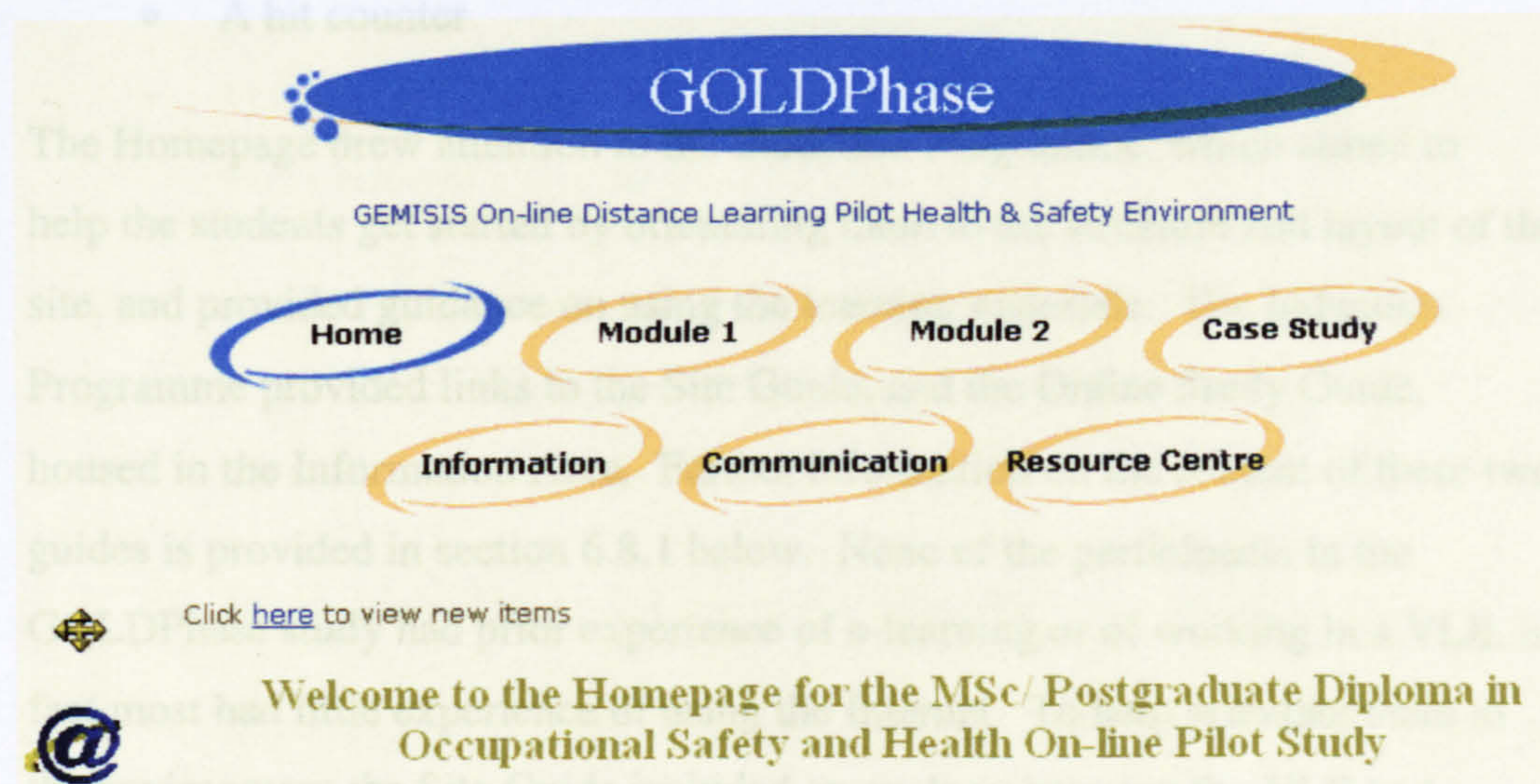
four learning styles are diverger, assimilator, converger and accommodator. Activities that accommodate the strengths characteristic of each style, as identified by Jonassen and Grabowski (1993), and shown in Table 4.3, are highlighted throughout the remainder of this chapter.

Thus, the purpose of the GOLDPhase VLE was to provide the learning materials and support structure to enable the cohort to study Modules 1 and 2 of the MSc OSH via e-learning and to generate data to help answer the questions that guided this study. Whilst the VLE generated data that helped answer all four questions, its design focussed on the second, by incorporating the six elements of learning that comprise that question, as identified in the literature review. The strategies used within the VLE were informed through observation of the paper-based distance learning feedback session, participant observation of the part-time attended classes and the findings of the review of the literature. The next section presents the GOLDPhase VLE and describes the general approach that was taken in its design.

6.6 The GOLDPhase VLE

The challenge was to provide an attractive and professional interface that would be user friendly and encourage student participation. To help achieve this I constructed the VLE using FrontPage '98, a Web-authoring program. A FrontPage theme, similar to a template, was selected as this simplified the design process and provided a consistent appearance. This section describes the overall layout of the GOLDPhase VLE by taking the view from the Homepage. The section then sets out the general design issues that were taken into consideration in its construction.

The layout of the GOLDPhase environment was hierarchical and comprised the six elements previously referred to. Three were Study Areas, comprising the learning materials, and three were Support Areas, designed to enhance learning. A Discussion Group (DG) and Online Symposium (OLS), accessible from any point within the VLE, facilitated Computer Mediated Communication (CMC). Figure 6.2 shows the upper part of the GOLDPhase Homepage, which was the top level of the site.

Figure 6.2: Homepage of the GOLDPhase VLE

The top row of the menu bar shows the three Study Areas and the bottom row the three Support Areas. The two icons to the left of the screen provided direct access to the DG and the OLS.

6.6.1 The Homepage

The Homepage of any Web site is important as it represents the provider's online presence and is usually the most frequently visited page within a site (Nielsen and Tahir, 2001). The Homepage of the GOLDPhase VLE was considered to be of prime importance as it provided the students' initial link with online learning, and as such needed to make them feel welcome and to provide guidelines on how to use and navigate the site, as such the following features were included:

- Links to each of the six main areas
- Links to the Discussion Group and Online Symposium
- A welcome notice
- Directions for following the Induction Programme
- A link to the Module One Study Area 'virtual classroom'
- A list of 'new' additions to the VLE with links to the appropriate items

- An email link to the GOLDPhase Co-ordinator (this author)
- A hit counter

The Homepage drew attention to the Induction Programme, which aimed to help the students get started by orientating them to the structure and layout of the site, and provided guidance on using the learning materials. The Induction Programme provided links to the Site Guide, and the Online Study Guide, housed in the Information Area. Further information on the content of these two guides is provided in section 6.8.1 below. None of the participants in the GOLDPhase study had prior experience of e-learning or of working in a VLE, in fact most had little experience of using the Internet. To help orientate them to the environment the Site Guide included an analogy between the VLE and a physical learning environment. This can be viewed from the CD-ROM by following the link from the Homepage to the Site Guide. Having completing the Induction Programme the students were advised to enter the Module 1 Study Area 'virtual classroom' to commence their studies.

The Homepage also included a 'new' section alerting students to changes to the Web site, for example, additions to the Notice Board or new external links. The list was hyperlinked, thus enabling them to move directly to the item concerned. The purpose of the 'new' list was to enable the students to locate up to date information without having to re-visit each area.

The Homepage was thus designed to provide a welcoming environment that facilitated easy access to all areas within the site. Moreover, it aimed to reassure the students from their first visit by providing clear guidelines on how to proceed, and thus reduce initial feelings of disorientation.

6.6.2 Design considerations

It was considered important that the VLE should adhere to good practice in Web design, as a poorly designed interface may have a negative impact on student learning. Thus, drawing on knowledge gained from undertaking two online courses, the first related to Internet tools, the second to writing HTML code, and following the advice of a number of Web design and development style guides

(Archives and Internet Group, 1998; Lynch and Horton, 1998), I took the following design factors and recommendations into account.

- The selected house style was adhered to throughout, thus signalling when users had left the GOLDPhase VLE.
- Care was taken to ensure that no 'dead end' pages were included in the site by providing links to the Homepage, the next level up, and previous and next pages.
- Tables of contents were provided to facilitate easy navigation.
- The name of this Web author and a direct 'mail to' link were supplied on each page, thus providing constant opportunities for contact and feedback.
- Web pages were updated on a regular basis with the date of the most recent revision being included in the footer.
- External sites were checked regularly to avoid expired links being pursued.
- Long pages of text were broken into manageable chunks to avoid delays in loading time.

Thus, to help ensure that the learners would feel comfortable and confident within the VLE the site was designed to be consistent and predictable, both in appearance and hierarchical organisation.

6.7 The Study Areas

This section describes the Study Areas that provided the learning materials for the pilot course and explains the rationale behind their design. The Study Areas are displayed in blue on Figure 6.1 above. They can be viewed from the CD-ROM by selecting 'Module 1', 'Module 2', or 'Case Study' from the top menu bar on the GOLDPhase Homepage.

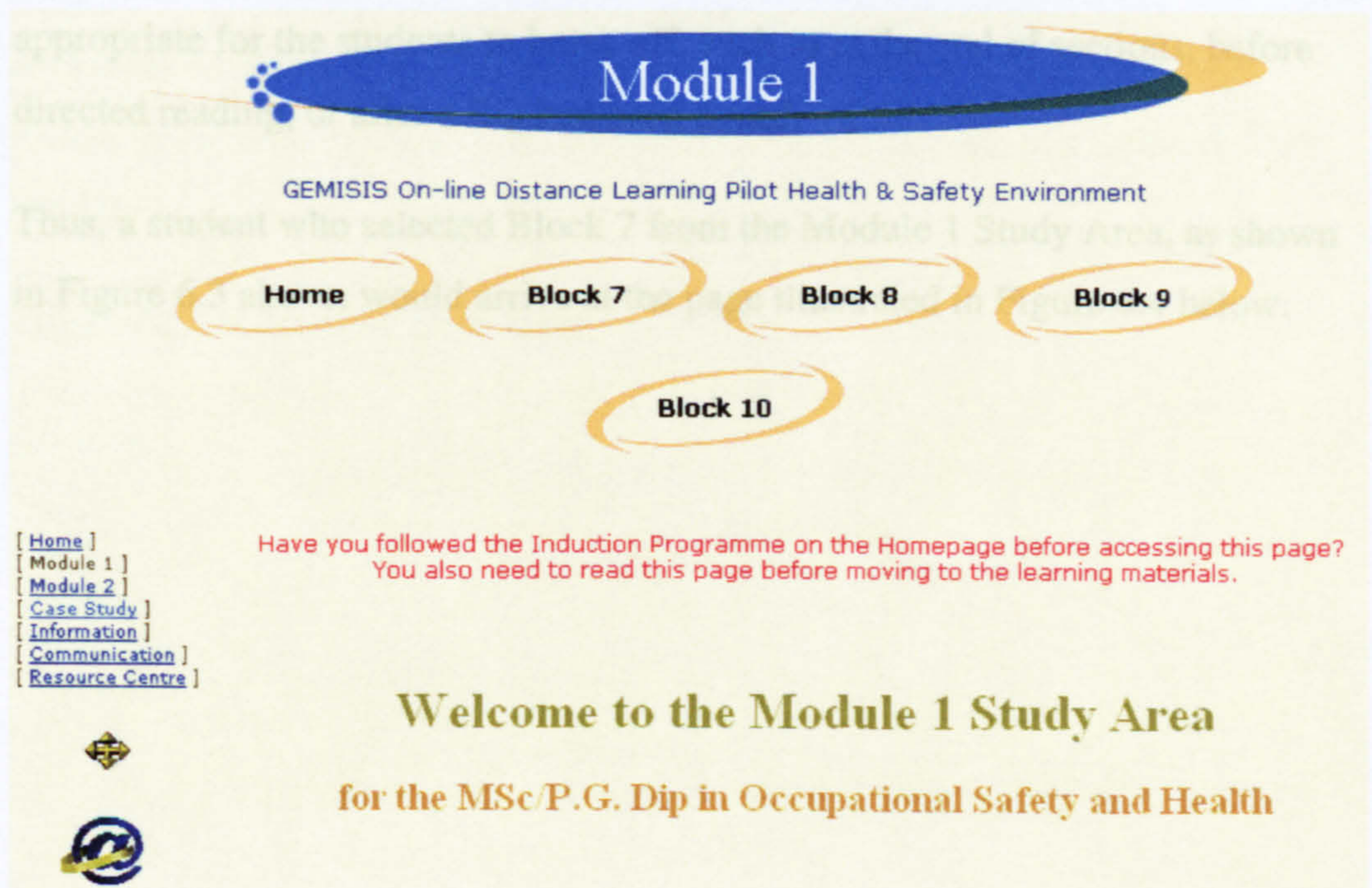
The learning materials comprised the last four blocks of Module 1, all eight blocks of Module 2 and the Piper Alpha Case Study. These materials were set out in the workbooks used by the paper-based distance learning students.

However, I did not wish to merely convert the workbooks to HTML and upload them to the World Wide Web (WWW). The intension was rather to explore how technology could be used to enhance these materials. Firstly, by incorporating some of the pedagogical and andragogical techniques previously excluded from paper-based distance education, and secondly by incorporating methods of best practice used in both distance and traditional education.

6.7.1 Module 1 and 2 study blocks

My first consideration in preparing the materials for online delivery was how they should be structured. The modules were already broken down into separate blocks and this provided a good starting point. I therefore decided that each module would be represented by a Study Area where the individual blocks could be separately accessed, as shown in Figure 6.3.

Figure 6.3: Study area level



The Study Areas included links to the individual study blocks that comprised each module, and module specific information, for example the Module 1 Study

Area provided an update on the first six blocks that the students had studied offline and an introduction to the four remaining blocks to be studied online.

To avoid student fatigue, and hence loss of interest in the materials, the blocks were broken down into smaller sections. Each block was roughly the equivalent of one or two three-hour classroom sessions. However, classroom study is largely orally based and as such not as visually demanding as reading distance learning materials, whether online or offline. Guidelines on the use of visual display units (Health and Safety Executive, 1992) recommend that users should take frequent rest breaks from computer screens. Whilst each study block could be read in considerably less than three hours, that is excluding additional activities, such as responding to RQs or accessing the Case Study, I considered that the length of time required for each block exceeded that normally spent reading from the computer screen without taking a break. Hence, I decided that the blocks should be broken down into smaller sections. A further advantage of splitting the blocks was that it reduced download time, thus reducing student frustration. Each block was therefore broken down into a number of pages according to its original length. Page breaks were placed at points where it was appropriate for the students to break off, such as at the end of sections, before directed reading, or after a RQ had been posed.

Thus, a student who selected Block 7 from the Module 1 Study Area, as shown in Figure 6.3 above, would arrive at the page illustrated in Figure 6.4 below:

Figure 6.4: Study block level

Block 7

GEMISIS On-line Distance Learning Pilot Health & Safety Environment

Home Up Block 7 Pg1 Block 7 Pg2
Block 7 Pg3 Block 7 Pg4 Block 7 Pg5 Block 7 Pg6

[Home]
[Up]
[Block 7]
[Block 8]
[Block 9]
[Block 10]

An Introduction to Accident Causation Theory

Piper Alpha Case Study

Contents

[1. Introduction](#)

[1.1 Aims and objectives](#)

Tables of contents were added to each block thus allowing students to select sections within the blocks, or individual pages from the top menu bar. A student who selected 'Block 7 Pg1' from the top menu bar would arrive at the page shown in Figure 6.5 below, which illustrates the top of page one in Block 7 of Module 1.

Figure 6.5: Individual page level

Block 7

GEMISIS On-line Distance Learning Pilot Health & Safety Environment

[Home] [Up]
[Block 7 Pg1]
[Block 7 Pg2]
[Block 7 Pg3]
[Block 7 Pg4]
[Block 7 Pg5]
[Block 7 Pg6]

An Introduction to Human Error and Human Behaviour

1.1 Aims and objectives

The overall aim of this block of study is to introduce you to an appreciation of some of the current definitions and classifications of human error and human behaviour. The definitions

The pages within the blocks ran in a linear format with contiguous forward and backwards links provided at the bottom of each page. The top menu bar was excluded from individual pages within the blocks as it was considered

superfluous. A side menu bar provided links up to the Homepage and the Study block page, and sideways between the block pages themselves, as shown in Figure 6.5 above. With the exception of some SAQs, which provided links to answer pages, this page level, as shown above, was the lowest tier within the learning materials.

Thus, the hierarchical structure of the learning materials comprised four levels: the Homepage, Study Areas, Study Blocks, and individual block pages, as illustrated in Figures 6.2, 6.3, 6.4, and 6.5 above. The Module 2 materials followed the same structure.

6.7.2 Piper Alpha Case Study

The Piper Alpha Case Study was used to illustrate some of the concepts introduced in the course. As discussed above the first cohort of students to study via paper-based distance learning reported that they found the Case Study confusing and difficult to follow. They also stated that they would have liked access to the Case Study at an earlier stage in the course. In the GOLDPhase VLE two approaches were taken to presenting this Case Study. The first was to make it available in its entirety, as in the distance learning workbooks. The second was to provide hyperlinks at relevant points in both the module study blocks and the Case Study, enabling the students to link back and forth as required. Thus the students could choose whether to read the Case Study in its entirety or to access the relevant points as directed in the study blocks. The objective of providing these two approaches was to accommodate students with differing learning preferences and thus alleviate the problems identified by the paper-based distance learning students.

The Case Study could be accessed from the top menu bar on the Homepage and from the left-hand menu bar in the Study and Support Areas. A jigsaw icon in the Activity Boxes alerted the students to the Case Study from the learning materials, as shown in Figure 6.6.

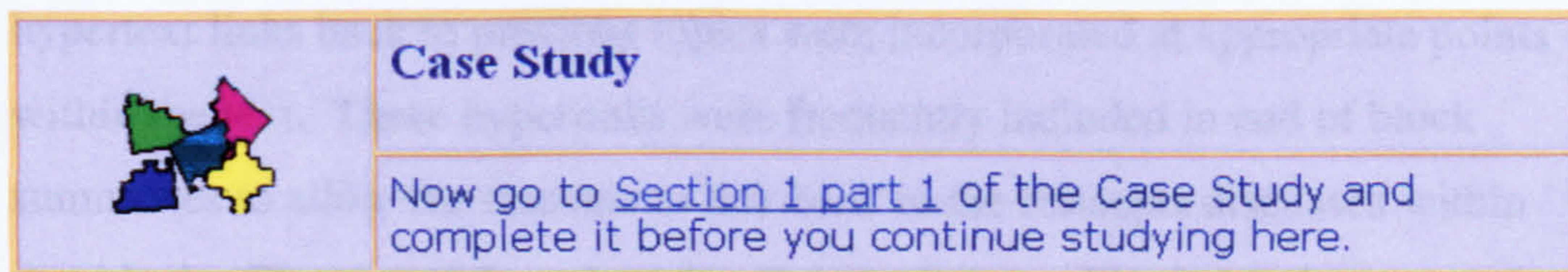
Figure 6.6: Linking from the text to the Case Study

Figure 6.6 can be viewed from Module 1/Block 8/Pg6 on the CD-ROM.

Teaching strategies used within the learning materials

The text of the pages was relieved through the inclusion of icons, heading styles, graphics, and Activity Boxes. Activities included RQs and SAQs, directed reading, viewing the offline video, listening to an offline audio-tape and linking to the Case Study. Each type of activity was clearly indicated by its own icon. Whilst some of the icons originally used in the paper-based workbooks were included, new ones were added and others were replaced with animated graphics, which quickly alerted the students to forthcoming activities. An example of this is the animated graphic used for the 'Read this' activity, which featured a turning page. The 'Read this' activity box is illustrated in Figure 6.7.

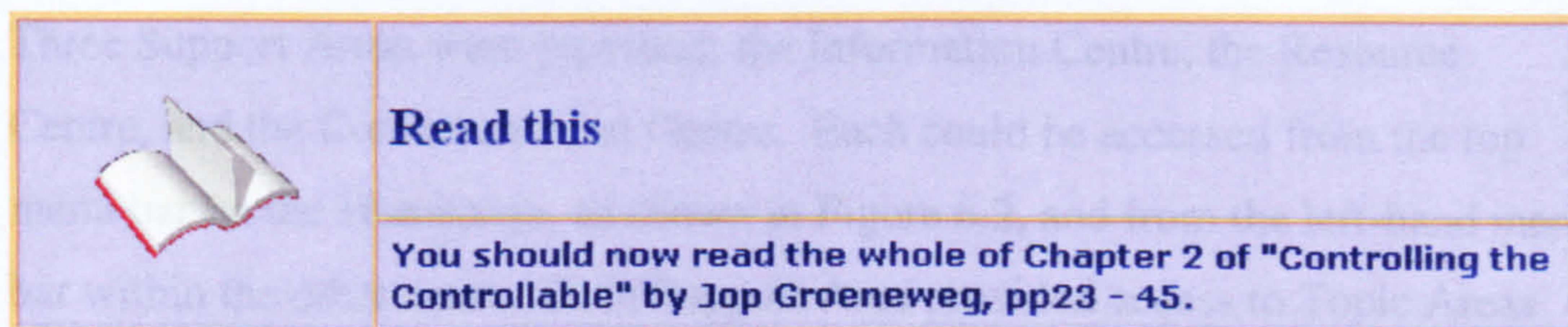
Figure 6.7: Activity box

Figure 6.7 can be viewed from Module 1/Block 7/Pg3 on the CD-ROM.

The purpose of these distinctive boxes and their icons was to provide clearer signalling of forthcoming activities, a feature that the paper-based distance learning students highlighted as lacking in the paper-based materials. Activity boxes were also used to direct students to the DG, therefore, signalling the transition from formal study to informal discussion, a strategy frequently employed in the traditional classroom by the use of visual cues.

The paper-based distance learning students had also identified a need for the connections between topics to be more clearly highlighted within the paper-

based workbooks. To help alleviate this problem in the online environment hypertext links back to previous topics were incorporated at appropriate points within the text. These hyperlinks were frequently included in end of block summaries to allow the students to link back to the concepts discussed within that block. The aim of these 'revision links' was to enable the students to make firmer connections between the concepts presented in the study blocks that comprised the two modules. This method also utilised one of the strategies previously identified as enhancing learning in the traditional classroom, that is, where the tutor referred to past lectures to help set the current one in context. This approach aimed to help students develop those strengths characterised by divergers and accommodators, who typically have the ability to gather and assimilate disparate information and to see many perspectives (Jonassen and Grabowski, 1993).

6.8 The Support Areas

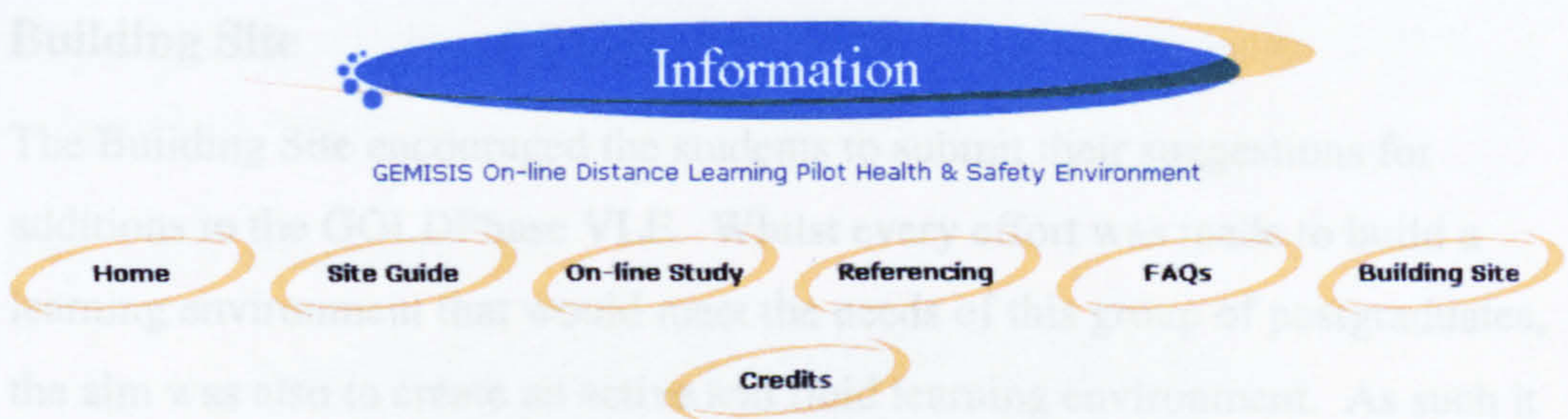
This section describes the Support Areas that provided additional resources to support student learning and explains the rationale behind their design. These areas are displayed in red on Figure 6.1 above.

Three Support Areas were provided: the Information Centre, the Resource Centre, and the Communication Centre. Each could be accessed from the top menu bar on the Homepage, as shown in Figure 6.2, and from the left-hand menu bar within the other areas. Each Support Area provided access to Topic Areas that supported out of classroom learning. These Topic Areas are displayed in green on Figure 6.1. The Support Areas and their contents are discussed below.

6.8.1 Information Centre

The Information Centre provided access to course related information, as shown in Figure 6.8.

Figure 6.8: Information Centre



Site Guide

The Site Guide was provided to help orientate the students to the VLE and thus aid their navigation of the site. The guide introduced the Study and Support Areas and provided an overview of their contents. The differing ways in which the site could be navigated were explained and tips for using the browser were provided. The DG was introduced together with guidance for its use. A simple flowchart showing the top two levels of the site structure was also included.

Online Study Guide

The Online Study Guide was provided to help the students gain the maximum benefit from the study and support resources and included course related information, guidance on using the online materials, and a study schedule.

The Site Guide and Online Study Guide formed the basis of the Induction Programme.

Frequently Asked Questions

The Frequently Asked Questions (FAQs) Topic Area provided answers to student questions about studying in the GOLDPhase VLE. According to Jones and Webb (2000) students tend to ask similar questions, if these questions and their answers can be captured they can be used as a reference for others.

Students in the face-to-face environment frequently hesitate to ask questions in case they appear inadequate in front of their peers. Frequently Asked Question lists provide an opportunity for them to seek answers without being observed by their peers, or making direct contact with the tutor. An online form was provided for the students to submit their queries, which were later posted on the FAQ page together with the answers.

Building Site

The Building Site encouraged the students to submit their suggestions for additions to the GOLDPhase VLE. Whilst every effort was made to build a learning environment that would meet the needs of this group of postgraduates, the aim was also to create an active and fluid learning environment. As such it was recognised that the VLE was likely to be lacking in certain aspects and that the students themselves were best placed to recognise any such omissions and suggest useful additions. An online form was provided for the students to submit their suggestions.

Credits

The Credits area acknowledged the authors of the learning materials and Web resources used in the VLE.

Referencing

The Referencing area provided guidance on using the Harvard method of citing and referencing authors' work. This topic was added to the Information Centre when the students' lack of confidence in relation to referencing became evident, thus making the area reactive to the needs of the students.

Overall, the Information Centre took a pedagogical approach in that the information it contained was largely tutor provided, thus placing the students in a passive role.

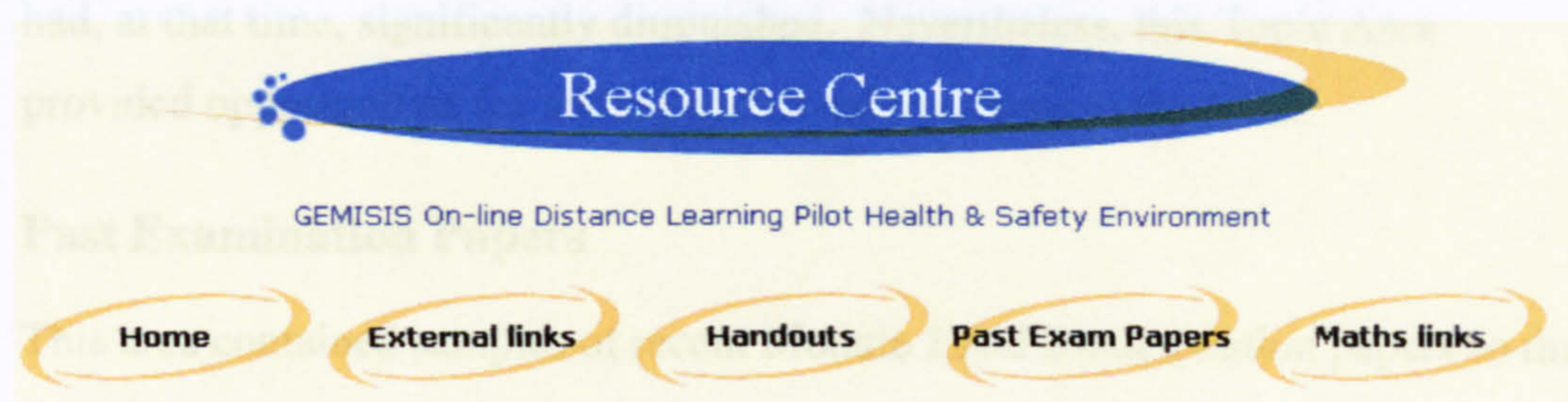
6.8.2 Resource Centre

The Resource Centre encouraged students to actively seek information to support their learning by providing categorised links to relevant external Web sites; thus

responding to feedback from the paper-based distance learners, who reported difficulty in locating suitable resources, and identified a need for guidance on where to look. The aim was to provide initial guidance whilst encouraging self-directedness.

The distinction between the Information and Resource Centres is that the former provided general course related information, of a given nature, whereas the latter encouraged the students to actively seek information. The Resource Centre included four Topic Areas as shown in Figure 6.9.

Figure 6.9: Resource Centre



In retrospect the Class Handouts and Past Exam Papers topics would have been better placed in the Information Centre as these were 'given' rather than 'sought', however it is often only upon reflection that such errors of judgement are identified.

External links

The External links Topic Area provided five sub topic areas: Web guides, Occupational Health and Safety (OSH), Newspapers, Reference materials and Course related links. A search engine enabling searches to be performed directly from the GOLDPhase VLE was also included. The Web guides enabled those students who lacked Internet experience to familiarise themselves with Internet technologies by completing tutorials. The OSH sub topic area provided direct links to subject related sites including: the Health and Safety Executive, Trading Standards, The European Commission and others. The Newspapers sub topic area included links to the Financial Times, The Guardian, The Times, and The Daily Telegraph. The Reference materials sub topic area included links to the Oxford English Dictionary, Roget's Thesaurus, WWWebster Dictionary,

Encyclopaedia Britannica, and the British Library. The students were invited to submit additional links for inclusion in these areas.

Class Handouts

The Class Handouts area was provided so that additional materials made available to the part-time attending students could be made available to the e-learners. However, many of the handouts given to the attending students had already been incorporated into the distance learning materials. Furthermore, the attending students were increasingly being referred to the Internet to seek additional resources. Therefore, the number of paper 'handouts' given in class had, at that time, significantly diminished. Nevertheless, this Topic Area provided opportunities for adding additional resources to the VLE.

Past Examination Papers

This area contained samples of recent Module 1 and 2 examination papers so that the e-learners could familiarise themselves with the examination layout and format.

Maths links

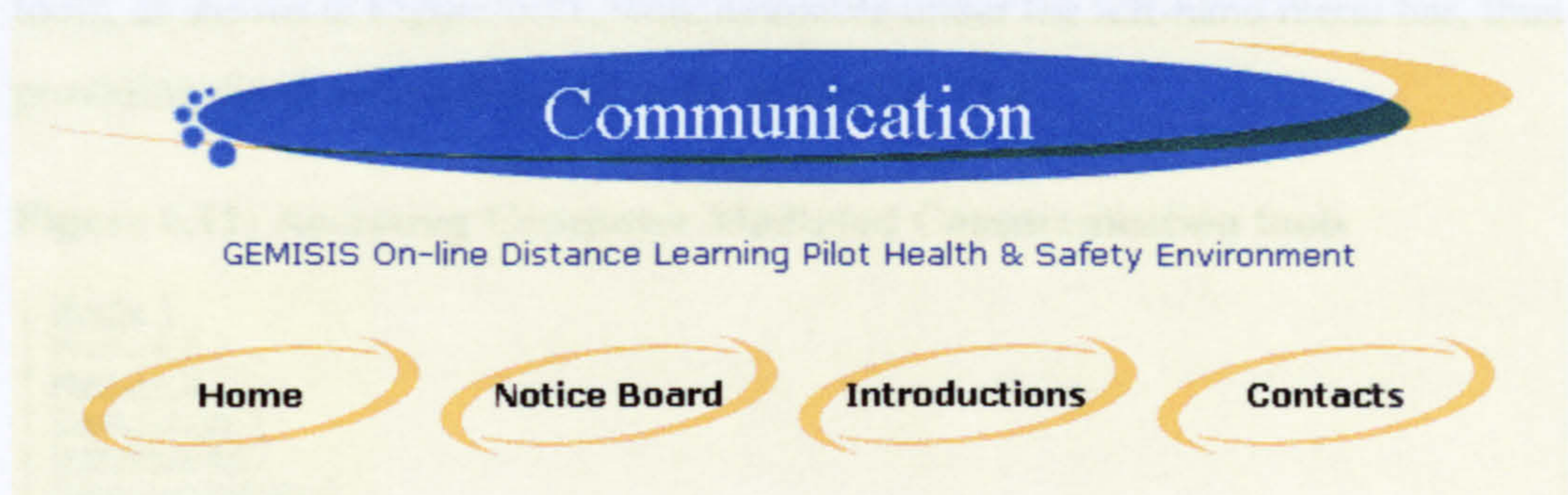
This area provided links to online tutorials on equations and probability at various universities. The purpose of these links was to provide underpinning knowledge for those who experienced difficulty with the mathematical concepts presented in Module 2. Links to statistics glossaries that included worked examples were also included. The maths links provided the opportunity for students to revise their basic knowledge of mathematics and statistics, in order to follow the concepts presented in Module 2.

The approach taken in the design of the Research Centre was largely andragogical as it provided the means for students to seek information that would enable them to construct their own knowledge, thus encouraging self-autonomy. This approach also aimed to help the students develop the learning strengths characterised by divergers and assimilators, who have the ability to gather and assimilate observations, information, and ideas (Jonassen and Grabowski, 1993).

6.8.3 Communication Centre

The Communication Centre provided opportunities for CMC and for the students to develop relationships with their online tutor and peers. As discussed in Chapter 1, Holmberg (1995), in his theory of guided didactic conversation, argues that the stronger the students' feelings of personal involvement with the supporting organisation, the stronger their motivation and the more effective the learning. The Communication Centre provided the Topic Areas shown in Figure 6.10.

Figure 6.10: Communication Centre



Notice Board

The purpose of the Notice Board was to keep the students up to date with the latest information, encourage a sense of course community, and provide a 'hook' to encourage regular visits to the site. A variety of items were included, such as, a welcome letter, examination dates, assignments, and the course reading list.

Introductions

The Introductions Topic Area provided the opportunity for members of the cohort to get to know about each other. The students were invited to write a brief message introducing themselves to their peers and to include a photograph if desired. The course tutor and I posted our own introductions to help 'break the ice'.

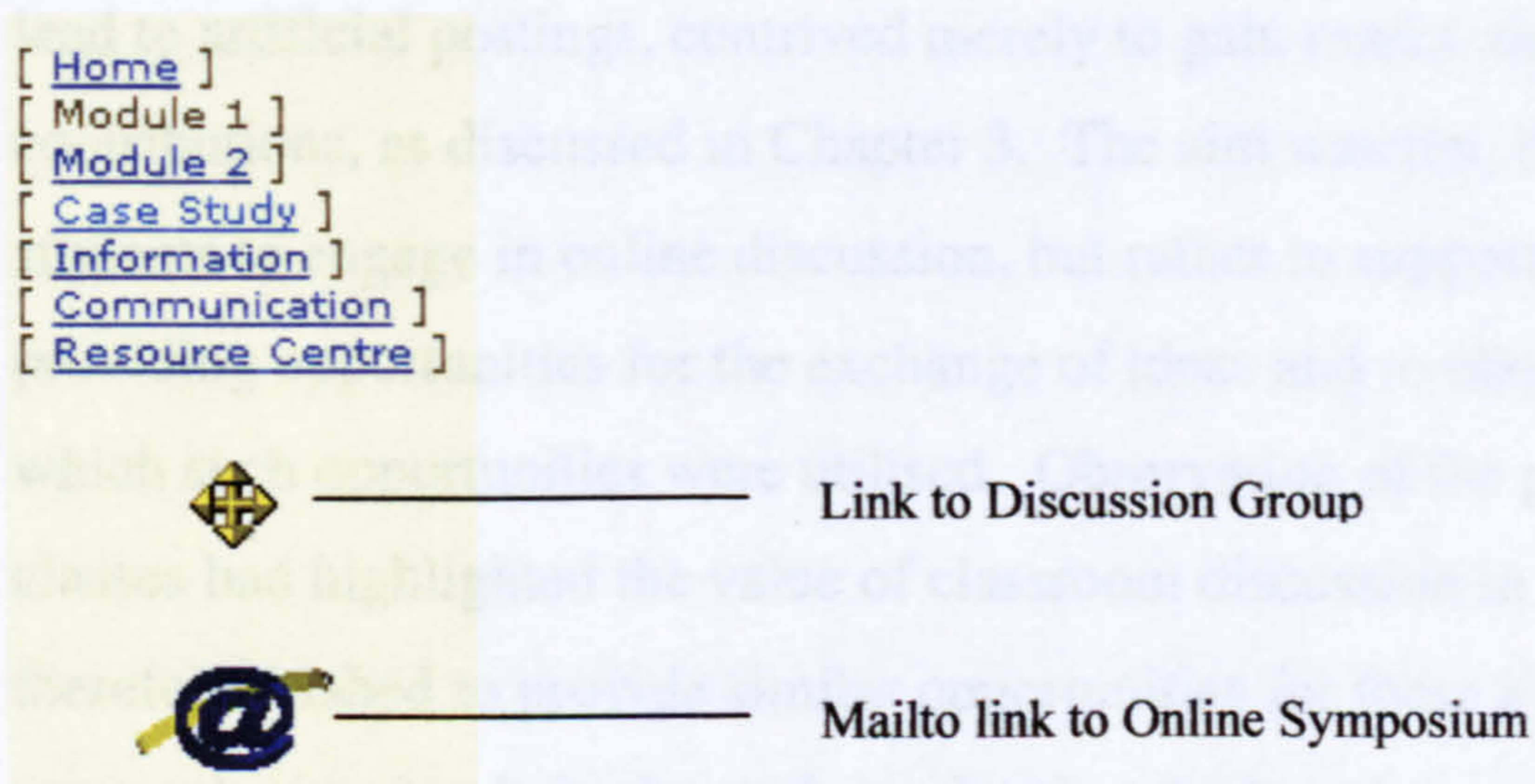
Contacts

The Contacts area provided details of departments and individuals within the university relevant to the MSc OSH. Email hyperlinks were included where appropriate.

Computer Mediated Communication

Computer Mediated Communication was facilitated via a Discussion Group (DG), an Online Symposium (OLS), and email. The DG took the form of a threaded list and the OLS was a closed email list. Hyperlinked icons to both tools, as shown in Figure 6.11, were available under the left-hand menu bar, thus providing direct access from all areas within the VLE.

Figure 6.11: Accessing Computer Mediated Communication tools



Computer Mediated Communication tools were provided to help overcome one of the major drawbacks of conventional distance education, that is, a lack of opportunities for interaction, as identified by the review of the literature presented in Chapter 3. The aim of the DG and OLS was therefore to provide opportunities for the discussion of course related issues, help develop a sense of course community, and to help reduce feelings of isolation. Moreover, courses aimed at specific professional groups frequently seek to make good use of the participants' personal experience and individual expertise through discussion (Kaye, 1989), an approach successfully employed in the part-time attended classes. I therefore aimed to incorporate this good practice into the GOLDPhase pilot course.

The DG was created using a FrontPage Discussion Wizard and took the form of a threaded list where students could read and respond to existing topics or initiate new ones. Features included a hyperlinked table of contents and a search facility enabling users to search articles by word or phrase. The OLS was a group mailing list set up using Majordomo, a program that automates mailing lists on the Internet. Messages sent to the list were automatically distributed to all list members. Both tools were used for informal dialogue and peer discussion of some of the RQs contained in the learning materials. Details of these RQs are included in the section on assessment later in this chapter.

Whilst participation in online dialogue was encouraged, it did not earn credit points. Firstly, because the assessment criteria did not allow for this strategy, and secondly, because as Jones and Cawood (1998) found, such a strategy can lead to artificial postings, contrived merely to gain marks, rather than meaningful contributions, as discussed in Chapter 3. The aim was not, therefore, to force students to engage in online discussion, but rather to support their learning by providing opportunities for the exchange of ideas and to observe the extent to which such opportunities were utilised. Observation of the part-time attending classes had highlighted the value of classroom discussion in this course and I therefore wished to provide similar opportunities for these e-learners. This approach aimed to help the students develop the learning strengths characterised by divergers who have the ability to relate to others, and accommodators, who tend to be open minded, people orientated, and enjoy personal involvement (Jonassen and Grabowski, 1993).

The Support Areas therefore provided opportunities for the e-learners to seek new knowledge that would build on existing knowledge, firstly by accessing course related information of a given nature, secondly by proactively seeking additional resources, and finally through engaging in dialogue with their tutor and peers. As discussed in Chapter 4, this constructivist approach to learning places an emphasis on the learner, rather than the tutor, and as Jonassen *et al.*, (1993) point out is of particular value to practitioners seeking knowledge at advanced level as it encourages reflective learning. The next section explains how, with the use of technology, the RQs and SAQs that were embedded within

the learning materials were adapted in an attempt to enhance learning at a distance.

6.9 Formative assessment using Reflective Questions and Self Assessment Questions

This section discusses the variety of ways in which formative assessment was incorporated within the online learning materials through the use of RQs and SAQs.

Reflective questions encourage students to pause and consider particular points. They are designed to focus the mind on those issues that are going to be investigated further on in the text. Self assessment questions differ from RQs in that they are designed to test the students' knowledge and understanding in particular areas and as such help them to assess their own progress through the module materials. Self assessment questions usually require some working out and the answers are provided elsewhere. The Module 1 and 2 study blocks and the Case Study that formed the online learning materials incorporated both RQs and SAQs.

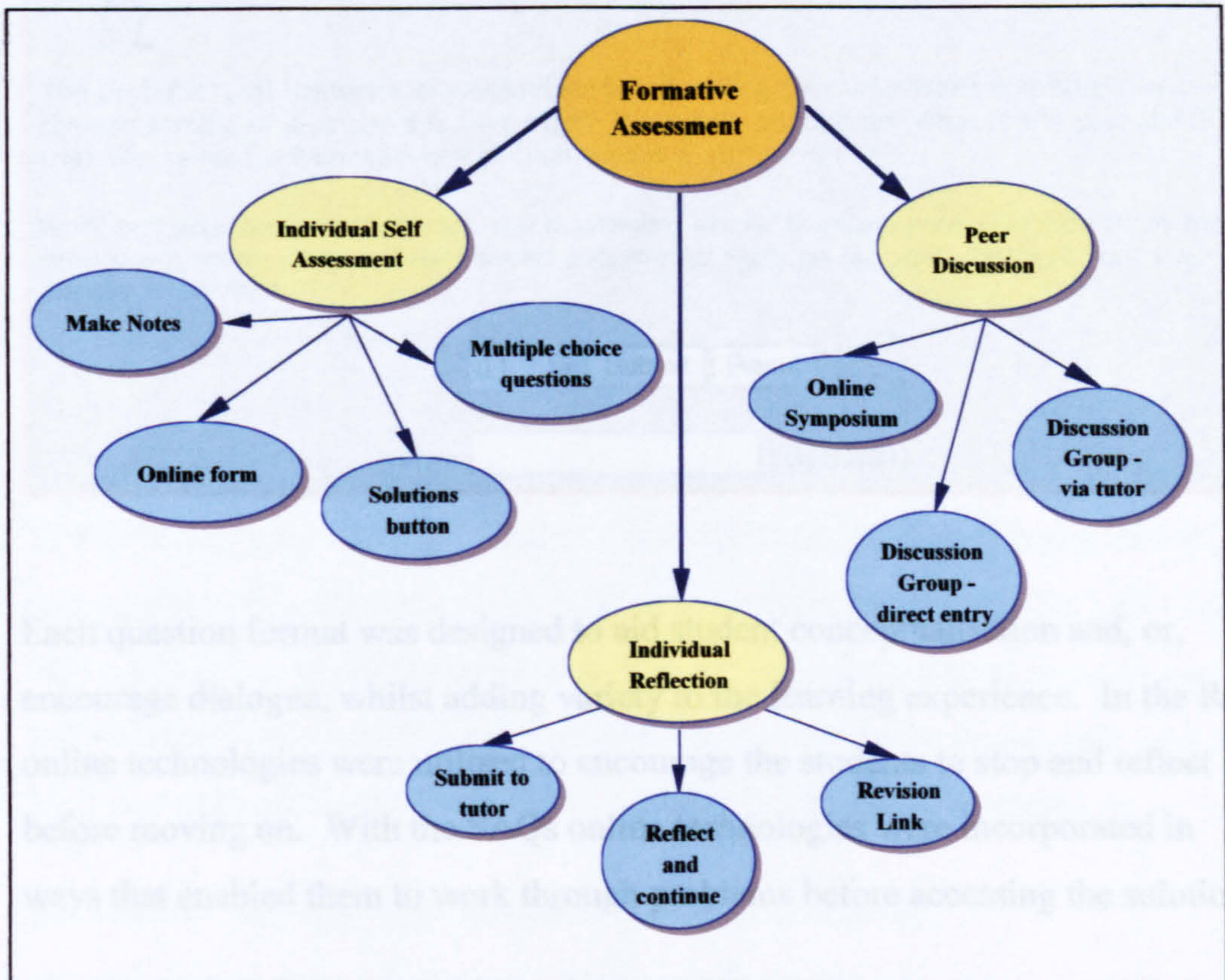
In designing the GOLDPhase VLE considerable thought was given to how Internet technologies could be used to help the students gain maximum benefit from the RQs and SAQs. Both question types were used in the paper-based distance learning workbooks, however, opportunities for interaction are limited in traditional distance learning programmes. Hence, the approach taken with the RQs in the workbooks was simply to ask the students to stop and consider certain issues, or to make notes, and the approach taken with the SAQs was to provide the answers at the back of the workbooks. I considered that the use of online technologies could widen the potential of these RQs and SAQs, thus encouraging interactivity and self-autonomy. The questions were therefore adapted to encompass ten different formats. The formats incorporated a mix of pedagogical and andragogical strategies and fell into three categories:

- Peer discussion
- Individual reflection, and

- Individual self-assessment

Figure 6.12 provides an overview of the formats within each category.

Figure 6.12: Reflective and Self Assessment Question Formats



A total of fifty-three questions (twenty four RQs and twenty-nine SAQs) were included in the online materials. Details of the ten formats are presented in Appendix 7. The table includes an example, or in the case of mathematical questions, an explanation, of each format, together with examples of typical notes to students.

The questions were numbered sequentially using the system of: block number.question number (module number), for example RQ 7.1 (1). Case Study questions were also numbered sequentially, for example SAQ CS1. In this way, each question had its own unique number throughout the course and could be easily referred to. The formats can be viewed by accessing the appropriate

question on the accompanying CD-ROM. Figure 6.13 shows an example of Format 7, the multi-choice type question.

Figure 6.13: Format 7 - multiple choice question

SAQ 7.4 (2)

The probability of someone at random suffering from a certain ailment is 0.002. If a random sample of six people is taken from the whole population, what is the probability that the sample will contain one person who is a sufferer?

Work out your answer then click the downward arrow to make your selection from the drop-down menu. You will receive an automated reply to tell you whether or not your answer is correct.

0.1 ▼ Submit Reset

Name (Optional)

Each question format was designed to aid student conceptualisation and, or, encourage dialogue, whilst adding variety to the learning experience. In the RQs online technologies were utilised to encourage the students to stop and reflect before moving on. With the SAQs online technologies were incorporated in ways that enabled them to work through problems before accessing the solutions.

A mixture of formats was used in order to accommodate students with differing learning styles. As discussed in Chapter 4, designing learning environments that cater for a variety of learning styles is essential for effective learning, especially in the virtual learning environment, where the tutor is unable to observe the learner.

The three categories and their formats are described below together, where appropriate, with an explanation of the andragogical and pedagogical strategies that lay behind their design and the learning style strengths that they aimed to develop.

6.9.1 Peer discussion

Discussion Group – moderated (Format 1)

The students' experiences of online learning began with Block 7 of Module 1, which included two RQs. Both asked the students to submit their ideas via an online form. A synopsis of their comments was then presented in the DG. There were both practical and andragogical reasons for taking this approach. From a practical viewpoint it allowed those students who wished to use incidents from their workplace as examples to remain anonymous and thus maintain their employer's confidentiality. From an andragogical viewpoint it enabled the tutor to lead the discussion whilst drawing on the students' experiences, thus encouraging those students who lacked self-directedness. As discussed in Chapter 4, Knowles (1980) asserts that adults move towards self-directedness at different rates and it is the responsibility of the tutor to nurture this progress. The approach taken in this format was therefore used at the beginning of the course when students were most likely to be hesitant about using the DG. The method aimed to stimulate the discussion without placing undue pressure on individuals. The students were therefore able to familiarise themselves with the VLE and gain confidence with the technology prior to posting messages.

Discussion Group – direct contribution (Format 2)

The first of nine RQs directing students to the DG, where they could debate issues raised in the text, occurred in Block 8 of Module 1. This andragogical strategy encouraged collaborative learning amongst the cohort, thereby acknowledging the value of experience that adults bring to learning situations.

Online Symposium (Format 3)

The OLS provided an alternative focus for the discussion of RQs and SAQs and was incorporated into Module 2 in response to student comments. Whilst studying Module 1, some of the students revealed that they were hesitant to use the DG because they felt their postings were 'too visible' in its threaded format. In response to this feedback I set up the OLS as an alternative tool for CMC. The OLS was then incorporated in four of the Module 2 questions so that I could observe the students' reactions.

Formats 1, 2 and 3 therefore encouraged the students to engage in online dialogue, firstly through indirect contributions and subsequently by initiating and responding to postings, thus encouraging self-directedness. As with the Communication Centre, this approach aimed to help the students develop the learning strengths typically displayed by divergers and accommodators, who tend to be people orientated and less concerned with theories and analysis (Jonassen and Grabowski, 1993).

6.9.2 Individual reflection

Revision link (Format 4)

The 'revision link' format was designed to draw the students' attention, at an early stage in the course, to the value of hyperlinks as revision aids. It was, therefore, used per se in only one SAQ. Revision links were subsequently incorporated into other RQ and SAQ formats, thus allowing the students to return directly to relevant sections of text via a hyperlink. This andragogical strategy was designed to encourage self-directedness by providing opportunities for organising revision strategies.

Reflect and continue (Format 5)

The 'reflect and continue' format was used in a variety of ways. Some simply prompted consideration of the issues discussed, whilst others presented a problem to be worked through. This format was interspersed throughout both modules and encouraged the students to internalise concepts before progressing to the next section and reading the ensuing discussion. A similar format was used in the paper-based workbooks, where, due to the limitations of paper-based materials, the discussion immediately followed the question, thus reducing the likelihood of the students pausing to consider before reading on. The online materials attempted to overcome this problem by placing 'reflect and continue' questions at the end of a Web page, so that the explanatory text was not immediately visible but had to be accessed via a hyperlink to the next page. It was suggested that this might be an ideal opportunity to 'take a break', make notes, and consider issues before physically linking to the ensuing discussion. Whilst this method inserted barriers to discourage students from rushing through the materials without considering the issues, it also required a degree of self-

restraint on the students' behalf and thus takes an andragogical approach, with the learner, rather than the teacher, controlling the learning.

Submit response to tutor (Format 6)

Three RQs asked students to submit their responses directly to the course tutor. One of these, RQ CS1, included an online form that enabled the students to complete the task whilst they were engaged with the materials and had the relevant information to hand, thus increasing the likelihood of a response. The two remaining questions were placed at the beginning of Module 2 and requested a response to the tutor via email. These two RQs were placed at the beginning of Module 2 because this was a stage in the course where I considered the students might become complacent and consequently be tempted to skip the questions. These requests to submit written work to the tutor, albeit brief, were therefore designed to maintain contact between the learner and the tutor and thus aimed to motivate the students and reduce feelings of isolation. This strategy took a pedagogical approach by providing an external motivator, that is, the students' desire for the tutor's approval, which in turn gave the tutor the opportunity to check the students' understanding of the concepts presented and, where necessary, to provide additional guidance and feedback.

These individual reflection formats aimed to help the students develop the learning strengths typically displayed by assimilators and convergers, who are able to focus on thoughtful understanding and reflection (Jonassen and Grabowski, 1993).

6.9.3 Individual self assessment

Module 2 was concerned with risk, both from a theoretical and practical viewpoint. As such the module was essentially in two sections, the first five blocks being concerned with qualitative issues and the last three with quantitative issues. The quantitative section included mathematical probability and analysis techniques. Therefore, the RQs and SAQs in these blocks were structured differently to those in previous blocks. Some students find mathematics a difficult subject area, so to avoid feelings of de-motivation an attempt was made to provide maximum support in this subject. The SAQs in

these blocks were combined with Internet technologies to devise methods whereby students could test their knowledge and progress through the materials at their own pace, without being observed by their peers or tutor, thus encouraging self-directedness. Whilst paper-based distance learners are provided with similar opportunities, they rarely receive feedback on their personal progress, nor do they have direct access to remedial resources to enable them to improve their level of understanding. In GOLDPhase the emphasis remained on *self*-assessment, as it would in the traditional classroom at postgraduate level, where the tutor would not assess the students' understanding of mathematical concepts. Therefore, the e-learners were encouraged to work the problems out for themselves before accessing the correct answers. However, the formats used for these SAQs incorporated methods by which they could also assess their progress. These methods of computer aided assessment (CAA) and computer aided feedback (CAF) are described below.

Multiple-choice question (Format 7)

In this multiple-choice format the students were presented with a problem and asked to select the answer from a drop-down menu. An automated response was instantly returned. When the correct answer was submitted the students received confirmation of this and were advised to move on. An explanation of why the answer was correct was also included. This enabled those who had worked through the problem to check that the process by which they had arrived at their answer was indeed correct. It also provided those who had merely guessed the answer with the opportunity to view the correct calculation. Where an incorrect answer was selected the automated response advised the students to check their understanding by re-reading the appropriate section in the learning materials before re-attempting the question. This method encouraged the students to work through the problems before submitting their answers, especially as they were unsure whether or not the course tutor was able to view their responses.

Solution button (Format 8)

This format was used where concepts were displayed in tables, trees, charts or diagrams. Printable forms were available online so that students could complete the necessary diagrams. The students worked out their answers then clicked the

'Solutions' button to view the correct answer together with explanatory text. The 'Solutions' button allowed them to check their calculations and was used where neither the question, nor the answer, lent itself to the use of online forms.

Online form with diagrammatic response (Format 9)

In this SAQ format the students performed the calculations necessary to complete a probability tree and submitted their response via an online form. The automated reply showed the correctly completed tree, which the students could compare to their own calculations. This question, unlike those for which Format 8 was used, lent itself to the use of an online form and therefore encouraged the students to work through the problem before accessing the answer. The method differed from Format 7 in that all students, regardless of whether they submitted a right or wrong answer, received the same automated reply showing the model answer in diagrammatic form.

Making notes and completing a diagram (Format 10)

Format 10 also utilised printable online forms by providing a template that students could use to help them apply the principles they had learned to differing situations. The completed forms, together with appropriate notes, were to be retained for revision.

Opportunities for developing self-autonomy

At the beginning of the maths blocks the students were advised how the SAQs could be used to help them assess their own progress. If their first answers were usually correct, and they felt confident with their learning, they were advised to move on. However, if it took two or three attempts to arrive at the correct answer then they were advised to revise the current section. Students who experienced difficulty were encouraged to contact the course tutor either by email or telephone. Further support was available through the Resource Centre, which provided a number of 'maths links' to recommended Web sites where some of the principles used in the blocks could be explored further. These sites varied in the way in which they explained differing concepts, the students were therefore advised to explore two or three in order to find one that best suited their learning preferences.

The four SAQ formats, used in the maths blocks, provided the students with opportunities to exercise control over their learning and to make their own decisions about the level of reinforcement required to enable them to proceed through the materials with confidence. In addition, these formats provided the students with opportunities for checking their calculations whilst putting barriers in place to discourage them from accessing the answers before completing the task. This approach aimed to help the students develop the strengths characterised by convergers, who typically have the ability to solve problems, are logical, systematic, and enjoy quantitative tasks (Jonassen and Grabowski, 1993).

All ten formats provided opportunities for creating and retaining hand written or printable revision notes. Students were advised that notes generated by the RQs and SAQs should be retained in their Revision Workbooks.

6.10 Timescale of the pilot course

The thirteen students who comprised the cohort for the study accessed the GOLDPhase VLE from their homes and workplaces via the Internet and World Wide Web utilising asynchronous technologies that enabled them to study at the time and place of their choosing. The course did not rely entirely upon Internet technologies, but employed additional media including offline video and audio recordings, directed reading, and journal papers, thus providing the students with a variety of online and offline activities. The GOLDPhase pilot course comprised three phases: pre-online, online and post online. Table 6.4 details the activities that took place in each phase.

Table 6.4: Timescale of the GOLDPhase pilot course

Phase	Activities	Duration
Pre online	Background reading Module 1, Blocks 1 - 6	12 weeks
Online	Module 1, Blocks 7 - 10 Module 2	30 weeks ⁶
Post online	Visit to Salford University: Examinations Post course Workshop	2 days
	Completion of questionnaires: 6 online questionnaires Kolb's LSI	

The twelve-week pre online phase allowed the students to conduct background reading and to study the first six blocks of Module 1. Students studying via the paper-based distance learning route cover these blocks in six weeks, thus the time scale of twelve weeks including background reading was considered reasonable for this cohort.

The GOLDPhase VLE was available for viewing one week in advance of the online phase. This allowed participants the opportunity to familiarise themselves with the environment and enabled me to identify any potential problems.

The GOLDPhase cohort first met face-to-face when they attended the University to sit the examinations. On the first evening they went for an end of course meal with the course tutor and I, where for the first time they were able to discuss together their individual experiences of the online environment that they had shared over the past seven months. The next day, following the Module 2 examination, they engaged in an informal de-briefing session that took the form of a workshop. Details of the workshop were presented in section 5.6.7.

The results of the GOLDPhase students' assignments and examinations were considered and moderated by the Board of Examiners together with those of

⁶ A breakdown of the thirty-week period is shown in the Study Schedule, which can be viewed by accessing the Study Guide from the Homepage or from the Information Centre on the accompanying CD-ROM.

attending and paper-based distance learning students. The outcomes are presented in Chapter 8.

At the end of the study a letter was sent to all members of the cohort formally thanking them for their valuable contributions to the study. Those who had successfully completed one or both of the modules were awarded a certificate setting out their achievement (see Appendix 8).

The GOLDPhase pilot course thus spanned a period of twelve months. This period encompassed twelve weeks background reading and pre-study, thirty weeks online study, a two-day visit to the University of Salford, and a consolidation period when online questionnaires, Kolb's LSI, and final interviews were completed.

Conclusions

This chapter has set the context in which this study took place and explained how conventional face-to-face and traditional distance education methods and theories of learning have been combined with new technologies to create a virtual learning environment for distance learners. Section one presented the structure, programme, and study paths of the MSc OSH, which formed the basis of this study. Section two described the methods used to gather the cohort and how the selection process was undertaken. The third section set out the content of Modules 1 and 2 of the MSc OSH and provided a rationale for having selected these modules for inclusion in the GOLDPhase pilot course. Section four explained the steps that were taken to ensure that I possessed the technical skills necessary to design and build the GOLDPhase VLE. More importantly, the processes followed in order to identify the needs of this group of learners, which in turn helped determine the pedagogical and andragogical approaches to be taken in designing the environment, were described. Section five presented the rationale for the design of the GOLDPhase VLE. In section six the reader was introduced to the GOLDPhase VLE and provided with an overview of its structure, layout, and design features. The next three sections examined the VLE in closer detail and explained the strategies that lay behind its design. The VLE comprised six elements, three were Study Areas and three were Support Areas. Section seven presented the Study Areas, which comprised the learning

materials. Section eight presented the Support Areas, which provided additional resources to support student learning. Section nine focused on the way in which formative assessment, in the form of RQs and SAQs, was combined with online technologies. The final section set out the timescale of the GOLDPhase pilot course, which spanned twelve months and encompassed offline and online study and the students' two-day attendance at the University of Salford.

This case study therefore comprised a group of thirteen people studying two modules from the University of Salford's MSc OSH in a custom designed and built VLE. The andragogical and pedagogical strategies that guided the design of that VLE, and the learning style strengths that certain activities aimed to develop, have been highlighted throughout the chapter. The chapter has also demonstrated the way in which the research questions, the methodology, and the design of the GOLDPhase VLE, were interrelated to help generate data to answer the questions that guided the study.

The scene has thus been set for the next three chapters, which will present the findings of this study. The first of these, Chapter 7, introduces the study's cohort and presents the findings that answer Question 1, that is, how the students integrated e-learning into their domestic and working lives.

Chapter 7

Integrating Distance e-learning into Daily Life

This chapter is the first of three that examine and discuss the findings of this study. The chapter, and the one that follows, present five themes identified from the analysis of the data. The first theme, that is, 'access' is presented in this chapter. The four remaining themes, those of 'engagement', 'e-learning strategies', 'heightened awareness of others', and 'feelings of insecurity', are presented in the next chapter. Running through each of these themes and their categories there is an overarching theme, which I have labelled the 'human-to-human and human-to-computer relationship'. As the story of this case study unfolds the reader will discern that each of the themes, to a greater or lesser extent, encompass human and computer elements. It is the e-learners' relationships with these two elements, and the positive and negative effects they had on learning that are of particular interest in this study. The e-learners appeared to find their relationship with the computer less problematic than their relationships with others associated with their e-learning. Overall, the barriers to learning were sociological, whilst the enhancements were technological. This central theme starts to emerge in this chapter and becomes more evident in the next.

The aim of this chapter is to facilitate an understanding of the problems and issues that members of this group faced in their everyday lives in relation to e-learning by focussing on their physical settings and the interactions that took place within those environments. As such, it presents and discusses the findings from the analysis of both qualitative and quantitative data that helped answer the first question that guided the study:

How do the students integrate distance e-learning into their domestic and working lives?

The chapter begins by introducing the cohort for the study and presenting portrayals of the individuals who took part. Section two presents the theme of 'access', which explores those issues from the students' domestic and working lives that impacted their access to e-learning. The theme comprises four dimensions, or categories; these are technology, space, time, and support. Each dimension is illustrated with a selection of extracts from the data. The extracts included have been selected from typical comments from the data within each category. The section culminates by discussing the findings that emerged from the theme of access, in relation to the literature. The final section in this chapter explores the impact that e-learning had on the students' personal and working lives and demonstrates the effectiveness of the Internet as a medium for learning.

Note:

In-depth face-to-face interviews were conducted with each of the thirteen students. Catherine and Graham, two of the three who continued with the course beyond the pilot study, also participated in second interviews. Therefore, quotes from interviews with these two students are labelled 'interview 1', or 'interview 2' as appropriate.

7.1 The study's participants

This section firstly introduces the cohort for this study; it describes their motivation for taking part, their reasons for choosing distance education, and their varying levels of participation in the pilot course. This is followed by portrayals of the individuals who made up the cohort.

Piantanida and Garman (1999) argue that qualitative studies in education:

aim to generate deeper understandings and insights into complex educational phenomena as they occur within particular contexts (pp. 32-33).

The reader cannot visit the virtual classroom; I can, however, attempt to bring the virtual classroom to the reader, thus enabling him or her to vicariously experience the phenomenon and the context under study, and thereby gain a deeper understanding of both (Piantanida and Garman, 1999). Portrayals are therefore presented to help the reader become acquainted with those who participated in this study thus bringing a sense of reality to the account. As thirteen students took part in the study the portrayals are necessarily brief. Firstly, an overview of the cohort is given followed by a portrait of each participant.

During the online phase of the study the students participated in individual face-to-face semi-structured interviews, either in their own home or their place of work. Visiting participants in their domestic or work setting allowed me to observe the physical environment in which they lived or worked, and in most cases in which they studied and gained access to Internet technologies. The purpose of the first part of each interview was to put the participants at ease by getting to know them, to learn something of their backgrounds, and to understand their motivation for taking part in this study. Their aspirations for their future careers were also discussed, as in some cases these were related to their motivation for study. These interviews were the main sources of data for this section.

7.1.1 The cohort

Thirteen students, six males ('Adam', 'Chris', 'David', 'Graham', 'James', and 'Peter') and seven females ('Andrea', 'Catherine', 'Christine', 'Joanne', 'Olwen', 'Sally' and 'Yvonne') were selected to form the cohort for the study. The selection process has been described in Chapter 6. To maintain confidentiality pseudonyms have been used for the students and their family members.

The cohort was geographically dispersed across a wide area of Great Britain, with one student living up near Aberdeen in Kincardineshire and another as far down as Truro in Cornwall. Of the remaining eleven, one lived in Cheshire, one in Derbyshire, three in Yorkshire, one in Oxfordshire, two in Hampshire, one in Kent, and two in London.

The participants were aged between twenty-five and fifty, the mean age being thirty-eight. Eleven were married and two were single. Levels of academic achievement ranged from Diploma to Masters level (Diploma: 4, First Degree: 6, Masters: 3).

All thirteen were occupational safety and health professionals. Eleven were in full-time employment. Seven of the eleven were employed by local authorities, two by registered charities, one by a National Health Service Trust and one by a Training and Enterprise Council. One worked on a part-time basis as a self-employed health and safety consultant. The remaining participant had previously worked as a local authority Environmental Health Officer (EHO), but at the time of this study was taking a career break to raise a family.

Motivation for taking part in the pilot course

The students' motivation for taking part in the study varied with each participant citing more one or more reasons for having applied, as shown in Table 7.1.

Table 7.1: Students' motivation for participating in the study

Reason	Number who selected this option
1. To expand existing knowledge of health and safety issues	13
2. Would like to go on to gain the P.G. Dip or Masters degree	9
3. To maintain continuing professional development	8
4. To learn more about the Internet	9

Source of data: student interviews

For all thirteen students the primary motivation for applying to take part in the study was to expand their existing knowledge of health and safety issues. In addition to wanting to learn more about their subject, nine were also interested in completing the full postgraduate diploma or MSc, eight felt the pilot course would contribute towards their continuing professional development (CPD) and nine aimed to learn more about the Internet. Whilst all thirteen wanted to expand their knowledge of health and safety issues, their reasons for doing so differed. Ten hoped the increased knowledge would improve their job prospects, whilst

two aimed to learn more about specific areas within health and safety and one wished to move to a different area within her field. Thus the cohort was largely motivated by internal factors such as job satisfaction and the desire for a better understanding of their subject area.

Why distance learning?

To fulfil the above objectives nine of the thirteen had previously sought part-time courses in occupational safety and health (OSH) at their local institution of higher education, however, only two of the nine found suitable courses within travelling distance. Moreover, all nine concluded that part-time evening attendance was not a viable option due to time constraints or family commitments, which is why the four remaining members of the cohort had not pursued this option. Furthermore, none of the participants' employers were able to release them to attend part-time day release courses. The following extracts typify the students' responses when asked why they had not attended traditional courses to achieve their learning objectives:

Lack of time to attend classes and type of course not available in commutable distance. At least this way I can work late into the night after the children have gone to bed (Catherine, interview 1).

I have absolutely no time to attend classes. Because I already have meetings three nights a week, so yes it's difficult (Adam, interview).

I had gone down that pathway with the Council to see if they would offer me day-release or some sort of time for study, and that resource wasn't available. The only way I could do it was to take annual leave, and I didn't have enough spare to be able to sort of commit to a part-time taught course really (Andrea, interview).

All members of the cohort saw distance learning as a means of achieving their objectives whilst maximising their time at home and work. Some had explored the possibility of studying by traditional distance learning, but found that many courses included weekend study schools, which they considered to be a disadvantage. Olwen, for example, initially enquired about the University of Salford's paper-based distance learning version of the MSc OSH, but upon reading the prospectus found:

... that several times in the year you have to attend the University. I just imagined that this would clash with my arrangements (Olwen, interview).

Yvonne's domestic responsibilities placed her in a similar situation:

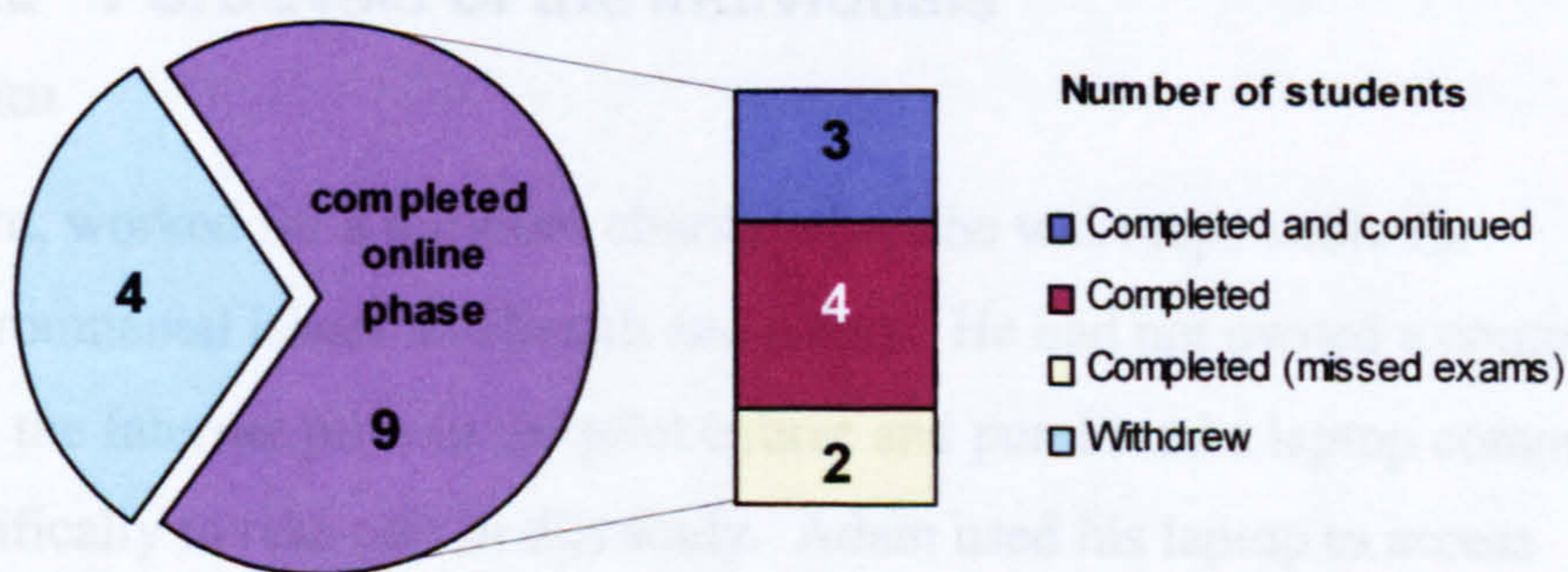
I decided to study the MSc OSH to maintain and develop my knowledge of health and safety. Distance learning seems the ideal way to do this as my home commitments make staying away from home difficult (Yvonne, Introduction on Web site).

All participants saw distance e-learning as a feasible alternative both to conventional learning and paper-based distance learning, as it offered the potential to fit part-time study into their demanding domestic and work routines, without the need to travel away from home and work.

Retention rates

All members of the cohort completed the preparatory phase of the pilot course by studying blocks one to six of Module 1 offline and progressed to the online phase. All thirteen also participated in the online phase, though with varying degrees of success. Figure 7.1 shows the four levels of participation in the online course, by student number.

Figure 7.1: Student participation in the GOLDPhase study



Four students withdrew from the pilot course, two at the end of Module 1, and two partway through Module 2. Nine continued their online studies through to the end of Module 2, however, two of the nine were unable to attend the university to sit the necessary examinations and did not therefore achieve the appropriate credit points. Seven therefore completed the pilot course, with six of

the seven gaining full accreditation for Modules 1 and 2 and one gaining full accreditation for Module 2. At the end of the GOLDPhase pilot course three of the seven transferred to the paper-based distance learning route and subsequently completed the MSc or Postgraduate Diploma.

As discussed in Chapter 5 the three who continued had the unique experience of studying the course in three distance learning formats: an online custom designed VLE, the paper-based workbooks, and an online MLE (see Figure 5.4), thus giving them a unique perspective of studying this course at a distance.

The four who withdrew from the pilot course reported that they did so because they found it difficult to incorporate private study into their busy work and domestic routines. Though they withdrew from the pilot course they remained supportive of the study as a whole, willingly participating in interviews and permitting me to include them, and any associated data, in the final analysis, thus allowing their experiences to inform the study. The variety that existed within the cohort, their differing experiences, levels of participation, and varying attitudes and perceptions of online learning only served to enrich the study.

The following portraits introduce the individual cohort members.

7.1.2 Portrayals of the individuals

Adam

Adam, worked for a religious charity where he was responsible for environmental issues and health and safety. He had not owned a computer or used the Internet prior to the pilot course and purchased a laptop computer specifically to take part in this study. Adam used his laptop to access GOLDPhase both from home and work. His main interest in the Internet was its potential as a resource for finding information related to workplace health and safety issues.

Andrea

Andrea was a local authority Environmental Health Officer (EHO). Her employers had limited resources available for education and training, she thus saw the course as a useful means of gaining continuing professional development

(CPD) credits. Prior to the online study she had a basic knowledge of ICT and described her experience as limited. As Internet access was restricted in her workplace she accessed GOLDPhase from home.

Catherine

Catherine, a local authority EHO, felt that the GOLDPhase pilot course would help her to expand her existing knowledge of health and safety issues and enable her to remain competitive in the workplace. She had Internet access from home prior to the study but described herself as having very limited experience of ICT. Catherine accessed GOLDPhase from home as there were few opportunities for gaining online access from work.

Christine

Christine was also a local authority EHO. She applied to take part in the GOLDPhase study to keep up to date with the health and safety side of her work, to gain an additional qualification, and to learn more about ICT. In common with other local authority employees Christine had limited access to the Internet from work and so conducted all her e-learning from home.

Chris

Chris was a computer assistant and researcher with a registered charity based in a National Health Service hospital where his duties included the role of departmental Health and Safety Advisor. He wanted to further develop the health and safety side of his career with a view to moving into a post where he would have full-time responsibility for occupational safety and health. Chris had a fair amount of Internet experience prior to the study and had Internet access from both home and work but used his home connection for study.

David

David was employed as Chief Health and Safety Officer for a local authority. He hoped the pilot course would broaden his knowledge of health and safety and set him on the path to gaining an additional qualification. David considered his Internet experience to be very limited, as his employers had only recently made online access available. During the pilot course he occasionally accessed

GOLDPhase from work but his main place of study was the home where he already had a computer and online connection.

Graham

Graham was a Health and Safety Advisor for a Training and Enterprise Council. He applied to take part in the study because he wanted to gain the MSc OSH to improve his future career prospects and to acquire a greater awareness of ICT. He had no prior Internet experience, nor did he have a computer at home. His employers were supportive and provided an Internet connection from his workplace computer from which he accessed the GOLDPhase Web site.

James

James was also a local authority EHO. He wanted to specialise in health and safety and saw the MSc OSH as a means of helping him achieve this. Though he did not have access to ICT from home he was already au fait with the Internet, describing himself as having a fair amount of experience. James was fortunate in that his local authority had recently made Internet access more widely available to their staff, therefore, he was able to access GOLDPhase from work, however, access was still somewhat limited.

Joanne

Joanne, a former local authority EHO was in the sixth year of a career break at the time of the study. She hoped to return to work on a part-time basis and felt that the pilot course, through expanding and updating her knowledge of health and safety, would enable her to interact with others in her field and boost her confidence in preparation for returning to the workplace. Joanne described her prior experience of the Internet as "absolutely nil" and was eager to learn about the subject in order to keep up with technological advances. She had online access from home.

Olwen

Olwen worked part-time as a health and safety consultant. She felt that the pilot course would expand her existing knowledge of health and safety issues and thus improve her ability to carry out her current role. She had recently acquired

Internet access and described her experience of ICT as limited. She accessed GOLDPhase from her home, which was also her workplace.

Peter

Peter worked in a university hospital as a Clinical Scientist and Deputy Safety Officer for a National Health Service hospital trust. A large proportion of his work involved research related health and safety issues, as such he was keen to broaden his knowledge of the subject. Peter had a fair amount of Internet experience prior to the study. He had Internet access from both home and work but mostly accessed GOLDPhase from work. He integrated his studies into his work routine and felt that he was able to do so because he worked in an academic environment that encouraged study and self-development.

Sally

Sally worked as a Food Safety Officer in a local authority. Her motivation in applying to take part in the pilot course was to increase her knowledge of health and safety as she believed few opportunities for training existed with her local authority. She also hoped the course would improve her job prospects and enable her to keep up with technological advances. Sally's prior Internet experience was limited. She accessed GOLDPhase from her home computer and in common with most other local authority employees had minimal access from work.

Yvonne

Yvonne was a Technical Officer in a local authority Environmental Health Department. She applied to take part in the pilot course to improve her job prospects, for self-development, and to learn more about ICT. Yvonne described her level of Internet experience prior to the study as "basically zero". She accessed GOLDPhase from home where she went online specifically to take part in the course, having limited Internet access from her workplace.

This section has introduced the cohort for this study, firstly by presenting an overview of the cohort as a whole and secondly by presenting portrayals of the individual members. The cohort was a mix of males and females, ranging in age

from twenty-five to fifty, working in both the private and public sector, with differing backgrounds, ambitions and domestic responsibilities, all of whom shared an interest in occupational safety and health, the Internet and opportunities for self development via distance learning. All the students were self-motivated and aimed to gain a deeper understanding of their subject and to develop their knowledge of ICT. They chose to learn at a distance for its convenience and flexibility. Whilst attrition rates on the GOLDPhase pilot study varied, all thirteen students contributed towards the findings of this study.

The next section examines how the members of this cohort integrated e-learning into their everyday lives.

7.2 Access to e-learning

Having acquainted the reader with the e-learners this chapter now takes us a little closer to their milieu by attempting to answer the first question that guided this study, as stated earlier, this is: How do the students integrate distance e-learning into their domestic and working lives?

In investigating this question I uncovered a theme central to the students' integration of e-learning at home and work. That theme is 'access'. Access to e-learning was found to be more complex than simply having a computer and Internet connection. It was dependent upon a number of dimensions, or categories. These are technology, time, space, and support from home and work. Running throughout these categories there is the overarching theme of the 'human-to-human and human-to-computer relationship' as discussed in the introduction to this chapter.

E-learning is frequently acclaimed for its ability to transcend time and space (Benyon *et al.*, 1997; Daugherty and Funke, 1998; Arnold, 1999), however, as discussed in Chapter 3 it also raises new issues in relation to time and space, those of the students' access to adequate time slots and the physical space in which to engage in the learning process. How e-learners organise their time, space and access to technology are crucial factors in determining their access to learning (Burke, 2001) and ultimately their success or failure.

It may be argued that traditional learners experience similar issues to distance learners in relation to time and space for learning within their homes and working environments. The domestic and working arrangements of traditional learners do not, however, prevent them from engaging in the learning process within the classroom where equal time, space, and access to learning materials are provided by the teacher, who structures the learning sessions, organises the classroom space and provides learning opportunities for those present. For distance learners, however, the responsibility lies with the individual to organise their own time and space before they can begin to engage with the learning materials. For online distance learners there is the added responsibility of organising access to the technology via a computer and Internet connection, which provides the critical link to their learning.

There is, however, a further dimension that affects access. These issues of access to technology, time, and space often require the support of others. As few people live in isolation the logistics of organising time, space, and access to technology for e-learning must be considered within the framework of both the home and working environments and therefore frequently require the support of family members, employers, and sometimes colleagues. Gaining the support of others can be a delicate balance, often necessitating negotiation and planning if students are to successfully engage with their learning.

The aim of this section is therefore to elucidate how the students in this study negotiated for access to technology, time, space, and support; how they integrated their learning into their domestic and working lives; and the impact that their distance e-learning had upon their relationships with others in their day-to-day environments.

7.2.1 Technology

The first dimension of the theme 'access' to be examined is technology. Three aspects of technology were found to impact access to e-learning; firstly, access to a computer and to the Internet; secondly, ICT (Information and Communication Technologies) skills; and finally technical skills and knowledge. E-learners require easy access to online technologies via a computer, the ICT skills necessary to use that computer and its online tools, and access to the skills and

knowledge required to overcome any technical difficulties encountered. These three issues and the ways in which they affected the students in this study are explored here.

Computer access

Access to a computer and Internet connection is essential for e-learning.

Difficulties in accessing these facilities can have a negative affect on student progress (Passmore, 2000; Lee *et al.*, 2001). Table 7.2 shows the sites from which the students gained Internet access and the locations in which they most often studied.

Table 7.2: Students' points of access to the Internet and main study environments

Student	Internet access		Main study environment	
	Home	Work	Home	Work
Adam	✓	✓	✓	
Andrea	✓	✓ LA	✓	
Catherine	✓	✓ LA	✓	
Christine	✓	✓ LA	✓	
Chris	✓	✓	✓	
David	✓	✓	✓	
Graham		✓		✓
Joanne	✓	n/a	✓	
James		✓ LA	✓	
Olwen	✓	n/a	✓	
Peter	✓	✓		✓
Sally	✓	✓ LA	✓	
Yvonne	✓	✓ LA	✓	

LA = limited access

Source of data: student interviews.

Neither Joanne nor Olwen had an outside workplace, both therefore studied from their homes where they were online. Nine of the eleven remaining students had Internet access both at home and work. Eight of the nine accessed the Internet and studied from home. Peter, however, accessed the Internet and studied from his workplace. Graham and James did not have Internet access from their homes

and accessed the course from work. Graham studied from the screen and James printed the materials out and studied them at home.

At the time of the study Internet access within local authority offices was fairly restricted. Where access was available it was normally limited to one computer per department. Therefore, of the seven participants who worked in local authorities six found difficulty in accessing GOLDPhase from their workplace. For example, Andrea explained the situation in her office in the following way:

Someone else in a different team has [Internet access] but I'd have to push them out of their desk to get to their computer so it's not very practical. And when he's not there there's always other people trying to get on as well (Andrea, interview).

James, experienced similar difficulties:

And I have found that because we've only got one Internet connection then people have been on it when I want to get on it. By the time they come off I've gone home so... (James, interview).

Difficulty in accessing the Internet from the workplace was not confined to local authority employees. Adam, for example, bought his own laptop computer to help overcome this problem:

Adam has found it difficult to work 'on-line' due to the fact that his organisation only has one computer and one e-mail address. E-mails are printed off and distributed to individuals with the daily post (Researcher's notes).

For the majority, gaining access to GOLDPhase from the workplace was feasible, but fraught with difficulty and frequently dependent upon the co-operation of others in the workplace.

Computer and Internet access from the home was more readily available, but often required negotiation with other household members. In some households, particularly those of the female students, the computer had previously been the domain of their partner for whom access had gone unchallenged. Thus the students' e-learning prompted re-negotiation. During the first few weeks of the course this issue caused Catherine considerable anxiety:

Another problem I have discovered is that I am going to have to fight with my husband for computer time, he likes to surf the net until the small hours (Catherine, email).

I have to make special arrangements at home because I have to make an appointment to use the computer [laughing]. On the whole he's quite supportive, but then sometimes I'll say "Well I want to do some studying" and he'll say, "Fine I've just got something to do." Then he gets involved in something... and its taken ages for him to sort out and I'm thinking, [voice lowered and said as if in jest] "I hate him because he keeps using that computer".... So its been a bit of a culture shock (Catherine, interview 1).

Different households used differing strategies to overcome this problem. For Catherine and her husband the solution was to buy an additional computer:

Neil is still talking about buying a new PC - this may help us not to fight for time on the existing one! (Catherine, reflective diary).

Once they had bought a second computer the problem was not immediately resolved as Catherine was allocated the old machine and found her access to it delayed whilst her husband copied his files over:

I haven't been able to use the PC as Neil has recently got his new computer and has been cannibalising this one so I can have it for my studies (Catherine, reflective diary).

Yvonne and her husband found they required access at different times:

Hi again, another late night response, my husband is usually finished using the computer by the time I'm ready to start. He thinks I'm mad to work so late (Yvonne, Discussion Group).

For Yvonne the arrangement suited her late night habits:

It was only when Catherine mentioned the thing about timing, [on the Discussion Group] because until then I hadn't noticed the times that people were going on. And I thought, 'Well sometimes I've gone on about half past twelve or one o'clock in the morning and not realised it's that time' (Yvonne, interview).

Whilst some students had to share the computer with other family members, most appeared to overcome this difficulty through negotiation. No students reported any serious conflict with regard to computer access in the home where the majority conducted their studies.

Information and communication technology skills

Information and Communication Technology skills are a further fundamental requirement for access to e-learning. Whilst all the students in this study had

basic IT skills, their experience in using the Internet varied. Table 7.3 shows the students' estimates of their levels of Internet experience prior to the study.

Table 7.3: Students' levels of Internet experience prior to the study

Level of experience	Number of participants
1. No experience	5
2. Limited experience	5
3. Fair amount of experience	3
4. Quite a lot of experience	0

Source of data: student interviews.

Five participants had no previous experience of using the Internet, five had limited experience and three had a fair amount. Three of the five who placed themselves in the 'limited experience' category qualified this by saying that they felt their experience was 'very' limited.

In the early stages of the course some students experienced difficulties related to their lack of ICT skills:

I am at last connected to the Internet but feel like I've been given a Ferrari without having had any driving lessons (Christine, email).

I have to send my introduction by e-mail. It will be the first e-mail I have ever sent! (Joanne, reflective diary).

The anxiety I mentioned in my interview was as a result of my inexperience, not of the design of the learning environment (Adam, questionnaire 1).

Andrea said she was a 'bit scared' at first when using the Internet, but has managed very well by following the instructions provided (Researcher's notes).

Sent off the last couple of responses, made a mess of pasting them and ended up with both answers in response to one question. I'm steadily going downhill (Olwen, diary).

Despite initial difficulties the students appeared to quickly overcome their nervousness with the technology. A few weeks into the course I asked Catherine if she had experienced any ICT related problems, to which she responded:

Yes [laughing]. I can't remember them now, but at the time they were very acute. You know enough to make you tear your hair out. Just little things like e-mailing and saving files. Because although I had some IT skills I had no Internet experience... Moving things, moving files I'd never done before and so

putting my answers into a Word programme and then pasting that onto the Internet was totally new to me. I had to find it out as I went along really. But it was very gratifying when it worked; it was great (Catherine, interview 1).

Yvonne's confidence also improved fairly quickly:

Well actually I'm learning because I didn't grow up with computers. So they've always been a little bit sort of um, you know... I'm a little bit afraid of them. And I have two sons that think they're really easy and can't understand why Mum can't. So I thought, 'Well I'll have to sort of learn a bit'. And it's been great because I've actually gone on the Internet at home now and so I'm doing quite well (Yvonne, interview).

Joanne was at first perplexed about how to send email attachments:

Cannot think how to e-mail 3,000 words of an assignment. Perhaps there is an easy way to do it. I have some questions for Heather so will try to ring her tomorrow (Joanne, reflective diary).

Yet only a few weeks later she reported:

Well I've found it easier than I thought I would with the Internet. I've done everything that I wanted to do. I've solved most problems like sending attachments and things like that (Joanne, interview).

Though the students' initial lack of ICT skills was a source of anxiety at the time, such interruptions to study were short lived and they soon became more confident in their ability to use the technology.

Technical difficulties

Problems of a technical nature were of more concern than the students' levels of ICT experience and in some instances caused anxiety and frustration. It is difficult to determine the extent to which these problems might also be attributed to a lack of ICT experience, though it would appear that most were beyond the students' control. Typical problems included the frequent loss of connections to the Internet due to difficulties with Internet Service Providers (ISPs):

Received GOLDPhase letter today - tried to access the GOLDPhase Homepage but could not access the Internet through my service provider due to technical problems - good start (Chris, reflective diary).

Once Block 6 came online I needed to do more work when connected to the Web site. [Because this block included multiple choice questions.] I immediately started encountering problems, as it seemed every time I tried to upload responses, the connection went down! This did not happen all the time, but sufficiently frequently that I became extremely frustrated (Catherine reflective diary).

Your server was not serving this afternoon. Maybe it decided to have a rest while you were away conducting interviews (Peter, email).

Computer breakdown was a further source of irritation:

Disaster struck, my computer hard-drive crashed - new hard-drive installed - luckily I had backed up all my files but it took me a while to reconfigure the new drive and install all software programmes – (Chris, reflective diary).

David rang to say that his computer has broken and therefore he may not be able to do any work over the weekend. He wanted me to know, as he has not responded to some of the RQs/SAQs in Block 2 (Researcher's notes).

It is interesting that David rang to tell me about his computer problems. Whilst the above extract illustrates the problems he encountered, the objective of his telephone call was not to bemoan his technical difficulties, but rather to explain why he would not be able to respond to the RQs in the DG. It is doubtful that paper-based distance learners or part-time students would ring to explain their reasons for not being able to work over a particular weekend. This behaviour appears to be related to the theme of 'heightened awareness' in the online environment, this is discussed in greater detail in the next chapter.

Those working from home frequently sought help from their family or friends:

Well I had difficulty at first because of not having the computer. That took a while, and then yes there were definitely technical hitches. So I had to rely on friends who knew more about it to install my modem, to get it working when it crashed and get it going (Adam, interview).

Noticeably, women sought help from men in the family. The following comments typify those made by female members of the cohort:

Mark helped me a lot to begin with and I got more and more confident with it as I went along (Andrea, interview).

I wish I knew more about all this technology, I am so lazy, it's much easier and quicker to get Neil to sort the problems out, but I don't learn from it (Catherine, reflective diary).

I tried to get my husband to download it but we ended up just printing it off (Sally, interview).

Male members of the cohort made no similar comments. It would appear that most of the women in this study had little computer experience whilst their male

partners had considerable experience. This may account for their initial reliance upon male members of the family for technical support.

In the first few weeks of the course I received a number of telephone calls expressing frustration with the technology and seeking technical assistance and advice about various aspects of using the Internet. However, as the course progressed the number of calls of this nature declined and were replaced by calls in which students expressed their jubilation at having conquered the technology.

Overall, access to a computer and Internet connection did not present any significant problems for this group of students and despite these initial difficulties the students' relationship with the computer appeared to be fairly positive and did not engender any significant barriers to learning.

7.2.2 Space

The second dimension identified within the theme 'access' is space for e-learning. In contrast to students who study in traditional classroom environments little is typically known about the physical surroundings in which individual distance learners study (Benigno and Trentin, 2000). As access to ICT is a pre-requisite for e-learners the environment in which they study is often determined by the location(s) from which they have Internet access, thus allowing them less flexibility with regard to their place of study than paper-based distance learners or attending students. For example, some might be able to incorporate study into their daily routines at home or work, whilst others might have to travel to a specific location such as a local library, Internet café or college.

Physical learning environments can impact student learning (Jegede *et al.*, 1995), as some may be conducive to learning whilst others may engender barriers. Whilst members of the GOLDPhase cohort shared the same virtual learning environment they did not share the same physical learning environment. To help identify any barriers they experienced it was considered appropriate to gain an insight of the physical surroundings from which they gained Internet access and conducted their day-to-day studies.

The eleven who studied from home (see Table 7.2 above) were fortunate in that they were able to do so in a quiet area set aside from the rest of the household, for example, a separate study or bedroom, and therefore found their environments convivial to study. Peter, who studied from his workplace also considered his environment to be conducive to study. Graham, however, found workplace learning difficult as he endeavoured to incorporate his studies into his daily work routine in an open plan office with all its inherent distractions:

I think I found it difficult to study, but not because of the way of the Internet itself, but more because of how I access it in within the work environment (Graham, interview 1).

Adam had his own office but also encountered problems similar to those experienced by Graham:

I can come into my office here out of hours and yes I've done some work in my own time. And I can take the laptop home. Usually for Internet connection I do it at home because if I do it here [at work] I have to disconnect my telephone. And if I was on the computer for ages people wouldn't be able to get through and they'd end up knocking on the door and saying "What's going on..." [laughing] (Adam, interview).

Whilst the physical surroundings in which the students studied were unique, thus differing from those of their peers, none had to travel to a specific location in order to gain access to Internet technologies, the majority (n=11) studied from home and all but one found their physical environment conducive to learning. Thus, for the majority access to space for e-learning did not present any significant barriers.

7.2.3 Time

A further dimension of access to e-learning is that of 'time'. The amount of time per week students spent engaged both in online and offline study varied, as shown in Table 7.4.

Table 7.4: Time spent studying the pilot course

Student	Estimated number of hours per week spent in study (including online time)	Estimated hours per week spent in online study
Adam	6	<1
Andrea	3 - 6	<1
Catherine	7 -10	2 - 3
Christine	<2	<1
Chris	8 - 10	1 - 2
David	3 - 6	<1
Graham	3 - 6	3 - 4
Joanne	3 - 6	1
James	3 - 6	<1
Olwen	>10	<2
Peter	3 - 6	2
Sally	3 - 6	1 - 2
Yvonne	8	3 - 6

Source of data: student interviews.

Most students (n=8) studied between three and six hours per week, four studied for seven to ten hours, and one for less than two hours per week. The student who studied less than two hours per week explained that not having enough time for study resulted in her falling behind in her work and contributed to her decision to withdraw from the course. Several students pointed out that many hours per week were spent reflecting on the issues presented in the materials and that the total time spent on the course was therefore incalculable.

Online connection time also varied, though not greatly. Six students were online for one hour or less per week and the remaining seven for between one and six hours. The finite time spent online can partly be attributed to the students' concerns about Internet connection charges. A number of strategies were used to reduce these costs. Some printed the materials out and studied from the hard copy. Others downloaded them to their hard drive and studied offline, thus utilising their online time to view and post DG messages, read the Notice Board, search for learning resources and respond to RQs and SAQs.

Distance learners are often under increased pressure, as in contrast to part-time attending students they are seldom allocated a specific block of time, for example, one day per week, in which to attend class, they therefore aim to fit their studies into their existing schedules. Time constraints were a constant problem for this group of learners. In common with most adult learners the majority had family responsibilities and were in full time employment. Some students found time constraints prevented them from maximising the resources provided within the VLE:

I can now see that all of the links and guides provided would probably have been of use, had I had the time and inclination to use them. Lack of time was one of my biggest constraints (Catherine, questionnaire 4).

I remember that someone put questions on [the Discussion Group]. And I thought to myself, 'Well if I'm going to answer that I'm going to have to do some research', and I don't really have the time for that (Adam, interview).

Though time limitations contributed to the lack of participation in the DG, the reasons were in fact more complex and are discussed in detail in the 'themes' section of the next chapter.

All four students who withdrew from the course cited lack of time as the main reason.

Organising study time

Finite time for study made it difficult for most students to plan specific study periods. To overcome this difficulty most adopted flexible study patterns, which they adapted to fit in with the changing demands of their working and domestic lives. Adam described his strategy as:

Cramming in modules when you've got some time, it's a much more flexible thing. If you can't spend the time every week but you know you've got to spend a certain amount of time you can budget for it (Adam, interview).

Whilst Adam's approach to organising his study periods may appear disorganised it is one that suited his lifestyle and facilitated his e-learning. It is also an approach that would not be possible in the traditional learning environment.

All five women who were mothers endeavoured to arrange their study periods around their childcare routines, for some this was once the children were in bed,

or when their husbands were present to share childcare responsibilities.

Catherine raised this issue in the DG:

I see a lot of folk have responded to the RQs quite late at night. I have to admit I am more of a 'lark' than an 'owl' and don't function at my best at night, but studying before work is not really an option for me as I have to get up by 6.30 at the latest on weekdays in order to get the boys to school and me to work on time. I suppose I could get up early at the weekends when everyone else is still asleep. Any hints and tips welcome.... (Catherine, Discussion Group).

Yvonne was able to relate to Catherine's post and responded in a similar vein:

It's good to find someone else with a similar problem of finding a good time to study. I tend to study late because it's the only time I can be free of my sons' interruptions... I am also finding that I have to study for longer periods to keep up with the study time plan. I am trying to negotiate with my bosses to allow me to work some evenings and take the time off in lieu when the boys are at school, which will give me the quiet time necessary.

Joanne also organised her study times around her children's routines:

Well it [study time] has to be irregular because it's when Don can look after the children really or when they're in bed. Usually that's the most regular time (Joanne, interview).

Olwen and Joanne were aware that the forthcoming school holidays would reduce the likelihood of quiet study periods and used long term planning strategies in an endeavour to fit the bulk of their learning into school term times.

I am going to have to try and gallop ahead, as I will not be able to do so much once the boys have broken up from school, and our holiday is only four weeks away (Olwen, reflective diary).

Managed to do a lot of work today, more than I had anticipated. Craig was at home from nursery all day but was very good. I have to take these opportunities before the school holidays start, as I do not know how much time I will have when the older children are at home (Joanne, reflective diary).

Andrea and Sally were not parents and usually studied early in the evening.

Peter and Graham studied in the afternoon in their workplaces. David had little time for study and seldom commenced before ten in the evening because at the end of each working day he and his wife completed a round trip providing meals and bedtime care for three of their elderly parents.

Late evening was the most popular time for study with eight of the thirteen students regularly studying between the hours of nine thirty p.m. and midnight.

Most reported that they liked the flexibility to study at the time and place of their choosing and that e-learning enabled them to do so. Catherine encapsulated this view:

it was just when I could fit it in really, that was the good thing I could work at midnight if I wanted (Catherine, interview 2).

Interruptions to study time

Planning study sessions around the needs of families was not always a simple process. As anticipated, Joanne found her study sessions were frequently interrupted during the school holidays and that she had to adapt her schedule accordingly. Such interruptions appeared to impact her learning as a series of entries in her reflective diary reveal:

Started studying Block 10 but did not get the chance to do much, finding it difficult time wise now the children are not at school. (28th July).

Did not have the chance to do much today, read a little last night. I am glad I am in front with the work as looking after the children all day makes me tired at night. (30th July).

Tried to do some reading for the assignment but have found time is short with the children not at school. (5th August).

Busy all day with the children did not have time to do much. I feel very tired, I think I am ready for my holiday! (11th August).

Craig back at nursery and Rebecca and Helen back at school, so I will have some time to study today. I must start work on Module 2. (10th September).

School holidays were not the only times when the needs of children interrupted planned learning sessions. Yvonne and Joanne lost study time in order to provide extra homework support for their children:

I'm sorry I've gone quiet, I've not been keeping up lately, mostly because the boys have exams at school and need extra help from Mum especially as Dad has been away with work. I'm hoping to catch up soon. I'm also trying to work on my assignment (Yvonne, email).

Have managed to get most of Block 8 done and I am in the process of reading the Case Study at the moment. I am helping Helen with her Spanish, German and French revision as well - I think the EEC have a lot to answer for - we only did one language at the school I went to! (Joanne, reflective diary).

Illness disrupted Catherine's literature search plans when she took time off work to look after a sick child:

The Barbour index was surprisingly useful too. There are a lot of reports of the big accident investigations. Unfortunately I don't have enough time left to peruse them as the index is at work and I am stuck at home looking after Oliver who has chickenpox! (Catherine, reflective diary).

Chris, who studied in the evenings whilst his wife was at work, also found his study periods disrupted, as his reflective diary reveals:

Checked e-mail - accessed GOLDPhase and checked Notice Board. Started Module 1, Block 7 - daughter wakes up - studying postponed for the night (Chris, reflective diary).

Access to time slots for e-learning presented challenges for these students, most of whom were in full-time employment. Some considered that time constraints prevented them from fully exploring online resources and from engaging in CMC. A number of students used forward planning strategies to help overcome these difficulties, though some found that even planned sessions were subject to interruption. Despite these difficulties most found that the flexibility of e-learning enabled them to schedule their studies around the demands of home and work.

7.2.4 Support from home and work

The final dimension identified under the theme of access is 'support from home and work'. Whilst this group of students had limited time in which to engage in e-learning most were fortunate in that they had the pre-requisites of physical space and access to ICT within their day-to-day environments. Nevertheless, utilising that time, space and ICT was not always straightforward and frequently necessitated careful planning and negotiation to elicit the support of others within both domestic and working environments.

Support in the home

Women in particular sought extra time and space for e-learning through negotiation with their partners. In some instances women's engagement in e-learning helped shift the balance of domestic responsibilities, with their male partners increasing the amount of time they spent engaged in childcare.

Catherine, for example, found that her husband's support for her e-learning resulted in him spending more time with their children:

Well actually it has forced my husband to look after the kids a lot more. I think it's actually redressed the balance. In some ways it's been a good thing because it forced him to spend more time with them (Catherine, interview 1).

It's a two-fold thing really, on the one hand because I'm studying, I'm not available to look after the children, but also because I'm studying he doesn't have access to the PC, so... [laughing], so he's got time on his hands to do it (Catherine, interview 2).

Joanne's husband also provided extra child care support by taking the children for walks in the evenings and at weekends, thus providing Joanne with additional study time. Towards the end of the study he took a week's holiday leave so that she could devote time to revision and the final examinations:

Don, my husband, has requested annual leave for a week before the exams so he will be able to look after the children while I revise and overnight while I am in Salford. I have never been away from the children for a night before so it will feel very strange (Joanne, email).

Whilst most received practical support from their partners this did not leave all students free to study, as in some instances emotional issues also impacted their access to learning.

Pressure and guilt

The students' lack of time for study, as discussed above, had an impact on their home and working lives. Men and women reported conflict between their studies and family needs. It was, however, noticeable that whilst men and women felt pressured by work related issues, the pressures of childcare and domestic responsibilities were more intense for women, who found it difficult to concentrate on their learning until such matters had been dealt with. Men, on the other hand, were more likely to separate and prioritise their study time. Whether this is because women felt greater responsibility for domestic issues and could not settle to study until such tasks were resolved, or whether it is simply because women discussed such issues more freely and frequently is unclear.

Nevertheless, the impact of e-learning on domestic arrangements was more frequently noted by female members of the cohort. The tension created by how best to integrate e-learning with Christmas preparations illustrates this point:

It's Christmas Day five weeks tomorrow, I haven't started on the Christmas shopping, and it looks like half the evenings between now and then are taken up with the boys' activities (Olwen, reflective diary).

About two weeks before Christmas I had all but given up on studying... I was falling behind in the work, and there was simply so much domestic work to do with Christmas coming that I really didn't have time for it. By this time the assignment had been posted [on the course Notice Board] and I had been giving it some thought and was gathering information while at work (Catherine, reflective diary).

Catherine described her frustration at combining the roles of employee, wife, and mother with those of e-learning in the following way:

Have fallen a bit behind again in my studies, partly because I had to work on a presentation to the management team asking for financial help to complete the course... Sometimes I feel stretched a bit too thin, that everyone wants a piece of me till there's nothing of myself left (Catherine, reflective diary).

The conflict that existed between e-learning and the demands of domestic and work responsibilities exerted pressure on some students' personal relationships. Graham, for example, explained that in order to avoid conflict at home he aimed, as far as possible, to study during office hours:

I felt it wasn't fair on the little boy either, or on the wife you see. So what I've tried to do, I've tried to do as little at home as possible and do more here [in the workplace] (Graham, interview 2).

Trying to resolve these difficulties put a strain on Graham's learning as he found it difficult to study in the workplace where he was based in an open plan office, yet was unable to find support for studying at home:

Towards the end of the programme of study, pressure from my home life became increasingly negative... Feelings of guilt began to take precedence over study requirements, therefore, commitment may have fallen below the required level (Graham, reflective diary).

Chris, who looked after his child during the evenings whilst his wife was at work also found that domestic responsibilities impacted his e-learning:

No, no problems at work, but at home towards the end I was having difficulty trying to find the time to get online. There have been quite a few changes in our lives, my wife, she's started a new job where she's doing a lot more late shifts and consequently I was having to look after our young daughter a bit longer (Chris, interview).

Towards the end of Module 1 Chris decided that the demands of the course were having too great an impact on his family life and that he could not find sufficient time for study, which led to his decision to withdraw from the course:

I have found it very difficult over the last couple of months to devote time to the course due to increased work commitments and major changes in my family life... and I have reluctantly decided to discontinue. May I take this opportunity to thank you and Liz for such an innovative and interesting course format, and wish you success with the course in the future. If you need any feedback on the course from me I will be pleased to help (Chris, email).

Christine experienced similar feelings of guilt with regard to finding the time and space for personal study and also withdrew from the course:

My husband is at home all day, I'm at work all day and then for me to go home, we'd have our meal and I felt I should of gone upstairs and started to work. And I thought, 'That's really not fair on him, he's been on his own all day, I've been out and now I'm clearing off and disappearing, shutting myself away'. And I did feel that I was shutting myself away from the family and I felt I should have been spending time with them. It was that conflict really... In fact when I got started and began to learn online I realised what a commitment it was, and I quickly decided that it was too much for my particular situation with home and work (Christine, interview).

Catherine, also expressed feelings of guilt about the amount of time spent engaged in learning:

I feel guilty as well sometimes because I'm not spending enough time with them. I'm not getting to appreciate them enough. But having said that you always perhaps think you should spend more time with your children than you actually do (Catherine, interview 2).

Feelings of guilt were experienced both during and outside of study periods. Whilst studying students felt guilty because they were spending insufficient time with their families, concomitantly, when spending time with their families they felt guilty because were not studying. Concerns about not accessing the course on a regular basis were partly due to the students' fears that their peers might leave them behind, this is related to their heightened awareness of others in the online environment and is discussed in the next chapter.

Workplace support

Eliciting support in the workplace was more difficult than in the home. Though the students e-learning endeavours were directly related to their work, support from employers was somewhat sporadic with opportunities for access to the Internet and workplace study being few:

I did ask when I applied if there would be any support from work for me doing this course and the answer was, 'Absolutely not.' (Christine, interview).

Work are not particularly supportive, I mean their attitude is 'Well what do you want to do that for?' (Yvonne, interview).

Peter and Graham were more fortunate as they were able to access the Internet and study at work. Peter felt he had sufficient time and space to do this as he worked in an environment that encouraged academic study. His work schedule was flexible and so long as his work commitments were fulfilled studying at work presented few problems. Graham's situation was different. His employers also supported his workplace learning, seeing e-learning as an opportunity for staff development without being absent from the office. He was not, however, allocated a specific period of time to undertake his studies but expected to integrate them within his workload. Graham found this situation difficult as he worked in an open plan office and consequently felt guilty when accessing the course in case his colleagues should observe him and think that he was "slacking off".

Employee support in the form of study leave and time off to attend examinations was also finite. Though most students requested this type of support the majority were refused, with limited budgets and staff shortages being the main reasons cited. Catherine was the exception, as her local authority granted her three days study leave and three days examination leave. None of the students received financial contributions towards their travel and accommodation costs in attending the final examinations. Catherine and Graham did, however, secure employee funding to continue the course beyond the pilot study.

Practical considerations were not the only barriers to workplace learning. Moral support was also lacking. For example, office politics further inhibited workplace learning as some students perceived their colleagues as being disapproving of their e-learning endeavours:

I suspect if I was doing that [accessing the Internet] on a regular basis, even if it was only during my lunch hour, then somebody would probably complain about it. There's always jealousy in every department and then you get people saying 'I wanted to use the net'. Because we have flexi times, see someone else might not be on their lunch break when I'm on mine and they'll say, 'Oh but I wanted to use it, she was using it' [Laughing] (Catherine, interview 1).

Catherine was not the only member of the cohort to perceive the intolerance of colleagues in relation to e-learning in the workplace. Some co-workers appeared

to be envious, interpreting the students' e-learning as an attempt to obtain recognition or promotion. Such attitudes exerted additional pressure on the students:

My colleague who's health and safety, he studied at Salford University, and he was sort of miffed that he hadn't thought of it and all the rest of it. I wouldn't say he was resentful but he was just a bit... Yes I mean there's been a lot of pressure at work and a lot of pressure at home (Andrea, interview).

Some co-workers detected changes in the students' outlook towards health and safety issues, viewing such growth with suspicion:

I think there is resentment at work... I've just joined ----- local authority... It's funny because when you study you can actually start applying it to physical situations in which you find yourself. So you start saying things in the office, saying, 'Well have you considered this?' and 'Well what about this and so on?' And then people say 'Well where have you got that from?' And so then you start explaining and they say, 'Well I'm going to have to watch you!' I mean they say it in jest, but sometimes you can see that it may not be, there may be something behind it... (James, interview).

James went on to explain that his e-learning was misinterpreted by some colleagues, who unaware that he was taking the course of his own volition, wondered why he was receiving employer support when others had been unable to secure local authority funding to undertake such courses. Negative attitudes such as these from colleagues resulted in some students feeling guarded about their e-learning and consequently less able to integrate it within their working environment.

Support from home and work appears to be a key factor in access to e-learning. Those who had adequate IT facilities, physical space, and time, still found that their access to e-learning was hindered if they were unable to gain the support of those around them. Both practical and emotional support was important to members of this group. It was noticeable, however, that support from family appeared to have a greater impact on emotional attitudes than support in the workplace. Those women whose husbands looked after the children whilst they studied appeared to gain more than practical support, as the gesture itself demonstrated their partners' moral support. Whilst women were more likely to be distracted by domestic chores than men were, both genders suffered emotional guilt in relation to the time spent engaged in study. For the majority

both practical and moral support was lacking in the workplace, which made it difficult for students to integrate their e-learning with their work.

Support from home and work was therefore found to be an important dimension of access to e-learning and highlights the significance of human-to-human relationships in distance e-learning.

7.2.5 Discussion

Of the four dimensions of access to e-learning presented here it was found that access to the technology and access to physical space were the least challenging and that time management issues and gaining support from home and work were of most significance to this group of students.

These findings produced both the expected and unexpected. It was anticipated that technology and time management would create the most significant barriers, as these are most often highlighted in the literature. Thus the finding that technology was not a serious issue was unexpected. Furthermore, the degree to which support from home and work impacted the students' access to e-learning was surprising.

A number of papers have highlighted how technology can create barriers to e-learning. Lee *et al.*, (2001) found that technology related problems were the most significant barriers to students' satisfaction in the VLE. Townsend *et al.*, (2002), suggest that a lack of technical knowledge can bar access to online courses. The findings of this study show that whilst a lack of ICT skills and technical knowledge impacted initial access to e-learning, they did not create a significant or ongoing barrier to access.

The findings of this study concur with those of Carswell *et al.*, (2000) and Valenta (2001). Carswell *et al.*, explored the impact of using the Internet for distance education at the UKOU. The study found that few students experienced technical difficulties and those who did accepted them as "a fact of life" (p. 44). Moreover, most had trouble in remembering the exact nature of such problems. Valenta *et al.*, (2001), in a study of twenty undergraduate and seventy-four postgraduate students undertaking Web-based learning for the first time, also

found that technical problems and ICT skills were of little importance to students, who considered the convenience of working from home and the ability to manage their own time to be the most important factors in relation to e-learning. There are similarities between this study and those of Carswell *et al.*, (2000) and Valenta (2001) in that whilst some technical difficulties were experienced in the early stages of the course these were viewed as teething problems that were soon resolved and forgotten.

Hara (1998) suggests that technical difficulties can lead to students being more concerned about the technology than the course content. This did not prove to be the case in this study where having overcome initial difficulties the students appeared to find the technology to be somewhat seamless. This was evidenced by their attitudes during interviews when I found it difficult to persuade them to talk about the technology and their experiences of using the Internet, as most were too preoccupied with issues related to the course content, which as Leamson (2001) points out is the primary goal of using the Internet as a medium for learning.

The findings of a survey by Kramarae (2001) suggest that women accommodate their e-learning by fitting an extra shift into their daily routines, frequently studying after other family members have retired for the night. The findings of this study show that this was the case for both men and women and highlights the difficulties encountered by e-learners who often have jobs and family responsibilities. However, it is the very nature of e-learning that enabled them to adopt their flexible study patterns. This issue is highlighted by Young (2000) who found that students in his study found the pressure to engage in e-learning was constant due to its instant availability, which means that "class is always in session". This concern links with the theme of 'engagement', which is discussed in the next chapter.

Burke (2000a; 2000b; 2001) asserts that emotional and physical barriers restrict women's access to computer assisted distance learning in the home. The findings of this study show both similarities and differences with those of Burke. Findings that differ show that neither male nor female members of the GOLDPhase cohort experienced significant physical barriers to access. All the

students had adequate access to a computer and Internet connection, and all except one had access to physical space that they found conducive to learning. Burke found that men frequently controlled use of the household computer and that where more than one computer was available women were most often allocated the older or slower machine. Whilst this was also the case for some women in this study it would appear that this was only because the women had not previously required access to the computer and once their needs were identified they were able to negotiate access.

Other aspects of Burke's findings were found to concur with the findings of this study, for example, the desire for the approval of other household members before accessing e-learning and feelings of guilt whilst engaging in the process. However, whilst Burke found that such issues were most likely to affect women's access to e-learning, the findings of this study show that whilst women were more likely to prioritise domestic tasks and childcare, both men and women experienced emotional barriers to accessing e-learning. Thus the gender and power issues highlighted by Burke in relation to access to e-learning were not evident in this study where access from the home was most often secured through compromise, co-operation and negotiation.

Both men and women found the practical and emotional support of partners to be a key factor in relation to e-learning access. Those who had partners that co-operated and provided emotional support gained additional access to learning, whilst those who experienced feelings of guilt reduced their access to e-learning.

This section has presented the theme of 'access' and discussed the four dimensions of access that affected e-learning for members of this group. The next section discusses the impact that e-learning had on the students' personal and working lives.

7.3 Impact of e-learning

Whilst access to e-learning was dependent upon technology, time, space, and support, the positive impact of the students' e-learning is evident from their changes in behaviour and their growing self development. These changes

demonstrate the effectiveness of the Internet as a medium for studying the MSc OSH.

7.3.1 Self development

E-learning contributed towards the students' self development and personal confidence. Chapter 4 discussed theories of learning and examined definitions of learning. Learning is frequently defined as a permanent change, or the potential for change, in behaviour as a result of experience. Definitions such as those provided by Lovell (1980), as presented in Chapter 4 and re-stated below, place an emphasis on what happens when people learn:

A relatively permanent change in our potential for performance as the result of our past interaction with the environment (Lovell, 1980, p. 30).

The students' changes in behaviour that resulted from their e-learning were evidenced by their attitudes and behaviour, both within the workplace and their personal lives.

The subject matter of the course was related to the students' roles as occupational safety and health professionals and there was evidence that the knowledge gained from the course was directly transferable to their workplace environments. A number of students related incidents from their workplaces that illustrate this point.

Adam, having studied the underlying causes of the Piper Alpha disaster used his knowledge to support his argument for improving health and safety within his organisation:

When you're talking about this business of persuasion, I remember writing a memo to quite a few people and putting in the Piper Alpha disaster and some of the lessons learned from that as a basis for persuading them to do something (Adam, interview).

James also found his online studies relevant, frequently applying his knowledge to the workplace by discussing issues with colleagues and searching for work related resources:

And to be honest it has benefited me in the sense that whilst I've been doing the course I've actually managed to delve into other areas and download bits of information for my job purposes and so it goes on (James, interview).

Catherine found herself stimulated by the concepts presented in the course thus considering their application within the workplace:

I'm really getting a lot out of it. I feel I'm learning such a lot. I think it's the process, I mean, I don't know if it's just the nature of the course, or the medium that it's presented in, but certainly I'm thinking about a lot of the issues when I'm not actually studying, when I might be working. Or I might read something in the paper and think... There was something about risk that I saw and I was thinking about the risk argument, you know, whether it's acceptable or not acceptable (Catherine, interview 2).

David, in his role as a local authority Health and Safety Officer, combined his new experience of using online learning materials with his increased knowledge of health and safety issues to initiate an online open learning workbook for local authority employees. With great enthusiasm he described how this came about, explaining that his local authority ran a two-day attended course on the basics of risk assessment but that in some sectors, education in particular, releasing staff to attend such courses proved difficult:

In Education, we can't get people released from schools. They have their training/inset days, which are taken up with lots of other things without health and safety... So you have to get them on a two-day course... and it's a non-starter, so consequently we've not done any risk assessments in any schools (David, interview).

David went on to say that studying via GOLDPhase gave him the idea for producing an open learning workbook that staff could study at their own pace via the local authority intranet. The workbook would cover "a lot of the spadework of the course then staff would only need to be released for half a day to go through the bits ". David's idea for utilising online technologies for workplace learning were drawn from his experiences of e-learning:

So it's certainly set my mind off and that's as a direct result of me pulling from there [the GOLDPhase study]. Yes, that's where I got the idea for that (David, interview).

During our interview David cited a further example from the workplace that illustrated his new found confidence. In the preceding week he had what he described as a confrontation with someone who challenged his view of risk assessment, believing his interpretation to be incorrect. David, drawing on the course materials, quoted the HSE, supporting his argument by citing Adams view on risk assessment, at which point his colleague conceded David's point of

view. David believed that prior to taking part in the course he lacked both the knowledge and confidence to pursue such an argument, commenting: "Its nice to have some ammunition!".

Graham applied a different set of skills and knowledge acquired through e-learning to the workplace, that of using his Internet research skills:

The course enabled me to begin accessing relevant Web sites for information, which I have since utilised within my day-to-day employment and I would only view this development as beneficial (Graham, questionnaire 4).

Improved self-confidence was not, however, confined to the workplace. From the outset of the course Joanne considered herself to be at a disadvantage in relation to the rest of the cohort:

I have been conscious all the while that, unlike many of the others, I am just a housewife and have not had the back up of a work situation. I know Heather has understood this fact and has been very helpful throughout the course, and I have been grateful for this (Joanne, reflective diary).

Halfway through the course there was a marked change in Joanne's attitude:

I think it gives you confidence if you can get qualifications, to think, 'Yes I can apply for this job' (Joanne, interview).

Towards the end of the course Joanne returned to the workplace having secured the post of Environmental Health Officer with a local authority:

Joanne rang to say that next week she starts a job with ----- County Council. She is feeling rather nervous, as she has not worked for almost seven years. Joanne feels that her e-learning experience via GOLDPhase and the MSc have given her the confidence to apply for jobs. Also [her future employers] were impressed that she was taking an MSc and will try to support her. Joanne feels she would not have got the position had it not been for the pilot study (Researcher's notes).

The students were therefore able to utilise their new knowledge and skills both within the workplace and their personal lives. Their growing self-confidence and personal development demonstrate the effectiveness of the Internet as a medium for learning.

Conclusions

This chapter has described how the students in this study integrated distance e-learning into their domestic and working lives. The chapter firstly provided an overview of the study's cohort and portrayals of the individual participants. The portrayals were presented to help acquaint the reader with the students and to provide an insight into their backgrounds and their motivation for participating in the study. Section two introduced and discussed the theme of 'access' and described four dimensions of access and the ways in which each enhanced or inhibited student learning. The final section examined the impact that the online course had on the students' self-confidence and personal development, thus demonstrating the effectiveness of the Internet as a medium for the delivery of the MSc OSH.

Access to e-learning was found to encompass four dimensions, technology, space, time, and support from home and work. All the students in this study had access to ICT either from home or work. Though few had ICT skills or technical knowledge at the beginning of the study they soon gained experience and overcame their initial difficulties. Most reported that they enjoyed working with ICT and found the experience to be satisfying and rewarding. Whilst the students' lack of ICT skills and technical knowledge created an initial barrier to learning it did not appear to have a significant impact upon their access to e-learning.

Integrating e-learning into the working environment proved more difficult than integrating it within the home. With the exception of one student, those who sought to undertake e-learning in the workplace encountered both physical and emotional barriers. For example, difficulties in gaining access to ICT and the negative attitudes of employers and colleagues. This lack of support meant that the majority avoided accessing e-learning from the workplace.

Most students therefore studied from home where they had access to ICT and the physical space to undertake their learning. Whilst most found it difficult to set time aside for study due to the pressures of work, family responsibilities, and

domestic chores, they found that the flexibility offered by e-learning enabled them to adopt flexible learning patterns.

The support of other household members was a key factor to the students' access to e-learning in the home. The support of family appeared to enhance e-learning by providing additional time for study and reducing emotional barriers.

The findings presented in this chapter suggest that time management and a supportive environment had a greater impact on access to e-learning than did technology. For most the work environment did not support a learning culture but the home environment did.

This examination of how the students integrated e-learning into their domestic and working environments highlights the importance of the 'human-to-human and human-to-computer' relationship in e-learning. For e-learners, learning can be dependent upon their relationship with the computer and with those around them. The quality of these relationships can both enhance and inhibit learning. The implications of this overarching theme of the 'human-to-human and human-to-computer relationship' are paid greater attention in the next chapter where the themes of 'engagement', 'e-learning strategies', heightened awareness of others', and 'feelings of insecurity' are examined.

In exploring how the students integrated distance e-learning into their domestic and working lives this chapter has provided a backdrop to the next chapter that will examine their experiences of studying in the GOLDPhase virtual learning environment and the andragogical issues that arose from this.

Chapter 8

Enhancements, Barriers and Learning Strategies

This chapter presents and discusses the findings from the analysis of both qualitative and quantitative data that answer the second and third questions that guided this study:

2. What are the students' experiences of the following elements of distance e-learning:

- The virtual learning environment
- Learning materials
- Information
- Resources
- Communication
- Assessment

3. What andragogical issues arise from the study?

The chapter is organised according to the elements that comprise Question 2. Analysis of data showed that the andragogical issues that arose from the study were intrinsically linked with these six elements. Therefore, the findings are presented together throughout the chapter.

Four themes related to these questions emerged from the analysis of data, these are:

1. Engagement with e-learning
2. E-learning strategies
3. Heightened awareness of others
4. Feelings of insecurity

As the study took a holistic approach these themes were not necessarily confined to a single element of e-learning, but rather cut across two or more. Thus, to aid continuity this chapter will present in turn the quantitative data for each category, together with any relative issues from qualitative data that fall beyond the scope of the themes. This will be followed by a presentation of the themes. This approach aims to do justice to both the categories within Question 2 and the themes that emerged as being important to the participants.

The chapter is thus divided into eight sections; the first six discuss the students' perceptions of the six elements of e-learning that comprise Question 2 and any andragogical issues that arose. In some instances the themes that emerged from these elements are touched upon, these are then discussed under the appropriate heading in section seven, which presents the themes that cut across these elements. The first theme, which is 'engagement', discusses the allurements of the VLE and the way in which it helped to engage the students with their learning. Data analysis also revealed that this group of e-learners adopted learning strategies that differ from those used by conventional and paper-based distance learners and these are examined under the theme of 'e-learning strategies'. Whilst the VLE engaged the students it also engendered some difficulties and these are presented under the themes of 'heightened awareness of others' and 'feelings of insecurity'. The chapter concludes with a discussion of the issues that emerged from these findings.

Findings from both qualitative and quantitative data will be presented here. In some instances the findings from the online questionnaires present a more positive view than those from qualitative data. Two factors may account for this.

Firstly, the six online questionnaires were undertaken by the nine students who completed the online pilot course, and not by the four who withdrew, the reasons for this were discussed in section 5.6.8. Therefore, those who completed the course, and hence the online questionnaires, are more likely to have had positive experiences than those who withdrew. Secondly, the online questionnaires were completed at the end of the study when barriers encountered during the online course may have seemed less significant. On the other hand, qualitative data were gathered on an ongoing basis from all thirteen students and are therefore more likely to accurately reflect the students' thoughts and feelings throughout the course. It was considered important to gain an understanding of the students' ongoing experiences of the course as negative experiences can trigger withdrawal from learning programmes.

Note:

In this chapter I will present tables showing extracts from the findings of the six online questionnaires returned by the nine students who completed the pilot course, responses to all items are displayed in Appendix 9.

8.1 Studying in an e-learning environment

This section presents findings from the analysis of both qualitative and quantitative data that help answer the first part of the second question that guided this study:

What are the students' experiences of the distance e-learning environment?

First impressions of learning situations can both encourage and deter learners. The students who formed the cohort had no prior experiences of e-learning, therefore the study aimed to gain an understanding of how they approached this new phenomenon and to capture their initial thoughts and impressions as they

ventured into the world of e-learning. In the following extracts three students recall their thoughts when they first entered the GOLDPhase site:

I thought it was brilliant, it just worked, all the links worked and seemed simple, and I had been dreading it, I'd been concerned that I wouldn't be able to move within it and find the information I needed (Christine, interview).

I think it was elation teamed with apprehension really in terms of, 'Am I going to be able to do this?' and 'Am I going to be able to follow this around?' But after I went into the Web site I would say it was very clear as to how you can get into certain things... The only trouble I found then was I spent all afternoon looking at it [laughter] (Graham, interview).

The course layout is much easier to understand than I had expected and I have started to read some of the material and try to find my way around the site. I think I must have gone into every area - but it will take a while to really get to know it (Joanne, reflective diary).

Christine's, Graham's and Joanne's comments are typical of those expressed by other members of the cohort and whilst they are positive reveal their initial apprehension at the prospect of engaging in e-learning.

Despite initial concerns about accessing the site the majority showed a positive attitude towards the VLE, as evidenced by their responses to those items shown in Table 8.1.

Table 8.1: Overall impressions of the GOLDPhase VLE

Item	Question	SA	A	D	SD
1	The GOLDPhase Web site was easy to navigate.	4	5	-	-
2	The different sections of GOLDPhase were easy to find.	5	4	-	-
3	I felt disorientated in GOLD Phase.	-	-	6	3
4	The colour scheme was easy to work with.	1	7	-	1
5	The font type was difficult to read.	1	1	3	4
6	The arrangement of the pages (headings, subheadings, layout of text) was useful to me.	3	6	-	-
7	The Contents pages helped me to locate specific points in the text.	4	5	-	-
8	The pages were well laid out.	4	4	1	-
11	The pages were in manageable chunks for accessing via the Internet.	4	5	-	-
12	I found it useful that the Homepage used links to draw my attention to new items.	7	2	-	-
13	I liked the overall style and presentation of the Web site.	5	4	-	-
14	I found it easy to link to the Case Study.	3	6	-	-
		A	B	C	
16	Did you find the use of images on the pages: <i>A: Added interest, B: Distracting, C: Neither.</i>	8	-	1	
17	The amount of images included on the pages was <i>A: Too much, B: About right, C: Insufficient.</i>	0	8	1	
		Yes		No	
22	Did you feel comfortable in the GOLDPhase learning environment?	8		1	

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree.

Source: analysis of questionnaire 1.

Most students liked the overall style and presentation of the Web site, found it straightforward to navigate and the pages easily accessible, soon becoming familiar with the layout and its contents.

8.1.1 Navigating the virtual learning environment

Differing approaches were taken in navigating the VLE. The GOLDPhase Homepage provided an induction programme which students were advised to follow before commencing their studies. Whilst all thirteen followed the induction programme most browsed the site in their own way before doing so. Andrea and David however, took entirely different approaches to the rest of the cohort. David plunged straight into the learning materials and upon seeing a topic of interest in Block 8, moved directly to the Discussion Group (DG) where he posted responses to the Reflective Questions (RQs) for that block. David's actions confused other students, who upon entering the DG for the first time found postings related to forthcoming materials. Andrea, on the other hand, immediately printed out the entire contents of the Web site and placed them in a lever arch file to ensure she had "captured it all", explaining:

I felt I needed to download it and print it off because that's just my traditional way of studying. When you're on the Internet you haven't got it all in front of you at once, you can't just flick round (Andrea, interview).

Whilst none of the other students immediately printed out the entire contents of the Web site in the way that Andrea did, about half the cohort felt the need to have a transportable hard copy that they could make notes on and access in a random manner. Typical comments from those who took this view were:

What I've done is I've printed it all out. Then I can bring it in to work, have a quick look in my lunch hour and so on. And then make a few notes and send any responses back (Chris, interview).

I print the blocks out, work through them and go back in at the appropriate bits. I prefer to read that way than read off a screen. Because you can make your own little notes (David, interview).

Others reacted differently and regularly interacted with the learning materials directly from the computer screen. Adam found,

The screen has a lot of life in it, the way that HTML documents move. They don't just scroll down like Word documents, they kind of - there's a different strange movement to them (Adam, interview).

Adam also found reading from the computer screen negated the need to "carry around bundles of paper". Catherine took a more ecological view:

Although I didn't have to read it off the PC, I did. I could have printed it off, but I never did. Well there didn't seem much point. Why print it all off when it's on the computer? Why kill all those trees? (Catherine, interview 2).

Table 8.2 shows that five of the nine respondents disliked reading from the screen and six regularly printed out hard copies, thus supporting the qualitative findings.

Table 8.2: Approaches to reading the course materials

Item	Question	SA	A	D	SD
9	I disliked reading the study block notes from the screen.	2	3	1	3
10	I frequently printed hard copies of the study notes.	4	2	2	1

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree.

Source: analysis of questionnaire 1.

These differing approaches highlight that e-learners have options not available to learners in the traditional classroom. Firstly, they are able to obtain the materials for forthcoming weeks, as Andrea did, secondly, access to these materials enables them to choose the point at which they start to study, without waiting for the tutor to impart the information.

Utilising hypermedia

It is interesting to note the different ways in which students used hyperlinks and the Case Study provides a useful illustration of this. The Case Study of the Piper Alpha Oil Platform disaster was embedded in the GOLDPhase VLE and could be accessed in two ways, firstly, in its entirety and secondly via hyperlinks placed at relevant points in the study blocks. Most students found that linking to the Case Study from the study blocks stimulated their learning. Catherine likened it to reading a book, but more convenient. Yvonne found that linking to the Case Study helped retain interest in the learning materials, thus alleviating boredom and stimulating learning, a view shared by most.

Others took a different approach. Graham, for example, disliked linking to the Case Study from the main text, explaining that when he was "just beginning to

get involved with a particular subject matter and therefore beginning to comprehend, it was very distracting to then be referred to a new set of information". He overcame this by reading the Case Study in its entirety and only returning to it as and when he felt necessary. He could then proceed through the study blocks in a linear way that better suited his approach to learning.

Andrea, having printed out the study blocks, completely missed the Case Study and was therefore confused by references to the Piper Alpha disaster. This omission was only discovered by chance when she rang me concerning another issue. Being unfamiliar with hypertext linking Andrea failed to recognise the significance of underlined text, and embedded links were rendered invisible on the printed page. This incident highlights the disadvantages of printing out hypermedia materials designed for e-learning.

The students differing approaches to accessing the Case Study are further evidenced by their responses to those items shown in Table 8.3 below.

Table 8.3: Attitudes towards linking to the Case Study

Item	Question	A	B	C
15 (Q1)	When you were asked to link to the Case Study did the activity: <i>A: Stimulate your learning, B: Interrupt your learning, C: Neither.</i>	5	1	3
32 (Q2)	How did you use the Case Study? <i>A: I usually read the relevant sections of the Case Study materials at the appropriate time, B: I read the entire Case Study all at once, C: I usually skipped the Case Study.</i>	3	5	1

NB: Q = questionnaire

Source: analysis of questionnaires 1 and 2.

Analysis of data related to hypermedia also identified issues related to the theme of 'e-learning strategies'.

This section has shown that the students had an overall positive experience of the VLE. Whilst most approached the online phase of the course with feelings of apprehension none experienced difficulty in accessing the GOLDPhase VLE. Moreover, the majority soon adapted to the wider online environment and felt a sense of relief at overcoming what they had perceived as a possible barrier to

their learning. The ease with which the students adapted to the VLE was somewhat surprising as few had previous experiences of using the Internet. This highlights the importance of providing a user-friendly learning environment to help students overcome their initial unease and enable them to focus on the learning materials.

The different ways in which the students approached the VLE highlights the way in which the e-learning environment can accommodate different learning preferences, for example, the option to take a linear or non-linear approach to learning, or whether to study from the screen or from hard copy. Some of these issues are discussed in greater detail in the next chapter. However, printing out materials designed for online delivery may be inappropriate, as some of the interactive features of hypertext can be overlooked.

8.2 Utilising e-learning materials

This section presents findings from the analysis of both qualitative and quantitative data that help answer the second part of the second question that guided this study:

What are the students' experiences of the distance e-learning materials?

The learning materials presented in the GOLDPhase VLE comprised study blocks 7, 8, 9 and 10 of Module 1, all eight blocks of Module 2, and the Piper Alpha Case Study. Both the study blocks and the Case Study included a variety of RQs and SAQs. Issues arising from these RQs and SAQs are discussed in section 8.6.1 under the heading of formative assessment.

Holmberg (1995), in his theory of guided didactic conversation, argues that the greater the student's interaction with distance learning materials, the greater the motivation, and hence the more effective the student's learning. Moore (1993) contends that the cognitive process of learning occurs as a result of interacting

with learning content and sees learner-content interaction as one of three defining types of interaction in distance education. In order to establish the value of the Internet as a medium for distance learning I therefore considered it important to explore the effectiveness of the learning materials from the perspective on the online learner. The materials used were adapted from the Module 1 and 2 workbooks written for the paper-based distance learners in the twelve months preceding this GOLDPhase study. The workbooks themselves having been developed from a range of materials previously tried and tested in the traditional learning environment, through both seminars and lectures. If the students did not find these materials to be effective in the online environment then it would be difficult to establish the value of the Internet as a medium for their delivery.

8.2.1 Study blocks

The students did not experience any significant difficulties with the learning materials, with most finding the content of the study blocks and Case Study engaging. Peter, for example, found the course to be "very well structured", that the course materials were "generally well thought out and prepared", and that the course presented "an interesting angle on the subject, bring in things you wouldn't normally think about on a day-to-day basis". Joanne was of a similar opinion, commenting that the materials were presented in a different way to any she had previously experienced and that they "opened up a new perspective" on the subject:

How we were taught at college was very, very different to how these materials were presented. It's just, it's a life away really. You know I had this pre-conceived idea that when I went into this course it would be just like a college thing and they sort of fed you legislation piece meal. And this is just a world apart. So it's been a shock in a way (Joanne, interview).

Peter and Joanne's comments typify those made by other members of the cohort who were able to engage with the materials and found them stimulating and interesting:

I mean the way it's laid out and the arguments that are put forward are clear and logical (James, interview).

I think the positive side of it is that maths is a very difficult subject to grasp if not explained in an easily understandable manner - so for me to have been able

to work through it as I have done really says a lot for the clear way it has been presented (Joanne, email).

The students also showed a positive attitude toward the Piper Alpha Case Study, finding that it was relevant to their learning and helped maintain interest in the learning materials:

I found the Case Study helped in holding my interest in the study material. It also made me want to find out more about the accident on the oil rig (Joanne, questionnaire 2).

The Case Study was very useful as an example of the 'sharp end' of practice (Peter, questionnaire 2).

I found the Case Study and video very interesting, which is why I read it all at one time, but still read the relevant sections again at the appropriate time (Yvonne, questionnaire 2).

The students' positive attitudes towards the learning materials are supported by quantitative data as shown in Table 8.4.

Table 8.4: Attitudes towards the learning materials

Item	Question	SA	A	D	SD
1	The aims and objectives of the study blocks were clear.	6	3	-	-
2	The materials presented in the blocks met the stated objectives.	4	5	-	-
3	The introductions to the blocks were stimulating and interesting.	3	5	1	-
4	The block summaries helped to reinforce my learning.	5	4	-	-
5	I found the content of the study blocks engaging.	4	5	-	-
		Number of students who selected each option			
8	What do you think of the tone and style of the learning materials? Please select any of the words below.				
	Friendly		5		
	Irritating		-		
	Patronising		-		
	Reassuring		-		
	Readable		9		
	Formal		-		
	Informal		5		
	Pleasant		1		
	Chatty		-		
	Interesting		9		
	Boring		1		
	Lively		2		
	Longwinded		-		
	Clear		7		
	Stimulating		5		
	Cold		-		
		A	B	C	
9	Did you find the length of the study blocks: A: <i>too long</i> , B: <i>About right</i> , C: <i>Too short</i> .	-	9	-	
		SA	A	D	SD
29	The Case Study contributed to my understanding of the material.	5	3	1	-
30	I found the Case Study irrelevant to my learning.	-	-	4	5
31	The Case Study helped to engage my interest.	4	3	2	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree.

Source: analysis of questionnaire 2.

Though the students generally agreed that the materials were engaging and liked

the tone and style used, there was some disagreement regarding their level of difficulty, as evidenced by responses to those items shown in Table 8.5.

Table 8.5: Attitudes towards the level of the learning materials

Item	Question	SA	A	D	SD
6	The level of difficulty of the materials was consistent.	1	3	5	-
7	I had difficulty understanding some of the concepts presented in the study blocks.	-	5	4	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree.

Source: analysis of questionnaire 2.

Most found the ideas presented somewhat challenging and of varying degrees of complexity. Particular areas of difficulty were accident causation theory in Block 7 of Module 1 and issues related to quantitative and qualitative analysis in Module 2:

But it really does challenge me as well, because there's part of me thinks 'well what's the point, why am I doing this [working in the role of Environmental Health Officer] if you can't predict accidents and I'm here to prevent them'. It just makes no difference because here I am trying to stop them, heading them off from here, but they could go down another direction and have an accident that is even worse, so what am I doing?... Like I said, it was starting to challenge all these things. I never thought about all this business about statistics (Catherine, interview 1).

The ideas of qualitative and quantitative analysis seem to be very complex and I will have to think hard about the RQ replies (Joanne, reflective diary).

I found I wasn't sure, we were at one level and suddenly we jumped to a very deep and intellectually challenging level, which I thought was quite a challenge for a lot of us. Even those who are working in health and safety and have done prior courses as part of their degree found it quite challenging (Sally, interview).

Whilst the above comments focus on the extent to which the materials challenged the students, they also reveal their levels of engagement with the concepts presented, thus demonstrating their effectiveness. Moreover, those who experienced difficulty with the concepts achieved a range of learning outcomes, indicating that whilst the concepts were challenging this did not necessarily affect student learning.

Though the students enjoyed the learning materials and appeared to interact well with them, some initially missed being in a live lecture theatre or classroom:

I'm very much a classroom person [laughter]. Before I did this I'd always been in a taught environment... Again it's what you're used to, and I would prefer using listening skills to just reading. If you're reading and listening you're going to take in more as a whole than you are if you're just reading. It sort of repeats and gets to a different part of your brain and you feel more confident about it. And also you've got that confidence in that your tutor is standing there in front of you, so if you can't understand you can say, "Well what does that mean?" or "Can you run through that again?" or whatever. Which I know you could do, but it was more structured to go and do that [online] than asking the question straight off (Andrea, interview).

The alternative view, and that expressed by the majority, was that the availability of online study blocks compensated for not being able to attend live lectures as the study blocks can be retained, copied and pasted into revision notes, and, unlike the live lecture, be re-visited after issues have been reflected upon. Christine, Yvonne and Adam commented on these aspects:

There's no pressure to take notes and to get the information down accurately because it's all there for you. So that's brilliant (Christine, interview).

On the Internet you can go back to it, you've not got to get it all down in one lecture. It's always there for you to go back to. You may get into another block and think, 'Oh I don't remember doing that' and you can go back. And that's what I find is really good. It helps me (Yvonne, interview).

Oh yes, I used to hate that [taking notes]. I was very surprised to go to university and end up writing down what the teacher says on the board, more than I did at school (Adam, interview).

Catherine, in her first interview commented that whilst she "would prefer to attend live lectures, having the lecture notes to hand for revision was probably one of the play-offs" for not being able to do so. However, her feelings changed over the duration of the study and by the end she considered the advantages offered by online learning outweighed those of the live lecture, believing that her initial comments had been based on her limited past experiences.

Yes, yes. I think that's probably because that's the way I'd always studied most effectively in the past (Catherine, interview 2).

Catherine went on to say that in the future she would seek online courses:

I mean if there was something local... I don't know though, not now I've done this. No, I don't think I would be bothered. I think I'd rather do it via the Internet. It is a fag going to night school (Catherine, interview 2).

Olwen, however, took a different view, whilst she could see the value of the Internet for certain aspects of learning, for example dialogue, reinforcing specific

points, and linking to external resources, could not see the advantage of online materials, believing there was

...no point in supplying the basic course material in this way. It would have been much better to provide the main text as a package through the post... It seems a great waste of time to copy material onto a Web site so that we can all copy it from the Web site, when it could all have been photocopied (Olwen, reflective diary).

Olwen's view was atypical of those expressed by the majority of the cohort who preferred the interactivity of Web based materials.

Offline media

Laurillard (2000) argues that providing alternative media in distance online courses provides a more balanced learning experience and constitutes good design practice. Moore (1993) includes both broadcast media and computer media in his description of learner content. The students in this study enjoyed the range of media included in the course and found that the variety of activities such as the video tape, audio tape, directed reading and the Case Study helped them to conceptualise the concepts presented in the online study blocks, as Joanne noted:

Watched the Piper Alpha video today and read the relevant case notes. The video was very interesting and I think I seemed to learn a lot from watching a visual account; it makes a welcome change from reading... (Joanne, reflective diary).

The students' positive attitudes towards additional learning resources are evidenced by their responses to those items shown in Table 8.6.

Table 8.6: Attitudes towards offline media

Item	Question	A	B	C	D
1	To what extent did the following additional resources stimulate your learning? <i>A: A great deal, B: Quite a lot, C: A little, D: Not at all.</i>				
a.	The video tape.	6	1	1	1
b.	The audio tape.	4	2	3	-
c.	The directed reading.	5	3	1	-

Source: analysis of questionnaire 6.

Both qualitative and quantitative data therefore show that the students'

experiences of both the online and offline materials were positive. There was evidence that they were able to engage with the learning materials and found them stimulating and interesting. Some students initially missed the live aspect of the face-to-face environment, however, most considered that the advantages offered by online materials outweighed those of the live lecture. Overall, the Internet was considered an appropriate medium for the delivery of the learning materials.

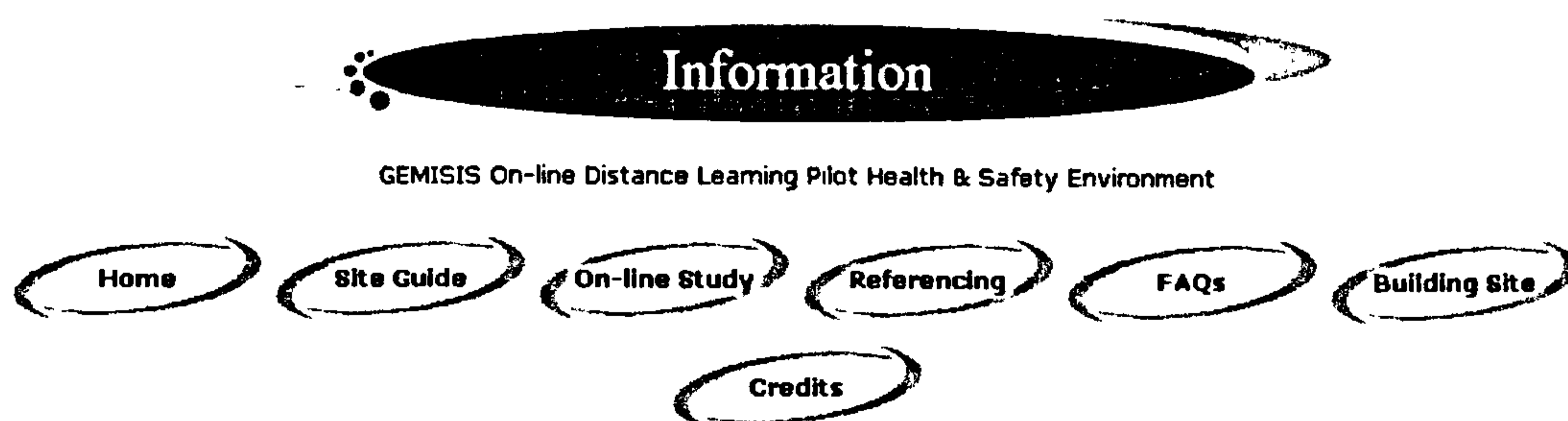
8.3 Accessing e-learning information

This section presents findings from the analysis of both qualitative and quantitative data that help answer the third part of the second question that guided this study:

What are the students' experiences of distance e-learning information?

An Information Centre was incorporated in the GOLDPhase Support Area. The purpose of the Information Centre was to enhance learning by providing easy access to course related information and as such included a number of Topic Areas as shown in Figure 8.1, which is provided to re-orientate the reader.

Figure 8.1: Information Centre



Detailed information about each of these Topic Areas is provided in section 6.8.1.

Table 8.7 shows the findings from quantitative data related to the Information Centre.

Table 8.7: Attitudes towards the Information Centre

Information					
Item	Question	SA	A	D	SD
1	The Site Guide helped me to become familiar with the layout of the GOLDPhase Web site.	4	5	-	-
2	The information provided in the Site Guide helped me to use the learning environment more effectively.	4	4	1	-
3	I found the analogy made between the online learning environment and a physical learning environment helpful.	3	5	1	-
4	The information contained in the Site Guide was of little use.	-	-	5	4
5	The information provided in the Online Study Guide helped to familiarise me with the GOLDPhase web site.	3	6	-	-
6	The Online Study Guide helped prepare me for online learning.	4	4	1	-
7	The information on citations and referencing supported my studies.	4	4	1	-
8	The information contained in the Study Guide was of little use.	-	1	4	4
		A	B	C	D
9	How frequently/infrequently did you refer to the Study Schedule? <i>A: Frequently, B: Sometimes, C: Occasionally, D: Never.</i>	4	3	2	0
10	Did the Study Schedule help you to organise your workload? <i>A: Frequently, B: Sometimes, C: Occasionally, D: Never.</i>	4	3	0	2
11	Did you feel pressurised by the Study Guide? <i>A: Frequently, B: Sometimes, C: Occasionally, D: Never.</i>	2	3	3	1
		SA	A	D	SD
12	The FAQ page provided a useful facility.	-	8	1	-
13	I would prefer to ask questions by making personal contact than via the FAQ page.	1	3	5	-
		Yes		No	
14	Do you think that you made the fullest use of the resources provided in the Information area of GOLDPhase?	5		4	

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree.
Source: analysis of questionnaire 4.

The Building Site, Credits, and Referencing Topic Areas yielded little qualitative

data of significance and are not therefore discussed here. Issues arising from the remaining topics in the Information Centre are discussed below.

Site Guide and Study Guide

The Site Guide provided an overview of the GOLDPhase VLE and introduced the students to the Study and Support Areas and their associated tools. The Online Study Guide introduced them to the course, explained how the materials were organised, and provided guidance on online learning. Attitudes towards both guides were positive. Yvonne explained how the Site Guide helped her:

I found the Site Guide very useful as I was not very computer literate before starting the course, especially with regards to using the Internet and linking etc. The Guide helped me gain confidence in getting around the materials and linking to other sources of information (Yvonne, questionnaire 4).

The Online Study Guide included a Study Schedule setting out a suggested time frame for study. The schedule showed the recommended number of weeks to be spent studying each of the module blocks and included the dates for assignment submissions and examinations. This was provided to help students organise and plan their time, however, some students felt pressured by this:

Yes, it helped, [said with hesitation] it helped a little. It made me feel under pressure from it really. I felt that I really ought to try to stick to that timetable and I found it difficult to do that (Christine, interview).

That pressurised me. Yes, it did, because I felt like I was getting behind all the time. I thought, 'Oh my God I've got to get these in'. And I felt it was an extra pressure on top of all the other pressures and I think I got really stressed by the whole thing. Because when I did my essay I was extremely stressed (Sally, interview).

Christine's and Sally's feelings about the Study Schedule reflect those of most of the students. However, some took a different view, Joanne, for example, found the Study Schedule helped her to organise her time and workload:

In fact, you know the timetable, I follow that, [laughing]. I always follow that. I very rarely deviate from it. I think, 'Well I'll keep to it and I'll do it that way' (Joanne, interview).

I like to be able to work to a set schedule if possible, so the Study Schedule proved useful for me. Also if I knew I was ahead with the workload I felt okay about taking some time away from the computer and the course (Joanne, questionnaire 4).

Items 9, 10 and 11 in Table 8.7 support these views as they show that whilst most referred to the Study Schedule at some point in their studies, and found it helped them organise their workload, it exerted varying degrees of pressure.

Overall, the Information Centre fulfilled its purpose in that it familiarised students with the course content and prepared them for online learning. This is further evidenced by responses to items 1 to 8 in Table 8.7. However, item 14 shows that half the respondents considered that they did not make the fullest use of the resources provided in the Information Centre. This may be due to lack of time, as highlighted by Catherine:

I would recommend the things I used. I am still finding my way round the Internet and I can now see that all of the links and guides provided would probably have been of use, had I had the time and inclination to use them. Lack of time was one of my biggest constraints (Catherine, questionnaire 4).

The issue of time constraints for this group of learners has been discussed in the previous chapter.

The Information Centre thus supported a self-autonomous approach to learning and enabled the students to familiarise themselves with the online environment and to organise their own learning.

8.4 Seeking e-learning resources

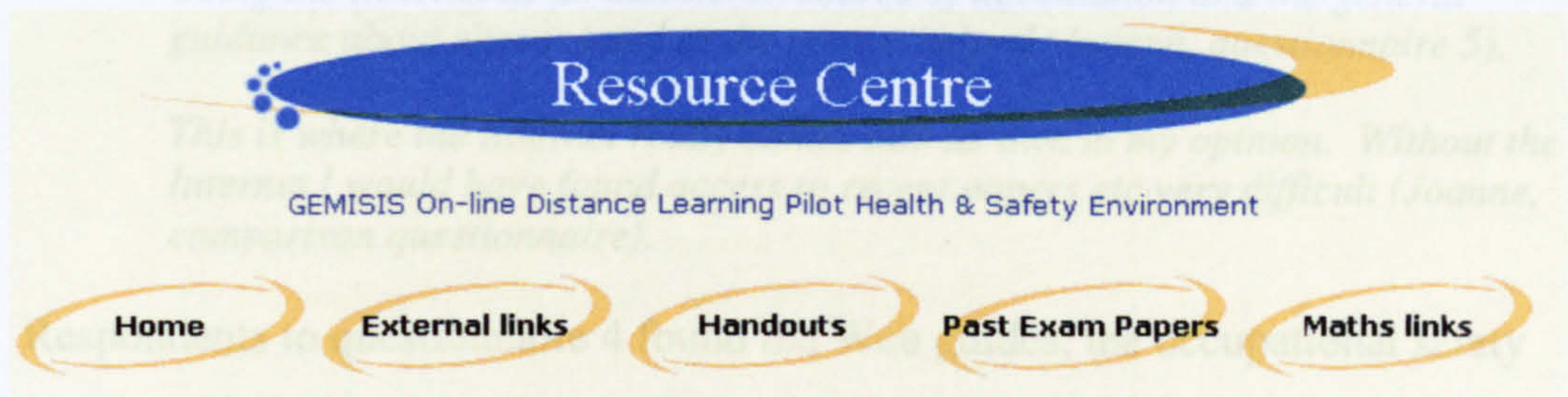
This section presents findings from the analysis of both qualitative and quantitative data that help answer the fourth part of the second question that guided this study:

What are the students' experiences of the distance e-learning resources?

A Resource Centre was incorporated in the GOLDPhase Support Area. Its purpose was to enhance learning by encouraging students to actively seek information that would support their learning and as such included the Topic

Areas shown in Figure 8.2, which is provided to re-orientate the reader.

Figure 8.2: Resource Centre



Detailed information about each of these Topic Areas is provided in section 6.8.2.

The Handouts and Past Exam Papers Topic Areas yielded little qualitative data and are not therefore discussed here. The discussion thus centres on two aspects of online resources. The first is the students' experiences of using external links from the Resource Centre, including the maths links. The second is their general perceptions of the World Wide Web (WWW) as a means of gathering resources to support their learning.

The purpose of this section is to discuss the students' experiences of seeking additional resources and not to evaluate the content of external sites, which was beyond the control of this study and used at the students' discretion.

8.4.1 External links

The External links topic area included links in five different categories, Web guides, occupational health and safety information, online newspapers, reference materials, and a search engine.

Most students found that these links helped them to locate information relevant to their learning:

It was far easier with the links from the online learning. Since having to undertake it myself frustration sets in at not being adept at searching and the amount of time utilised in trying to locate appropriate material (Graham, comparison questionnaire).

I used the information in several past journals and searched the Web for other related information to supplement my learning. Although if it hadn't been for

I used the information in several past journals and searched the Web for other related information to supplement my learning. Although if it hadn't been for the prompts I may not have looked up so much information (Yvonne, questionnaire 3).

Using the Internet as an additional source of information and the general guidance about sites related to the course helped (Joanne, questionnaire 5).

This is where the Internet really comes into its own in my opinion. Without the Internet I would have found access to recent papers etc very difficult (Joanne, comparison questionnaire).

Respondents to questionnaire 4 found the Web guides, the occupational safety and health links, and the search engine to be the most relevant to their learning, though the frequency with which they used these links varied (see Appendix 9, Table 4, items 17a, 17b, 18a, 18b, 21a and 21b). The online newspapers and reference materials were little used (see Appendix 9, Table 4, items, 19a, 19b, 20a and 20b).

Maths links

The Maths Topic Area included links to supplementary maths materials available at other universities' Web sites. Some students used these links to broaden their understanding of the course materials:

Getting on reasonably well with the stats, looked up the course links to find out more about conditional probability, the Australian stuff looks helpful (Olwen, reflective diary).

Found Block 6 very interesting and enjoyed the maths, as I've never done probability before. I found the Surf-Stat link useful and I am still reading through this at the moment, I think it will prove useful for Block 7 as well (Joanne, email).

Quantitative data shows that more than half of the respondents to questionnaire 4 visited the maths sites, found them to be useful, and would recommend them to future students (see Appendix 9, Table 4, items 22a, 22b, and 22c).

The maths links therefore encouraged those who required additional support to be self-directed and supplement their learning through online resources.

8.4.2 Searching the World Wide Web

Table 8.8 shows the students' attitudes towards using the WWW to find resources to support their learning.

Table 8.8: Attitudes towards seeking online resources

World Wide Web					
Item	Question	SA	A	D	SD
23	The WWW helped me to conduct research for my assignments.	5	3	1	-
24	The amount of useful information I was able to gather on the WWW for my assignments was disappointing.	-	2	5	2
25	I expected to be able to conduct all the research for my assignments on the WWW	-	2	5	2
26	I felt swamped by the amount of information on the WWW.	-	1	8	-
27	The WWW provided a useful source of information for the course.	2	6	1	-
28	Using the WWW for research was a waste of time.	-	-	4	5
29	The WWW is a powerful research tool.	7	2	-	-
30	When conducting research for assignments I preferred to use books and journals from the library to using the WWW.	1	4	4	-
31	I would rather use the WWW to find information than use traditional methods.	1	6	2	-
32	The time I spent surfing the WWW could have been used more productively.	-	3	4	2
33	I found surfing the WWW for course related information a frustrating experience.	-	2	7	-
34	The abstracts in online databases helped me to identify useful articles or papers.	2	1	6	-
35	I had difficulty accessing online databases.	1	4	4	-
36	I found some useful information in the online databases.	4	1	4	-
37	I frequently accessed the University of Salford library via the WWW.	-	1	5	3

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of Questionnaire 4.

Overall the students had positive experiences of using the WWW to find course related information, with most preferring the Web to traditional methods of seeking resources. Some areas of concern were however identified and these are discussed below.

Sources of dissatisfaction

Whilst quantitative data shows that only one respondent felt swamped by the amount of information on the WWW (item 26), analysis of qualitative data

revealed that many were initially overwhelmed by the quantity of information available. Typical comments included:

I went online quite a bit for the assignment, seeing what I could find. I went into those databases [referring to BIDS and OCLC] and just got lost with all the searches. They were coming up with four thousand or something. I just didn't know how to narrow it down. I tried to but it just didn't narrow it down enough to get what I really wanted (Joanne, interview).

Yes, there's masses, there's masses. You search for something and it can come up with three thousand and sixty five things. And you think, 'argggg'. I mean obviously you have to refine your search but it's just very daunting, there's that much stuff there. And you think, 'buried in there there's probably two crucial things', but how do you find them? (Catherine, interview 2).

This finding supports those of Hess (1999) who found that seeking online resources at postgraduate level resulted in information overload, and the views of Roszak (1996) who contends that insufficient quality control is available in online resources.

A further source of dissatisfaction in relation on online searches was the process of accessing and searching online databases. A number of factors contributed to this, firstly as registered postgraduates the students were issued with usernames and passwords to enable them to access the University's restricted Web pages and thus a variety of electronic databases from off campus. However, at the time of this study it was necessary to set up a proxy authentication to use these facilities. This necessitated configuring the Web browser on their personal computers and not all Internet Service Providers offered this facility. Secondly, the Online Computer Library Centre (OCLC) database was undergoing re-organisation during the summer that the pilot course took place and this resulted in disruption to their service. These issues caused considerable problems for some students:

I managed to get myself onto the Salford library system okay, but found out that I have to enter it every time I want to use the Internet, also BIDS will not recognise the access codes we've been given. I don't want to risk messing up the configuration of our computer, so I have uninstalled the proxy until I have had time to talk to Salford (Olwen, reflective diary).

Unable to connect to BIDS using username and password provided. Studying interrupted at 21:39 (Chris, reflective diary).

Responses to items 35 and 37 in Table 8.8 support the finding that some students had difficulty in accessing online databases and the University library system.

Though such problems were isolated incidents, and mostly beyond the control of both the students and the university, for the students concerned they presented a barrier to their learning and highlight the difficulties typically faced by e-learners endeavouring to access online resources.

A voyage of discovery

As the course progressed the students became increasingly aware of the potential of the Internet for locating course related materials and most found a variety of resources relevant to both the course and their working environment. Joanne, for example, searched the Internet to find information for her assignment:

Have started to look at Block 7. As there is only a week to finish this I must start writing something for my assignment. Over the weekend I managed to go into more sites and get some more information about the E.Coli debate (Joanne, reflective diary).

And her searches met with a fair degree of success:

Most of my information for the last assignment has been taken from Internet sources, there really is a wealth of information waiting out there (Joanne, reflective diary).

Catherine also met with greater success as her skills improved:

I'm finding stuff out, well on the Internet certainly I'm on a voyage of discovery. It's amazing the stuff that's on there ... Since the online study I've really got more into the Internet and used it to look up things and I'm just astonished by the things that are there. There's just a huge amount of information that you can get via the Internet. It's just unbelievable. So it's bigger than I ever thought it would be (Catherine, interview 2).

Didn't really get into the Web or online databases until well into the second module. Now I'm kicking myself for not checking them out earlier. But I was having to learn so much new stuff just with the course materials (Catherine, questionnaire 4).

The ways in which the students used the external links to seek additional resources and to supplement their learning demonstrate that the Resource Centre supported an andragogical approach by encouraging a self-directed and constructivist approach to learning. The maths links encouraged them to identify their learning needs, and where necessary to seek underpinning knowledge to

help gain an understanding of the statistics presented in Module 2. Additional resources, such as journal papers and articles, helped them to gain a wider understanding of the learning materials and supported the writing of assignments.

The Resource Centre as a whole fulfilled its purpose in that it provided a starting point that both directed and encouraged students to actively seek information in the online environment. The categorised links helped direct the students but allowed them to exercise self-autonomy in their searches. The information obtained provided an alternative perspective to the course materials and enabled the students to fill gaps in their previous knowledge. A number of drawbacks were experienced including difficulty in accessing online databases and feeling overwhelmed by the volume of online information. However, as the students gained experience they became more adept in their online searches. The students' overall experiences of e-learning resources were more positive than expected given their relative inexperience in the online environment. Their enthusiasm for the WWW as a source of information, and the applicability to learning of the resources located, support the findings of Daugherty and Funke (1998).

8.5 Communicating with e-learning peers

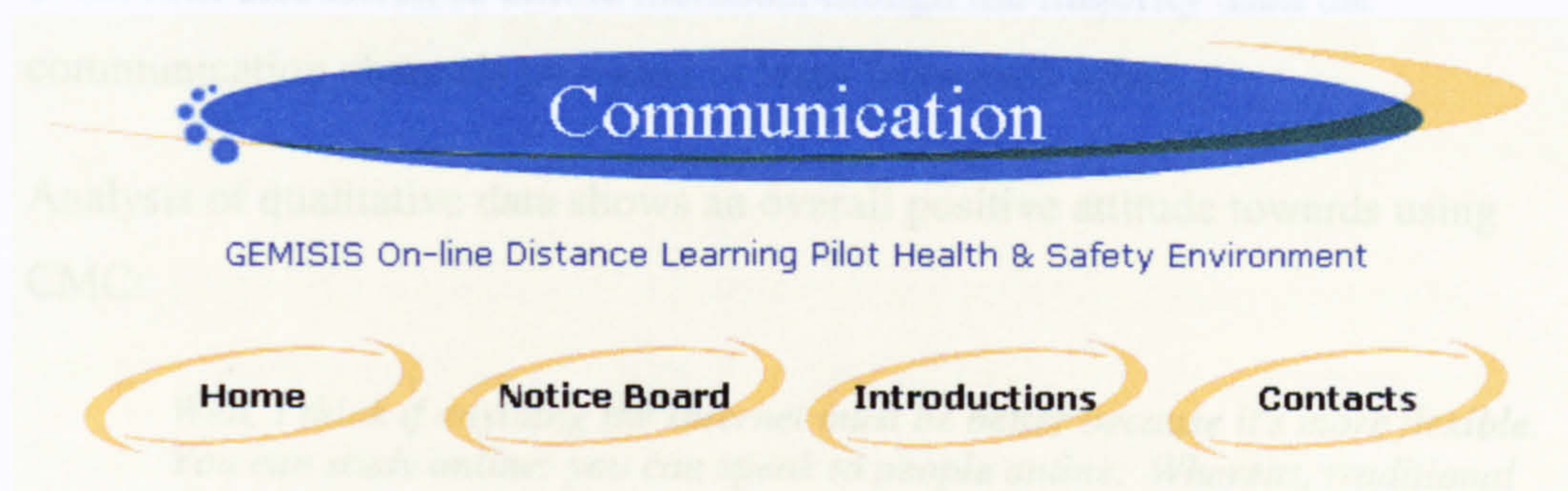
This section presents findings from the analysis of both qualitative and quantitative data that help answer the fifth part of the second question that guided this study:

What are the students' experiences of distance e-learning communication?

The GOLDPhase Support Area included a Communication Centre. Its purpose was to provide convenient and easy access to communication tools and facilities from within one area. Figure 8.3 shows the Communication Centre top toolbar.

from within one area. Figure 8.3 shows the Communication Centre top toolbar.

Figure 8.3: Communication Centre



Detailed information about each of these Topic Areas is provided in section 6.8.3.

8.5.1 General Communication

Table 8.9 shows the students' attitudes towards communication in general on the course.

Table 8.9: Attitudes towards general communication

General Communication					
Item	Question	SA	A	D	SD
21	Communication between the tutor and myself was effective.	1	7	1	-
22	Communication between the GOLDPhase co-ordinator and myself was effective.	7	2	-	-
23	Communication with other students was an important part of the course.	3	6	-	-
24	I felt isolated.	-	3	6	-
25	I prefer interactive classroom discussion to online methods of communication.	1	4	4	-
26	I learned a lot from other students on the course.	-	6	3	-
27	I prefer traditional forms of communication (eg telephone, letter) to online communication.	-	2	5	2

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree, Source: analysis of questionnaire 3.

Responses to item twenty-one indicate that most students found communication with the tutor effective, however, analysis of qualitative data shows that whilst communication was effective once established, many students were hesitant

All respondents agreed that communication with other students was an important part of the course, yet some experienced feelings of isolation in the online environment. More than half agreed that given the choice they would prefer classroom discussion to online methods, though the majority used the communication channels provided to learn from each other.

Analysis of qualitative data shows an overall positive attitude towards using CMC:

Well, I think if anything the Internet must be better because it's more flexible. You can study online; you can speak to people online. Whereas, traditional distance learning is just pieces of paper coming through the post (James, interview).

Personally I think the electronic communication is great and you have done it very well (Peter, interview).

Traditional forms of communication were what I was more used to prior to studying online. Having used the online methods of communicating during my studies I now feel more confident about using this method of communication (Yvonne, questionnaire 3).

8.5.2 Introductions

Table 8.10 shows the students' attitudes towards the Introductions Topic Area.

Table 8.10: Attitudes towards the Introduction area

Item	Question	SA	A	D	SD
33	The Introductions page helped to establish a course community.	3	6	-	-
34	I found it useful to know about other course members.	5	4	-	-
35	The Introductions page was too formal.	2	-	7	-
36	Seeing people's photographs helps me to relate to the person.	5	2	2	-
37	I couldn't see the point of the Introductions page.	-	-	2	7

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of questionnaire 3.

Quantitative data shows the majority of respondents had a positive attitude towards the Introductions page as it helped establish a course community and enabled them to gain knowledge of their peers. To some extent this view is supported by qualitative data:

Introductions were useful to gauge type of personnel undertaking the programme (Graham, questionnaire 3).

It was useful having the Introductions page, it made up for not being able to meet people before the start of the course. It was interesting to read about people's backgrounds and careers (Yvonne, questionnaire 3).

I've got other students that I'm... I wouldn't say I know them, but I feel that I'm acquainted with them just through the introductions that they put up (Catherine, interview 1).

The Introductions page helped students to learn about others on the course, however, further analysis of qualitative data revealed underlying issues related to the themes of 'awareness' and 'insecurity', as intimated by Graham:

I thought that was good actually. I remember going through all the Introductions though and thinking, 'I don't think I should be on this course' [laughing] (Graham, interview 1).

Two respondents considered the Introductions page to be too formal, and this formality appears to have contributed to feelings of insecurity.

8.5.3 The Notice Board

Table 8.11 shows the students' attitudes towards the course Notice Board.

Table 8.11: Attitudes towards the Notice Board

Item	Question	SA	A	D	SD
28	I checked the Notice Board regularly.	6	3	-	-
29	The Notice Board was of little use to me.	-	1	5	3
30	I enjoyed reading the Notice Board.	4	5	-	-
31	The Notice Board added a sense of 'community' to the course.	3	4	2	-
32	The Notice Board helped to support my learning.	3	5	1	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree, Source: analysis of questionnaire 3.

Analysis of quantitative data shows attitudes towards the Notice Board were positive and that all respondents checked it regularly and enjoyed reading the contents. More than half considered the Notice Board added a sense of community to the course and the majority agreed that it helped support their learning. Analysis of qualitative data in relation to the Notice Board supports the quantitative findings and highlights issues related to the theme of 'engagement'.

8.5.4 Computer Mediated Communication

Table 8.12 shows the students' attitudes towards the DG.

Table 8.12: Attitudes towards Computer Mediated Communication

Discussion Group					
Item	Question	SA	A	D	SD
1	The Discussion Group was easy to use.	4	5	-	-
2	I accessed the Discussion Group to read messages on a regular basis.	5	2	2	-
3	I enjoyed contributing to the Discussion Group.	3	3	3	-
4	I found other people's contributions to the Discussion Group intimidating.	-	3	4	2
5	The Discussion Group was a valuable means of communication during the course.	3	5	1	-
6	I felt confident using the Discussion Group.	1	5	3	-
7	Other people's contributions to the Discussion Group helped my learning.	2	6	1	-
8	I felt that people's contributions to the Discussion Group did not necessarily reflect their own opinions.	-	3	5	1
9	I would have liked the Discussion Group to have been used on a more informal basis.	2	5	2	-
10	I felt that my postings to the Discussion Group may be read out of context.	-	4	5	-
11	I don't feel that the Discussion Group supported my learning.	-	3	5	1
12	I didn't feel comfortable using the Discussion Group.	-	4	3	2

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of questionnaire 3.

Analysis of quantitative data reveals mixed feelings towards the DG. All respondents found it easy to use and the majority valued its use as a communication tool. Most reported they felt confident about using it and enjoyed making contributions. The majority accessed the DG on a regular basis, though some did so in order to view postings rather than to contribute, with most students finding others' postings aided their learning. Some students didn't feel comfortable about using the DG and the majority would have liked it to include more informal postings.

These quantitative findings do not entirely reflect the findings from qualitative data in that the latter focuses more closely on the negative impact of the DG on the students' levels of self-confidence. Negative attitudes included fears that messages may be misconstrued; concerns that some people were echoing the

views of others rather than stating their own; and feelings of inadequacy generated by the postings of others. Issues emerging from this category relate to the themes of 'awareness', 'insecurity', and 'engagement' and are discussed in detail later in this chapter.

8.6 Undertaking e-learning Assessment

This section presents findings from the analysis of both qualitative and quantitative data that help answer the sixth and final part of the second question that guided this study:

What are the students' experiences of distance e-learning assessment?

The assessment strategy for the GOLDPhase course consisted of both formative and summative methods. The students' perceptions of both approaches are discussed below under the appropriate headings.

8.6.1 Formative assessment

Three main categories of formative assessment were used in this study:

- Peer discussion
- Individual reflection, and
- Individual self assessment

Reflective questions (RQs) and Self Assessment questions (SAQs) facilitated all three categories. The questions, twenty-four RQs and twenty-nine SAQs, were incorporated within the learning materials and used a variety of strategies comprising ten main formats, each of which incorporated Internet technologies (see Appendix 7).

Table 8.13 shows responses to those items that explored the students' attitudes towards the overall use of RQs and SAQs within the learning materials.

Table 8.13: Attitudes towards RQs and SAQs in the learning materials

Reflective Questions					
Item	Question	SA	A	D	SD
10	The RQs contributed to my understanding of the materials.	5	4	-	-
11	Completing RQs was a waste of time.	-	-	3	6
14	The RQs interrupted the flow of my learning.	-	-	7	2
		A	B	C	D
15	What do you think about the amount of RQs? <i>A: Too many, B: About right, C: Not enough.</i>	-	9	-	
18	How much did you learn overall from using the RQs? <i>A: A great deal, B: Quite a lot, C: A little, D: Nothing.</i>	1	6	2	-
Self Assessment Questions					
		SA	A	D	SD
19	The SAQs contributed to my understanding of the materials.	4	4	1	-
20	Completing SAQs was a waste of time.	-	-	5	4
24	The SAQs interrupted the flow of my learning.	-	-	6	3
		A	B	C	D
25	What do you think about the amount of SAQs? <i>A: Too many, B: About right, C: Not enough.</i>	1	7	1	
28	How much did you learn overall from using the SAQs? <i>A: A great deal, B: Quite a lot, C: A little, D: Nothing.</i>	2	5	2	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of questionnaire 2.

All respondents agreed that the RQs contributed to their understanding of the learning materials, and eight agreed this to be the case with the SAQs. None found the RQs or the SAQs to be a waste of time, and neither type of question interrupted the flow of their learning. The number of RQs and SAQs included in the learning materials was also acceptable and most felt they learned a lot or a great deal from both question types.

Qualitative data related to the students' overall views of the RQs and SAQs reflect these findings and show that the students considered the online questions aided their conceptualisation of the learning materials:

The SAQs were as useful as the RQs in terms of getting your mind around some quite challenging ideas (Catherine, questionnaire 2).

I enjoyed the RQs and the SAQs, because otherwise I have a tendency just to read and maybe not take it in properly. They made me stop and think and I think that's quite important (Christine, interview).

I would say that the SAQs were probably where I gained most benefit, from the questions posed, as they focussed my thoughts (Graham, questionnaire 2).

Overall, the RQs and SAQs made a positive contribution to the students' learning and provided an alternative method for the conceptualisation and reflection of the issues presented.

The quantitative and qualitative findings related to the students' perceptions of the RQs and SAQs within in each of three categories of formative assessment are now presented.

Peer Discussion

The following question formats were used to aid peer discussion:

Format 1 – Discussion Group (moderated). Response typed into online form and sent directly to GOLDPhase co-ordinator (this author) for inclusion in the DG.

Format 2 – Discussion Group (direct contribution)

Format 3 – Discuss in Online Symposium (automated email list)

Table 8.14 shows the students' attitudes towards using CMC to debate issues raised in the RQs and their attitudes towards Formats 2 and 3. Due to an oversight the questionnaire did not include a question related to Format 1, however, this did not impact the study as a large amount of qualitative data was generated in relation to this format.

Table 8.14: Attitudes towards Peer Discussion Questions

Item	Question	SA	A	D	SD	
12	I found it useful to discuss the RQs in the Discussion Group.	2	5	2	-	
13	I frequently visited the Discussion Group to view other people's responses to RQs.	4	4	1	-	
16	Please indicate the extent to which you agree or disagree that each of the following question styles helped you to learn					
	Format	Question	SA	A	D	SD
a.	2	Using the Discussion Group to discuss issues.	5	2	2	-
d.	3	Discussing issues in the Online Symposium.	1	3	5	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of questionnaire 2.

Though the questionnaire did not include a question related to Format 1, qualitative data revealed some interesting issues in this regard, these are mostly related to tutor feedback and are discussed under the theme of 'insecurity'.

Format 2 directed students to the online DG to deliberate issues raised in the learning materials, most respondents found it useful to discuss the RQs in this way and considered this method helped them to learn. The majority frequently visited the DG to view other's responses. Analysis of qualitative data related to this format reveals a more complex situation than indicated by these responses as the students had a number of concerns about the overall use of the DG.

Furthermore, the students' high level of agreement that the DG helped them to learn may be rather attributed to their practice of lurking than to contributing. As these matters are closely allied to the themes of 'awareness' and 'insecurity' they are discussed under these headings in order to avoid repetition.

Despite the students' concerns about CMC, discussing course related issues with their peers aided their conceptualisation of the course materials, helping them to think about and understand the issues under discussion. Graham, for example, found that "the online method provided an immediate opportunity to detail [his] thoughts".

Attitudes regarding whether or not using the Online Symposium (OLS), as in Format 3, aided learning were mixed. Four questions of this type were posed in Module 2. At that stage in the course nine of the original thirteen students were still participating, but only five of the nine used the OLS to respond to these questions. Little quantitative data related to this question format were gathered from the study; therefore no further analysis is included.

Whilst quantitative data indicates that the RQ and SAQ formats in this category facilitated peer discussion, their success was limited, and analysis of qualitative data from this category indicates a number of factors that inhibited student learning, these relate to the themes of 'heightened awareness' and 'insecurity'.

Individual Reflection

The following question formats were used to aid individual reflection:

Format 4 – Revision link

Format 5 – Reflect and continue

Format 6 – Submit response to tutor

Table 8.15 shows students' attitudes towards these formats.

Table 8.15: Attitudes towards Individual Reflection Questions

Please indicate the extent to which you agree or disagree that each of the following question styles helped you to learn.						
Item	Format	Question	SA	A	D	SD
26a	4	Making notes then following a hyperlink back to the relevant section to check against your notes.	3	4	2	-
16b	5	Linking to the next page to read the discussion in the text.	3	6	-	-
16f	5	Working out a problem then moving to the next page to check the answer.	6	3	-	-
16c	6	Making notes and emailing them to the tutor for a response.	3	2	4	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of questionnaire 2.

The students generally agreed that these formats helped them to learn. Format 5, where students were asked to consider an issue, or work out a problem, before

linking to the ensuing discussion or answer, elicited the most positive response in this category, attitudes towards Format 6 were more varied.

The mixed responses to these formats demonstrate how some students took an andragogical approach to certain aspects of learning whilst others preferred a pedagogical approach. Formats 4 and 5 encouraged the students to monitor their own progress and the popularity of these appears to stem from the fact that they were able to complete them in privacy without being observed by their tutor or peers.

Whilst some students disliked Format 6, as emailing a response to the tutor could reveal where they were up to in the course, others took a pedagogical approach and seized the opportunity to demonstrate their progress to the tutor, which may account for the mixed response to item 16c. Some students reported that working online made them feel accountable and gave them a sense that the tutor was observing them. Though these feelings in relation to assessment were in some instances rational, as online submission forms could be collated from the server and viewed, in other instances they were irrational. For example, the students' sense of being observed extended to the way in which they approached Formats 4 and 5, which merely asked them to make notes or to consider an issue. As Catherine explained, even with these types of RQs she had the "perception that someone could be monitoring your usage at the other end and would be able to tell if you didn't pause to reflect". This sense of being observed by the tutor encouraged students to complete the RQs or SAQs as opposed to skipping them. Some students considered this to be a positive aspect of online learning as they felt it encouraged them to be diligent and thorough in their learning. However, it would appear that their actions were driven by their sense of being observed by the tutor, thus demonstrating a lack of self-autonomy.

Analysis of qualitative data related to the RQs and SAQs in this individual reflection category highlight that this category enhanced student learning as it facilitated conceptualisation of the materials. However, this category also engendered feelings related to the themes of 'heightened awareness and 'feelings of insecurity'.

Individual Self Assessment

The following question formats were used to aid individual self assessment:

Format 7 – Multiple-choice question

Format 8 – Solutions button

Format 9 – Online form with diagrammatic response

Format 10 – Make notes or complete a diagram and retain for revision

Table 8.16 shows students' attitudes towards these formats.

Table 8.16: Attitudes towards Individual Self Assessment Questions

Please indicate the extent to which you agree or disagree that each of the following question styles helped you to learn.						
Item	Format	Question	SA	A	D	SD
26b	7	Selecting an option from a multi-choice question and submitting a form which returns an immediate response.	5	4	-	-
26c	8	Working out an answer then clicking the 'Solutions' button to see the model answer.	6	3	-	-
26d	9	Submitting an answer in a form and receiving an automated response showing the correct answer.	6	3	-	-
16e	10	Making notes and retaining them for revision.	3	5	1	-
16g	10	Printing out a blank table, completing the table and retaining it for revision.	3	2	4	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of questionnaire 2.

The students showed a positive attitude towards the RQs and SAQs in this category and considered these types of questions helped them to learn.

Those formats that provided computer aided feedback (CAF), that is, Formats 7, 8, and 9 were considered the most likely to facilitate learning. This view is supported by qualitative data drawn from the wider cohort, which shows Format 7, the multiple choice question, as being the most popular in this category.

These formats allowed the students to monitor their progress and decide whether they should proceed or take remedial action where necessary. For example, when students submitted an incorrect answer the online response suggested that

they re-visit the learning materials before attempting the question again. The response also directed students to alternative online resources to enable them to gain a different perspective on the topic and thereby reinforce their learning. All respondents found the automatic response to correct answers reassuring (see Appendix 9, Table 2, item 22) and the majority considered the automatic response to incorrect answers provided adequate guidance about what to do next (see Appendix 9, Table 2, item 23). The students appeared to make good use of the automated response SAQs, with none of the respondents skipping the questions altogether (see Appendix 9, Table 2, item 27d) and only one reporting that he looked at the responses before attempting the questions (see Appendix 9, Table 2, item 27b).

Format 10, which asked students to make notes or complete a table to be retained for revision purposes, was the least popular in this category with students reporting that they were less likely to complete this type of task because it did not provide any feedback.

Analysis of quantitative data indicates that the RQ and SAQ formats in this category did facilitate self assessment. Furthermore, analysis of qualitative data shows these formats aided the students' conceptualisation of the learning materials. The following extracts support this finding:

I found the SAQs in the maths part of the last blocks particularly helpful and they helped me to assess whether I had fully grasped the material or not (Joanne, questionnaire 2).

That was useful, to get the feedback. I think on a few of those I got them wrong the first time. I had to go back and see where I had gone wrong and try and work it all out (Catherine, interview 2).

There was also evidence that those SAQs that provided CAF, that is, Formats 7, 8, and 9, further encouraged self-autonomy and improved self motivation.

When Graham reached this stage he sent an email expressing his enthusiasm for this type of question.

Shock, Horror! I have made it into Block 6 and have been attempting some of the multi-choice questions, it may be because I was correct in my original answers but I found them very useful and interesting as a way of reinforcing that I had understood the concepts of risk quantification (Graham, email).

Later, in our second interview, Graham reflected on his experience:

I'm no good at maths it was my worst subject. But I must have gained a lot of confidence. I must have become confident because I got quite good at those first few (Graham, interview).

When asked whether his confidence stemmed from a new found enjoyment of maths, or the fact that he could monitor his progress, Graham replied:

I think it was a combination of, what's the word, self-fulfilment basically, that I could do it anonymously. Because you get the answer back without having to go through anybody... The thing about the maths ones that was good, right, was the fact that you had this chance to work it out for yourself and you actually got an answer. I liked that, that was the good bit. But if you'd just put those maths things up then I'd have given up, I wouldn't have done them (Graham, interview 2).

Graham therefore found that CAF boosted his confidence and reinforced his learning.

Joanne also responded positively to Formats 7, 8, and 9. At the beginning of Module 2, having received a fairly low mark for her first assignment, she was feeling somewhat despondent about her level of progress and considered withdrawing from the course. Once she reached Block 6 of Module 2 and undertook the individual self assessment questions there was a marked improvement in her confidence and motivation. At this stage Joanne made the following entry in her reflective diary:

Halfway through Block 7 now, I am really enjoying the maths, even took the chart up to bed with me last night to make sure I had fully understood it. Have just gone into the site and checked my answers and they were all right. Wish all the course was like this. Can't wait to get into the next part. Find this probability [subject content] fascinating... (Joanne, reflective diary).

The success that Joanne achieved through CAF increased her motivation and helped her to engage with the learning materials.

Other members of the cohort also appeared to be encouraged by those questions that provided CAF:

Finished Block 6, got all the awkward problems right first time! (Olwen, reflective diary).

I think the 'instant' feedback is a good idea (Peter, email).

These individual self assessment formats helped the students to take responsibility for their learning by allowing them to identify their learning needs

and to take appropriate action, for example, by revising the learning materials or seeking additional resources. This enabled them to assess their learning needs in privacy, without intervention from the tutor or being observed by their peers, thus encouraging self-autonomy. When the students moved on to using these question types there was a marked improvement in their confidence and motivation. Providing CAF helped the students to take responsibility for their learning, encouraged self-autonomy, and increased self-motivation.

8.6.2 Summative assessment

Summative assessment took the form of one written assignment and one three-hour final examination for each module studied. At the time of the GOLDPhase study final examinations were a requirement of the MSc OSH. As no arrangements were in place for these to be sat externally members of the GOLDPhase cohort were required to attend the university. Nine students studied the online modules through to the end of the course and seven attended the examinations. Table 8.17 shows the results for each module.

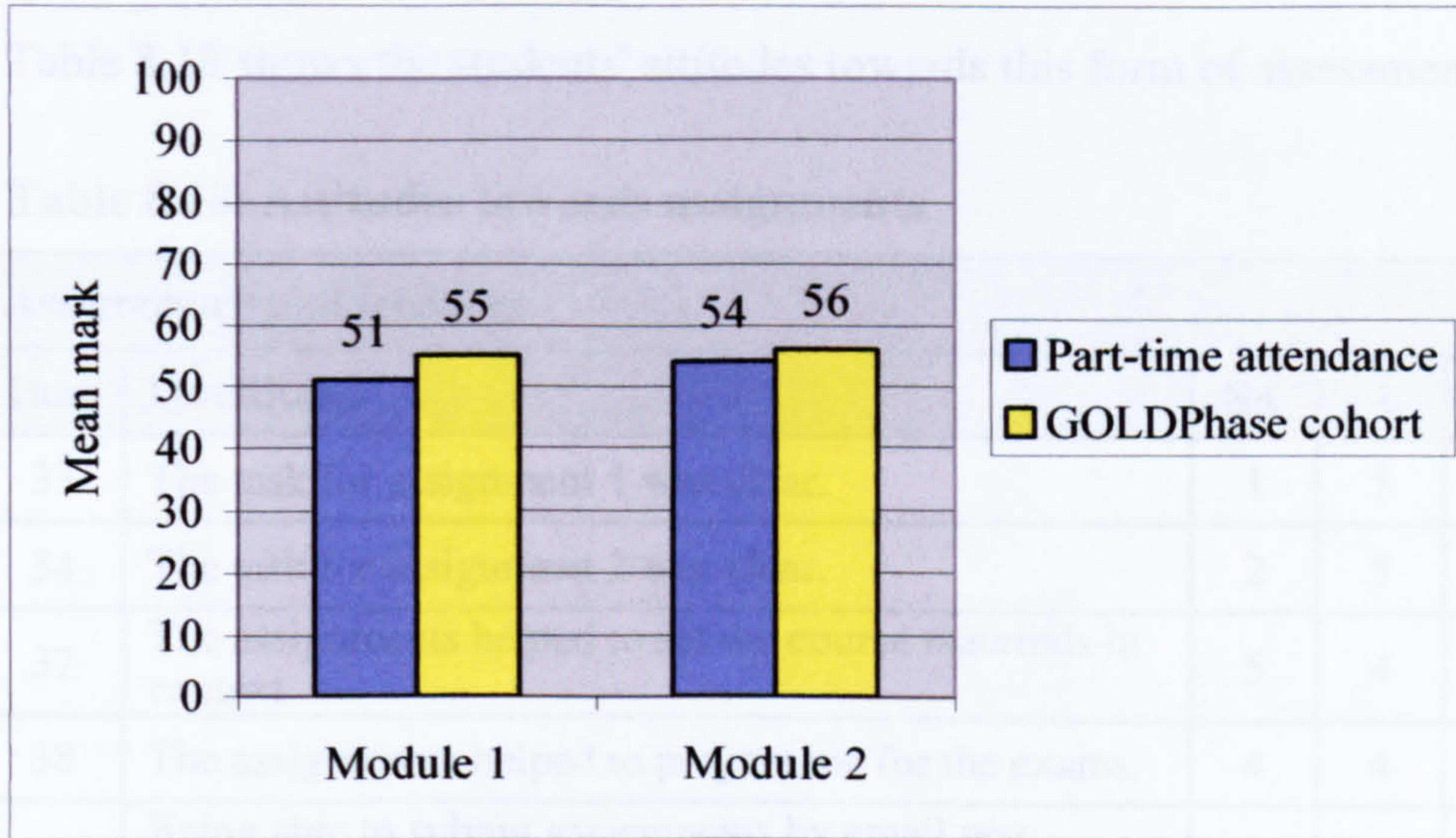
Table 8.17: Module 1 and 2 learning outcomes

Name	Module 1		Module 2	
	Exam %	Assignment %	Exam %	Assignment %
Adam	72	60	60	58
Andrea	W	45	W	W
Christine	W	W	W	W
Catherine	60	90	65	80
Chris	W	W	W	W
David	40	40	40	45
Graham	52	40 (PR)	48	40
Joanne	65	40	65	45
James	NA	50	NA	NS
Olwen	58	60	58	60
Peter	35(R)	55	55	60
Sally	W	30 (R)	W	W
Yvonne	NA	50	NA	NS

Key: R = referred; PR = post referral; NS = not submitted; NA = not attended; W = withdrew.

Christine and Chris withdrew from the course before undertaking any summative assessment. Andrea and Sally submitted their first assignments before they withdrew from the course. James and Yvonne finished the online phase of the course but did not submit their second assignments, nor did they attend the examinations. Therefore seven students completed both forms of assessment for Modules 1 and 2. The mean mark for these seven students was 55% for Module 1 and 56% for Module 2.

Figure 8.4 shows how these results compare with the part-time attending students who studied the same modules in the same semester.

Figure 8.4: MSc Occupational Safety and Health assessment results

Source: analysis of Module 1 and 2 assessment

The GOLDPhase cohort achieved a slightly higher overall score than the attending students (4% higher for Module 1 and 2% higher for Module 2).

Whilst this is not a comparative study, and the groups were relatively small, the results demonstrate that the e-learning group achieved outcomes comparable to those of attending students.

Written Assignments

Each module assignment comprised one piece of written work of approximately 2,500 words in length. Assignments were submitted via e-mail and tutor marked using the review and comments facility in Microsoft Word. This enabled students to read the tutor's remarks or corrections in context. The marked assignments were returned via email together with the coursework assessment sheet.

Table 8.18 shows the students' attitudes towards this form of assessment.

Table 8.18: Attitudes towards assignments

Assignments and feedback					
Item	Question	SA	A	D	SD
33	The task for assignment 1 was clear.	1	5	3	-
34	The task for assignment 2 was clear.	2	5	2	-
37	The assignments helped to set the course materials in context.	5	4	-	-
38	The assignments helped to prepare me for the exams.	4	4	1	-
40	Being able to submit assignments by email was convenient to me.	8	-	1	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of questionnaire 2.

Responses to items 33 and 34 indicate the majority found the assignment tasks clear; yet this is contrary to the findings from qualitative data, which reveal that these created a fair amount of uncertainty and anxiety amongst the students. These issues are related to the theme of 'insecurity'.

The students generally agreed that the assignments helped set the course materials in context and prepare them for their examinations. Catherine found the first assignment "really put the whole module into context" and that if she had not done it she would not have "got nearly as much out of the study materials". Graham, who suffered considerable anxiety over the assignments, echoed these feelings:

Didn't like the assignments when I had to do them but found them invaluable once I had managed to complete them (Graham, questionnaire 3).

Students also liked being able to submit their assignments via email as this was convenient and allowed them the flexibility to send their submissions at any time of the day or night.

Table 8.19 shows the students' attitudes towards tutor feedback on their assignments.

Table 8.19: Attitudes towards tutor feedback

Assignments and feedback					
Item	Question	SA	A	D	SD
35	The tutor provided feedback to me in a timely manner.	4	4	1	-
36	The quality of feedback provided by the tutor met my needs as a learner.	1	5	3	-
39	The tutor's use of the word processor to insert comments in my assignments helped me to understand those comments in the context of the assignment.	7	1	1	-

NB: SA = strongly agree, A = agree, D = Disagree, SD = strongly disagree,
Source: analysis of questionnaire 2.

Most respondents agreed that the tutor's feedback was timely. Whilst the majority agreed the quality of tutor feedback met their needs as learners', qualitative data shows the issue of tutor feedback was a cause for concern amongst the students, this is also related to the theme of 'insecurity'.

The use of annotations in Word for marking assignments was well received with the majority agreeing this facility helped them to understand the comments in the context of the assignment, as articulated by Yvonne:

I really liked the way the comments were put. When I got it back and went through the highlighted bits, and the comments, it made sense to me then (Yvonne, interview).

Overall the formative and summative strategies used in this study helped the students to engage with the learning materials and aided their conceptualisation of the issues presented, with the students overall average marks for both modules being slightly higher than those achieved by the attending group. The learning outcomes of this group of students support the view that there is no significant difference between the learning outcomes of those studying by distance learning and those studying in a face-to-face environment (Clark, 1983; Agostino, 1999; Saba, 2000). However, as argued by Russell (1997) and Phipps and Merisotis (1999), focussing on learning outcomes alone can obscure the complexities of how individuals react to using technology for distance education. This study revealed that some students found certain aspects of assessment, such as using the DG and tutor feedback, inhibited their learning. These issues were mostly

related to human factors rather than technological ones and are examined more closely in the section that follows.

The first six sections of this chapter have attempted to answer the second and third questions that guided this study by presenting the students' experiences of the six categories within Question 2 and highlighting any andragogical issues related to them. However, a large proportion of the data presented within these sections has been drawn from quantitative findings, which as discussed in Chapter 5, can fail to provide in-depth analysis at an explanatory level or reveal underlying meanings of students' experiences and behaviours. Therefore, whilst the quantitative and qualitative data presented above answer the questions, they do not present the full picture as they obscure the underlying themes that emerged from the study. These themes were largely identified from the analysis of qualitative data and are presented next.

8.7 Themes emerging from the research

Throughout this chapter I have referred to the themes that emerged from the analysis of qualitative data. As the reader will have discerned, these themes are not necessarily confined to one of the six elements identified in Question 2, but frequently cut across two or more. To help identify the elements of e-learning to which these themes are related, they are displayed in matrix form in Table 8.20.

Table 8.20: Relationship between elements and themes

Elements	Themes			
	Engagement	Strategies	Awareness	Insecurity
Virtual learning environment	✓	✓		
Learning materials	✓	✓		
Information	✓			
Resources	✓			
Communication	✓	✓	✓	✓
Assessment	✓	✓	✓	✓

Each theme is illustrated with a selection of extracts from the data. Not all of the themes were necessarily applicable to all of the students.

8.7.1 Engagement with e-learning

One of the positive themes to emerge from this study is the students' engagement with e-learning. A number of factors contributed to this, including the live aspect of the Internet, the variety of activities used in the learning materials, and the communication channels provided. These features appeared to have a dual effect on the students, firstly, by providing an incentive to commence study sessions, and secondly by retaining interest throughout study periods.

Allurement

The first illustration of this theme is the way in which the students found the study environment alluring. Distance learning can be isolating (Robinson, 1981) and finding the motivation to engage in learning activities, particularly at the end of a long working day, is one of the main problems faced by distance learners. The students in this study found that the 'live' aspect of the learning environment provided the motivational incentive to commence learning sessions. The Notice Board, for example, enticed them into the site:

The Notice Board was of value to me because it often provided an added incentive to go into the site. I enjoyed reading the contents (Joanne, questionnaire 3).

I checked the Notice Board every time I logged on and was disappointed if there was nothing new on there (Catherine, questionnaire 3).

You see I think that [the Notice Board] was a good thing, especially at the start. Certainly, when I go in I'll go into that area first before anything else (Graham, interview 1).

Joanne and Catherine found that the CMC element of online learning, such as the DG and email, also provided an incentive for them to commence their learning sessions:

I've really enjoyed reading some of the things in the Discussion Group and I look forward to going into it and seeing what other people have put. I've also enjoyed getting email. A friend of mine never gets anything, she's quite jealous (Joanne, interview).

And there's always that 'Oh I wonder if I've got any messages?' And I have that kind of thrill, you know going 'I wonder if anyone's replied to anything, I wonder what else someone has put in' (Catherine, interview 1).

At one stage in the course Catherine was unable to access the Internet for a few days due to technical problems. Her eagerness to return to the online environment is evident from her diary entry:

I have been a bit held up, because of lack of access, so I am bursting with issues for the RQs and the Discussion Group and can't wait to get them down (Catherine, reflective diary).

When Joanne transferred to the paper-based workbooks at the end of the study she missed the live aspect of e-learning:

I miss the email contact since going on to paper-based. Also I miss the Notice Board and going into the site (Joanne, Kolb feedback sheet).

Chris frequently recorded in his reflective diary the sequence of events he followed when studying, which typically read, "Accessed GOLDPhase, checked emails, checked Notice Board, accessed study blocks...", thus indicating the lure that the interactive elements of the course held for him.

Catherine found that the act of sitting at the computer helped to engage her interest:

If I sit at the PC and do it, it grabs my attention more (Catherine, interview 1).

Retaining interest and motivation

In addition to luring the students to initially commence study, the VLE also helped to retain their interest and motivation throughout study periods. Some described how the 'live aspect' of the Internet helped to engage them with their learning. The use of animated images was particularly well received. Though few animated images were used in GOLD Phase, the students found they added more than visual stimulus, but made the learning environment come alive and aided the retention of information in a way that the printed page could not.

Sally pointed out that "health and safety is a very practical" subject, and though the discussions in the learning materials were mostly theoretical, "pictures are still necessary". Adam enthused that pictures "excite the mind a little bit more than something that is just printed on the page". Though Catherine would have

liked more images she considered those used to be more effective because they were relevant, citing the moving image of the cyclist accompanying the discussion on the cycle helmet debate in Block 4 of Module 2 as a good example of using images in a light-hearted yet meaningful way.

The varied activities provided in the VLE, for example the use of RQs and SAQs, linking to the Case Study, and directed reading also maintained student interest. In our interview I asked Yvonne to explain how she thought online learning differed from paper-based distance learning. Her response revealed how the Internet helped to engage her with her learning:

I think the Internet is better. I think it stimulates you more, because you're using a computer. I think when you're reading a book you can get bored. You know, you're reading but you're not taking it in. It's as if you're on autopilot. With the Internet you're reading it, but you're aware that you can do these alt+tab things and you can go where you want. So it actually keeps your interest. It keeps your concentration more (Yvonne, interview).

Yvonne re-stated this view at the end of the study:

When I first started studying in GOLDPhase I felt nervous but once I got used to it my confidence grew and I really enjoyed my studies. It was more stimulating than just reading notes from a book or text (Yvonne, questionnaire 1).

Adam also found that the online environment stimulated his learning:

Because you do miss the benefits if you regard the Internet only as a postal service, don't you? Because it's the live aspects of it that in the end make it more stimulating (Adam, interview).

Catherine found that the 'Read This' activity boxes encouraged her to read the texts:

Where it says 'Read This' I think I was less tempted to skip on ahead without doing the reading. I'm conscious that with the paper-based system, if I come to a bit that says 'Now Read This', that I haven't read it straight away. I've carried on reading through the text. Whereas, I don't know, [voice lowered] it's almost like the computer is alive, like it would know. So I did what I was told (Catherine, interview 2).

Some students found that CMC further engaged them with their learning, as the process of detailing their thoughts in writing helped them to assimilate information:

Though there was a lack of general participation in the online discussions, putting my thoughts down on the word processor (I was going to say paper!) did force me to really consider my point of view - I often found I completely changed my mind half way through, or at least realised some issues weren't quite as clear cut as I'd first thought (Catherine, questionnaire 2).

Lurking

Whilst some students rarely participated in online dialogue, most enjoyed being able to 'lurk'. Lurking is the term used to describe the practice of participating in CMC by reading others' postings but not actively contributing. The ability to observe both the threaded DG and the OLS helped students to keep track of the discussions and learn from their peers' postings:

Whenever I felt uncertain about how to answer a question it was reassuring to have the responses there to help (Yvonne, interview).

I found the RQs interesting especially reading other peoples' responses to the same question; it often made me think again about my answer... Even when I stopped contributing to the symposium I still read those responses posted (Yvonne, questionnaire 2).

Catherine, though a regular contributor to the DG, also found it reassuring to see others' responses to the RQs:

It's good at the moment just seeing other people's ideas. I try not to have a look at the Discussion Group before I answer. I'd rather do my answer first and then have a look at what they've written. I mean I must be on the right track because everyone else is coming up with the same things and that's reassuring (Catherine, interview 1).

Though James did not contribute to any of the discussions he found CMC of value to this studies, frequently taking on the role of a 'lurker':

You get different people's perspectives and experiences in there. And I think that's relevant and it's good for generating ideas. You talk about various accidents, and so on, and as I say other people's experiences come out through that. And the more ideas you generate, it's like case law in the legislation and legal purposes for precedents, the more you have the more you can see how this particular point comes across and how it actually works (James, interview).

Christine also recognised the value of CMC for gaining an understanding of others' views:

Oh excellent for that, yes, [seeing others' views] because you can see that, you know, if you were a bit confused so are three or four others. And you feel encouraged by that (Christine, interview).

It would seem that the practice of visiting the DG group, whether to contribute or lurk, helped engage the students with their learning.

This theme of engagement with e-learning has shown how the students were lured to the VLE and the ways in which the interactive environment helped to engage them by retaining interesting and stimulating learning.

8.7.2 E-learning strategies

A further positive theme to emerge from the study was the online learning strategies that the students developed to reinforce their learning. These strategies differed from those adopted by traditional learners and paper-based distance learners and were facilitated by the use of hypertext. The strategies used fall into three categories: gaining a holistic view, gleaning for facts, and looped learning. The students used these strategies to help them gain an overview of the course, to conceptualise the learning materials, and to reinforce their learning.

Gaining a holistic view

The online environment enabled students to use the study materials in ways that traditional learners cannot. As multiple study blocks were available at any one time, and each study block and its associated resources represented one or two lessons, students were able to gain access to more than one 'lesson' during any given period. This was facilitated by the tables of contents and the navigation links between the modules and study blocks, which enabled the students to look ahead to forthcoming 'lessons' and thus gain a holistic view of the course. In the following extracts the students explain how they used this strategy to gain an overview of the learning materials:

...whereas if you can scan through the whole module, well in fact what I do is just read them several times, gradually reading them more slowly, or going to points that I don't understand and spending more time on them. I find that a much more useful way of trying to absorb information than just having it spoon fed, where it tends to get boring, and you don't know the relevance of it to the next bit that is coming along (Adam, interview).

I like to read things and then relate them across when I've read it as a whole. (Graham, interview 2).

I had a look at some of the headings and there was an index at the beginning of each block you go to so I looked through that (Catherine, interview 1).

I didn't read them in detail. I just scanned through to look what sort of headings were coming up (Olwen, interview).

I didn't start [with subsequent blocks], I read through some stuff but I can't say I studied them. I just sort of read through them just to have a look at what there was, you know (Yvonne, interview).

Twelve of the thirteen students scanned through the materials in the manner described above but were not tempted to start studying the materials for forthcoming weeks. The exception was David who also scanned through the materials, but as discussed earlier began by answering questions in Block 8. Most used this 'looking ahead' strategy at the beginning of their studies to gain an overall view of the course, finding the approach helped them to understand the 'big picture' of the issues under discussion.

As the course progressed the students were able to look back as well as forward. They frequently moved back and forth between current and previous blocks of study, checking details and reinforcing their learning:

Every paragraph makes you think. And I've found as I've gone along I've sort of gone back to the first blocks and had a look at them, and that I've sort of had different ideas. And I've viewed it differently reading it for the second time around and with the knowledge of the other course work (Joanne, interview).

I think it's much better because you can go back to it and think about the issues. And it's wonderful because of the way that it's presented, it's so easy... You can copy and paste and make your own notes and you can't do that in the classroom, so it's superb from that point (Catherine, interview 1).

The ability to move back and forth through the course materials in this way, according to individual preferences, enabled the students to gain a holistic view of the course, which appeared to aid their conceptualisation of the materials. Yvonne pointed out that this approach is one that cannot be taken in paper-based distance learning courses where the materials are sent progressively over time. Nor is it possible in the classroom situation where learning is delivered in small chunks and the tutor, rather than the learner, determines both the volume of the chunks and the pace at which they are delivered. David aptly summarised this strategy of online learning by pointing out that in the traditional classroom you can't attend next week's lecture this week, but on the Internet you can. Approaching the materials in the ways described above enabled the students to take a holistic view of the course and feel in control of their learning.

Gleaning for relevant facts

In addition to providing the students with a holistic view of the course the above strategy was also used to glean relevant facts from the materials.

The materials presented in the GOLDPhase course built upon concepts introduced in preceding blocks and to some extent required a linear approach, which is the path the majority took. Whilst the students found some of the issues fairly challenging, they took a considered approach to their learning and aimed to fully grasp the concepts presented in one block before progressing to the next:

I have had a look at Block 7 [Module 2], but must make sure I understand Bayes Theorem before I begin this next block (Joanne, reflective diary).

[I've] not particularly [studied] out of order, but would say I've had a glance through things that I've thought might be interesting to me, but then I tended to go back and do the bits that I should have been doing (Graham, interview 1).

Well I usually try to go one block at a time; sometimes I look ahead (Peter, interview).

Whilst the students took a mostly linear path through the study blocks they also dipped in and out of forthcoming blocks gleaning information according to their needs. Sally, for example, found she was starting to slip behind in the study schedule and that the first assignment was fast approaching. As a coping strategy she scanned through the remaining blocks of Module 1, picking out references and locating issues relevant to the assignment. After completing the assignment she returned to the blocks she had previously skimmed through and studied them in more depth.

A further example of utilising the materials according to individual style and need is provided by David who liked being able to exercise control over his learning and regularly skipped those areas he was already familiar with, citing 'domino theory' as one such example of this. As he was already familiar with this concept David moved on to the next section thus "saving time and the boredom bit". He joked that the ability that e-learning gave him to skip familiar concepts saved him many hours of "counting ceiling tiles", a practice in which he had apparently become extremely skilled during his time attending classroom based lectures in college.

This 'gleaning for facts' strategy was also used as a revision technique. Firstly, the 'lecture' notes were readily available and could be revisited at any time, thus reducing reliance upon hand written notes. Secondly, the hyperlinked tables of contents within the study blocks made it easy to locate specific topics and retrieve information. Adam identified these revision strategies as one aspect of e-learning that supported the way he liked to learn.

'Looped' learning

A third strategy is that termed here as 'looping'. Analysis of qualitative data drawn from all thirteen students provides further insights into their perceptions of the inclusion of RQs and SAQs in the learning materials and highlights two main issues. Firstly, these aided conceptualisation of the issues presented within the materials, and secondly they encouraged reflective thought. In the following extracts three students discuss their perceptions of the RQs and SAQs:

Oh they definitely help you get thinking. They helped me clarify my thoughts, but then I wouldn't remember those thoughts, I would remember the concept (Catherine, Interview 2).

I think they're good. I mean you do come across them and think, 'Oh I've really got to think now'. But that's the whole point of it so, you know, I like them because they concentrate the mind. They make you sit down and have a think rather than just reading along for hours, they make you interact with it (Andrea, interview).

I think it would definitely reduce the quality of the site if they [the RQs and SAQs] weren't there. I think they make you think about what you have gone through (David, interview).

The thinking process prompted by the RQs, as described above, was not confined to the students formal online study periods, but extended into their daily lives. One student explained that she frequently found herself mulling over issues raised in the RQs whilst pushing a supermarket trolley during her lunch break. The presence of the RQs within the learning materials appeared to help the students to hold issues in abeyance for consideration, whilst they moved on through the materials. Having distilled the information they then re-considered former issues in the light of additional learning. This 'looping' of concepts was facilitated by hypertext, which influenced the way in which the students moved through the materials:

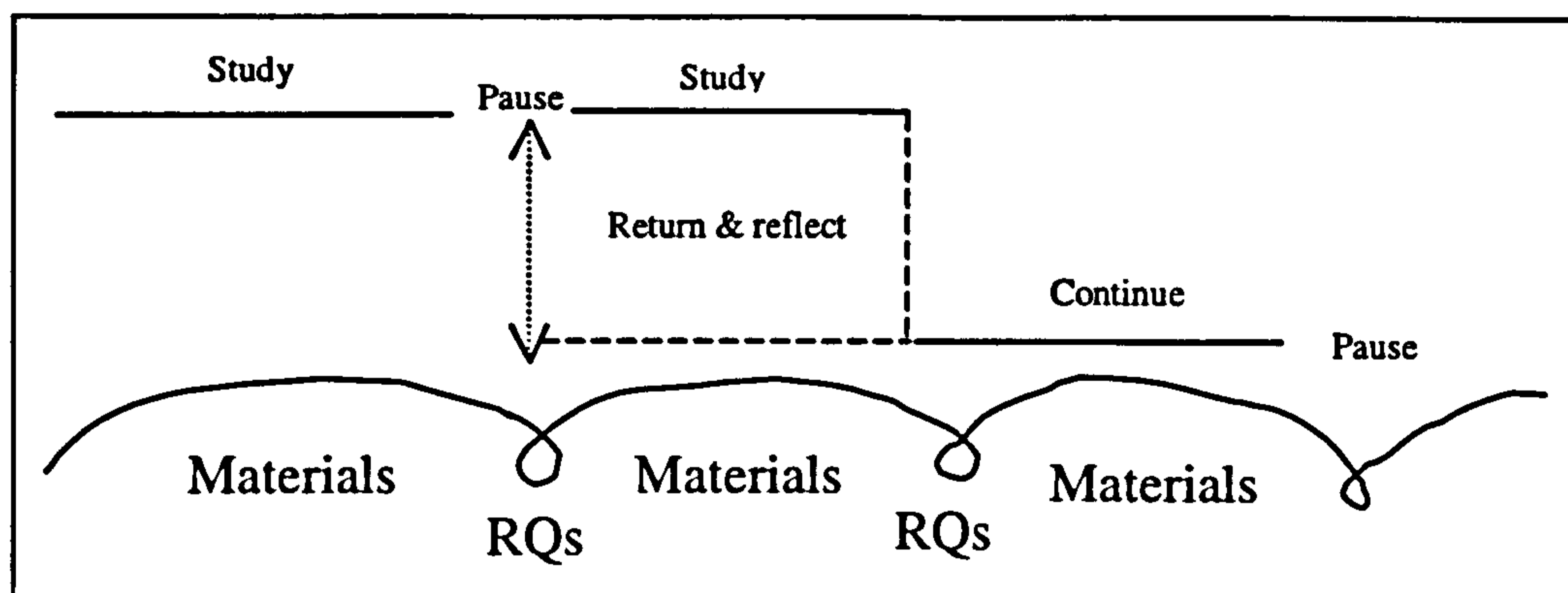
I have now reached a point where I find I can't answer some of the RQs straight away because the issues are too complex, so I often continue to work through the materials while I mull over the questions when I am away from the PC. I do this because I can't always study when I want to due to domestic commitments (Catherine, interview 1).

Andrea used the same strategy, preferring to consider issues, make notes and return to the questions later:

I like to think I've had a good stab at it rather than putting down the first thoughts that came in my head. I had to think about what I thought and how I could structure it and go from there (Andrea, interview).

Figure 8.5 shows a graphical representation of the looping process the students used to aid reflection as they worked through the learning materials.

Figure 8.5: Model showing 'looping' process



The curves in the model represent the learning materials and the circles represent the RQs within the materials. Learners read the materials, paused at the RQs, considered the issue(s) raised and continued through the materials. Then in the light of the new information they looped back and re-considered previous RQs before continuing again. Learning in this way is a looped process rather than a linear one, it allows for reflection and the reinforcement of concepts and is facilitated by hypertext in the online environment.

Thus, the students in this study made use of hypertext to develop a range of e-learning strategies to, firstly, gain a holistic view of the course, secondly, locate facts relevant to their individual needs, and finally to reinforce their learning.

These strategies enabled the students to interact more closely with the learning content.

Jonasson *et al.*, (1993) describe three stages of knowledge acquisition, introductory, advanced, and expert. The three strategies of e-learning described here demonstrate that hypertext supported a constructivist style of learning that encouraged the students to engage in the expertise phase of knowledge acquisition. In this higher stage of learning students develop the ability to draw on interrelated concepts, which helps them to develop problem-solving skills and to relate existing knowledge to current situations. The expertise stage is considered to be most beneficial to practitioners studying in higher education as it encourages reflective learning (Jonassen *et al.*, 1993). Thus, for some students in this study the process of higher order thinking and reflective learning, as required by occupational safety and health professionals, was facilitated by the use of hypertext in the VLE.

Moreover, the various strategies used in navigating the learning materials further demonstrate self-directedness, as they enabled students to select the order in which they studied the materials, to take a discursive or recursive approach, and to control their own pace of learning rather than depending upon the teacher's pace of delivery. Thus the accessibility of the online materials enabled students to exercise greater control over their learning.

8.7.3 Heightened awareness of others

The themes presented in this section and the one that follows were the strongest to emerge from this study. This section discusses the theme of 'awareness', which relates to the students' apparent heightened awareness of others in the VLE. The section that follows discusses the theme of 'insecurity', and focuses on the students' thoughts and feelings as e-learners. These two themes are not distinct but include some degree of overlap.

Though the overall attitude towards the learning environment was positive some underlying tensions that acted as inhibitors were also evident. The students described vague feelings of awareness in the online environment. These feelings were expressed in a variety of ways with the students alluding to feelings of

pressure, a sense of being watched, and a wariness of their peers. Such feelings largely emanated from the DG and assessment.

Awareness of peers

Olwen described a sense of 'pressure' in the VLE:

While I found the presentation of the site attractive, and clear and pleasant to look at, there was something about it that made me feel more pressurised when compared to paper based distance learning courses I have used before (Olwen, questionnaire 1).

Adam experienced similar feelings of pressure, explaining that these were not so much generated by the site itself but by a sense of the presence of his peers:

I suppose what you could say is that if you're going into a classroom with other people you know that you're up to speed and you can see what's going on. Whereas going to this Web site and being on the Internet for the first time and not actually seeing anybody, you feel that you might be... [hesitation] in my case I felt that I might be way behind. Or not doing it right, or something like that (Adam, interview).

The main source of this awareness was the DG. From here the students could, to some extent, gauge the progress of their peers by observing their responses to the RQs. This practice made some students conscious of their own pace of learning:

I could see where other people had got to by looking. Because I joined late some people were already online and they were on the next block and I was thinking, 'Oh God'. And they had already responded to some questions, so if I put a response in and people had already discussed it I'd think, 'I bet they must think I'm really stupid'. You know, because I put it up without reading their stuff (Catherine, interview 1).

The subjects in the Discussion Group are way ahead of me. Panic!! (Christine, reflective diary).

This sense of awareness of other students and their progress through the learning materials had different effects on the students. It motivated some to respond to those questions that asked them to debate issues in the DG:

It was probably my own perception that I felt that if I fell behind, because you have to bear in mind that I'd been answering SAQs and RQs... And if you weren't posting things up then maybe it could be supposed, by your fellow students, that you weren't keeping up (Catherine, interview 2).

I felt as though there was a commitment, it wasn't that we were being marked but it was being, you know, monitored, if we did reply or not, I felt that I had to reply. Which is good because it made me do it. So I don't think that's a

negative, I think that's a positive thing. Yes because you know when you're at home and you've got ten million other factors around you, and you've got to think, 'No I really must get on with that because there'll be someone else's on there.' So it does push you to do it (Andrea, interview).

This competitive element had a positive effect on some students' learning.

Catherine, for example, commented:

Once I got into it the Internet opened up a whole lot of new possibilities for me. I have got much more out of online than paper based because I felt that there were other people out there that I had to keep up with and this encouraged me to study more frequently and attentively (Catherine, questionnaire 6).

Early on in the course Catherine noted that the way she studied in the online environment differed from how she had previously studied on distance learning courses:

I feel I have put more effort into study than I have done in paper based distance learning. You know that there are other students out there who are working alongside at the same pace as you and that pushed me a bit (Catherine, reflective diary).

At the end of the pilot course, when continuing with the MSc by studying the paper-based distance learning materials, she reaffirmed this view:

Yes I felt pressured, but at least it forced me to do the work - I do need a bit of prodding! (Catherine, questionnaire 4).

I don't feel quite so pushed or motivated as I did by the online course. There isn't the same sense of urgency (Catherine, telephone conversation).

An awareness of others in the DG also had a motivational effect on Adam in that it encouraged him to think about the issues raised:

The style of RQs where the answer was reviewed by others got me thinking hardest, but I am glad they were not all like that (Adam, questionnaire).

It is interesting that Adam considered his answers to be "reviewed" by his peers, as this was not the intention. Peer review was not mentioned anywhere in the course and the intention of using the DG for the RQs and SAQs was merely to stimulate debate about the issues under consideration.

Whilst peer awareness motivated some students it had a negative impact on others. Though most indicated that they liked the RQs and SAQs, many disliked visiting the DG only to find that others had already addressed a topic:

Well it wasn't that I didn't like them... It was just when I read what everyone else had put in as an answer and I had to think of new ideas. And I was like, 'Oh I've missed out on that'. If you were all together in a lecture theatre I mean you could all answer at once or something (Sally, interview).

And also sometimes people would get there before me and I would think, 'Oh well that's what I would have liked to have said, there's no point in saying it again, I don't really feel I've got anything additional to contribute' (Christine, interview).

The thing was, I don't know if I was a bit late, but every time I got to the Discussion Group the information was there. I'd be saying something, this particular sentence, and it would be there, someone had already done it basically (Chris, interview).

Olwen was particularly concerned about this issue and raised it during our interview:

I also have a query about the RQs and SAQs and the replies in the Discussion Group. Are we all expected to make a response, or only reply if we have something different to add to the discussion? Since the first respondent has given more or less the same replies that I was about to, in defining an accident and listing incidents that have given rise to changes in legislation, there seems to be little point in replying. But is this a requirement of the course and will we be penalised for not contributing, even if it is only replication? (Olwen, interview).

My response was that students would not be penalised for their lack of contributions to the DG, the aim of which was to provide them with the opportunity to explore issues in more depth, or to raise their own topics. I also pointed out that where issues had already been covered Olwen might take the opportunity to expand on the discussion or to present an alternative view. However, rather than building on the discussion and considering others' viewpoints the students appeared to view the DG as a rush to answer the questions, assuming there to be a right or wrong answer, rather than the opportunity for dialogue.

The source of the students' heightened awareness of each other was not confined to the DG. My interview with David took place early in the pilot course when he had yet to submit his contribution to the Introductions page. In discussing this David revealed that having read the other participants' Introductions he was hesitant to submit his, fearing that due to his lack of first degree, his educational background might be inferior in comparison to other members of the cohort.

Andrea, who did have a first degree, also suffered feelings of inadequacy when reading the Introductions page, explaining:

I was quite scared by the Introductions when I read them because everyone seemed to be really high up and I wasn't... They seemed to be very much specialist health and safety, whereas my background isn't specialist... I set myself high standards and I like to attain them and I like to feel that I've got a good grounding. And when I read the other things I thought, 'Oh God! I haven't got a good grounding at all compared with you people (Andrea, interview).

David's and Andrea's comments illustrate the lack of foundation for their fears. They were more than likely intimidated by each other, as each represented what the other admired. Though David did not have a first degree he had considerable experience to draw upon. Andrea, being at the beginning of her career, had little experience but possessed an excellent honours degree. They had different strengths and weaknesses and probably could have drawn on these to facilitate collaborative learning in online discussions, but in the online environment they seemed to perceive each other's strengths, yet their own weaknesses.

Awareness of the tutor

The students' heightened sense of awareness in the online environment also extended to an awareness of the course tutor. Again, these feelings were induced through the students' perceptions of formative assessment, which some perceived as a means for the tutor to keep track of their progress through the course. The students' differing attitudes towards those questions that asked them to make notes and email them to the tutor for a response (Format 6) illustrate this point. Catherine, for example, found that emailing a response to the tutor for comment provided an added incentive for completing this type of question because she "wanted the tutor to know that she wasn't one of the cop out wimpy people who hadn't bothered". Though this was said with some degree of humour the comment highlights Catherine's desire for tutor approval, which provided a stimulus to respond to the online questions.

A further example of Catherine's awareness of the tutor and the positive effect that it had on her learning is apparent from her response to the question 'Did the RQs in the online materials encourage you to pause and consider the issue under discussion?':

Yes, much more so. Perhaps the more sinister aspect of online learning is the perception that someone could be monitoring your usage at the other end and would be able to tell if you didn't pause to reflect! (Catherine, comparison questionnaire).

Catherine noted that the questions in the paper-based materials, which she later moved on to, did not have the same effect as those in the online environment:

Yes, but again there is always the temptation not to try so hard to get it right [in the paper-based] as there is no possibility of the tutor checking to see if you did it, or got it right!... Yes, there was that feeling of [voice lowered], if you didn't study someone would know. Whereas if I'm not studying on the paper-based no one would know. I could lie and nobody would know if I was telling the truth or not [laughing]. 'Oh yes Liz, yes Liz, no problem, yes I'm on block six, yes' ...

Interviewer: But you thought we would know on the Internet?

Oh yes, because they'd think, 'Oh yes she says she's done that but she hasn't answered any of the RQs, she hasn't answered this, she hasn't responded to that, she hasn't posted a reply to this particular question', which I wouldn't know about if I hadn't got there yet. Because there were one of two where you had to post a response to Liz, weren't there? (Catherine, interview 2).

Graham, on the other hand, preferred to complete his RQs and SAQs in privacy without submitting them. However, this perspective also emanated from an awareness of others. Graham explained that in the online environment he perceived that others were ahead of him and that submitting his questions would reveal his lack of progress. Moreover, sending them to the tutor, as required in Format 6, would identify the precise point he had reached in the course, thus revealing whether or not he was behind in the study schedule. Responses to item 16c on questionnaire 2 (see Table 8.15) indicate that others may have shared Graham's view, as Format 6 was the least popular type of question in the individual reflection category, thus indicating that the students favoured formats that did not involve a tutor response, preferring to assess their own progress.

Though Graham and Catherine differed in their approaches to the Format 6 questions, the reactions of both illustrate their sense of awareness of the tutor in the online environment. For Catherine this awareness motivated her to respond to questions, for Graham it increased his feelings of vulnerability.

The students thus appeared to have a heightened awareness of both their peers and their tutor in relation to formative assessment. For some this acted as a barrier to learning whilst for the majority it provided an incentive, not only to

participate in online formative assessment, but also to take more time over their responses, which in turn helped them to conceptualise the materials.

The students' heightened awareness of their peers and tutor appeared to impact their perceptions of each other and lead to feelings of insecurity, as described next.

8.7.4 Feelings of insecurity

The theme 'feelings of insecurity' was a rich theme that strongly emerged from the data related to this study. The theme comprises six dimensions, or categories, these are: (i) peer perceptions, (ii) lack of self-confidence, (iii) uncertainty, (iv) anxiety, (v) vulnerability, and (vi) sensitivity. In common with the theme of 'heightened awareness', this theme and its categories largely emanated from the students' perceptions of CMC and assessment, and are therefore discussed under these headings with the six dimensions being highlighted as appropriate.

Insecurity in relation to CMC

As pointed out earlier, the purpose of using CMC in this course was to provide the students with the opportunity to discuss the course materials, through the RQs and SAQs, and to engage in informal dialogue. However, whilst most recognised the potential of CMC they were reluctant to use it. A variety of factors contributed towards this as discussed here.

Several members of the cohort were uncertain about the appropriate style and tone to adopt online, for example, whether to use formal or informal language:

I mean this alludes back to what we were saying about the personal interface between each other. Because when you're at university, you know, at ['at' said with emphasis] university, then you have that on a day to day basis. You make new friends and you build up trust and things. I mean the Internet doesn't lend itself to that. It's a more formal approach of communication rather than, you know, just chatting generally like you and I might do here and now. Because you're having to put it down in writing, I think most people just think, 'Well I'll watch what I say when I put it down in writing'. But, yes, I think it does have that element of personal interface missing but that's not necessarily a major point (James, interview).

Yes, I think the other thing about communicating via e-mail and the Internet is I wasn't comfortable with the style of communication. Everyone knows the sort of

language they use in the letter. The way they talk on the phone. The way they talk face to face and they're all different. Now with e-mail and Internet which model do you use? And I wasn't sure really. I suppose it's up to the individual (Christine, interview).

I think, potentially it's great in that it does give you a bit of contact and you don't feel so isolated. But I don't think there is an easy way of getting over the human nature part of it. If you don't know anyone else you're going to feel a bit hesitant about using it... I mean it's nice to have the facility there, but it wasn't something I jumped in and felt that I could start initiating things, I very much just put down the RQs and that and no more (Andrea, interview).

I wouldn't have wanted to put things on there that were too informal (Adam, interview).

Some students did see the potential of the DG for peer support. Yvonne, for example, explained that she originally viewed it as a forum for discussing both the RQs and informal course issues:

I feel the Discussion Group is not presently being used as a Discussion Group... I had been thinking of asking for comments when replying to questions in the future as I felt that might encourage others to respond. I feel we're all perhaps too nervous at present, I know I am. I have been feeling very conscious of the fact that I'm probably the least academically qualified person following the course, but I am enjoying the studying even if it is quite tough trying to fit it in with all my other commitments... I think we should be able to ask questions such as, 'Did anyone else find the section on event trees difficult to understand?' I found I had to read it a couple of times before I felt I had grasped it. Perhaps I will put it forward for comment (Yvonne, email).

Yvonne's interpretation of how the DG should be used was the way in which it was intended, however, the students' lack of confidence with regard to CMC appeared to inhibit them from using it in this way.

Incorporating RQs into the students' first experiences of CMC, without setting the scene for informal discussion, may have contributed towards their reluctance to engage in dialogue. Despite assurances to the contrary, some students feared that their RQs would be marked in some way. Adam remarked, "you imagine you're going to be marked on them, even though it said you're not", a view that reflected those of other members of the cohort. This assumption further eroded the students' confidence in the DG. James, the only student who didn't use the DG, remarked:

... again it goes back to what we were saying before, that because it's a more formal system people may not be willing to put down their answers because it may be assessed in some way, or something of that nature (James, interview).

Olwen had particularly strong feelings on this matter:

I am more than happy to enter into a Discussion Group with my peers, but I'm not so keen on having my thoughts displayed in black and white for all the world to see, so that we can score points off each other. Never mind the fact that we are being marked on these responses (Olwen, reflective diary).

I found the idea of the Discussion Group interesting; I'm not sure why it didn't gel. It may be because initially we used it to respond to questions, which made it feel like a form of public assessment, and made more open discussion feel awkward (Olwen, questionnaire 3).

Though the RQs and SAQs were not formally assessed the students gained the impression that they were and this made them cautious about posting and inhibited their use of CMC.

Peer perceptions

As discussed in the previous section the students' awareness of each other largely emanated from their Introductions and their postings to the DG. From reading these contributions they started to form perceptions about one another. In the following extracts five students describe how they felt when reading their peers' contributions:

... and that's how I started using it [for peer support] and then I noticed that there were these long, you know, almost like they'd gone and looked up somebody else's definition and put it on. And I thought, 'Well should I have done that?' (Yvonne, interview).

I felt a bit inhibited to use it, I must say. I was conscious of [now with lowered voice] not putting anything on that made me look silly. [normal voice] It's the old embarrassment thing isn't it? I've been looking at other people's contributions and would sometimes think, 'Oh wow they've obviously taken it in so well and they've brought out the answer'. And so I felt, 'oh dear' (Christine, interview).

It's just their responses were... I read them and I thought, 'Wow!' You know, and I kind of looked at mine and I thought, 'Um!' (Andrea, interview).

And when I went to answer the questions it put me off, because I thought of the answers long before I'd actually read any of the other responses, and then I thought, 'Oh God I'll have to write something really sensible now'. So I thought 'Well, I'll have to look that up tonight' and I actually spent a while answering those questions (Sally, interview).

And I thought about this, that they've taken the time to compose it and I thought, 'Flipping heck, look at that on there.' And then it's like, 'I don't think I'm going to respond to that because anything I'm going to say now is going to be, you know, futile... This is the sort of impression you get from the things put on there, you think, 'Core blimey! I'm not putting my bit on this' [laughter]... I

mean the thing that struck me is that it tends to be the very same few people that are using this all the time. And these names keep coming up and I keep thinking, 'I'm going to get on this lark', but then I read it... And I think, 'No I'm not going on that'. [that said with emphasis]. I think, 'If I [I said with emphasis] put something on there...!' (Graham, interview 1).

Graham's feelings on this matter changed little throughout the duration of the study and remarks made in his second interview, some ten months later, substantiated his original viewpoint:

I've probably said this before, but originally, I think the first people, and I can't remember who they were, and I can't! But I looked at that and I thought, 'I'm not putting anything on there because I'm not at that level!' [laughing] (Graham, interview 2).

It would appear that some students inadvertently adopted an online persona when using CMC. The formal tone adopted in their postings intimidated others and led them to believe that their peers were more knowledgeable than themselves, thus increasing feelings of insecurity. However, as the course progressed, some, whilst being slightly in awe of those who regularly engaged in CMC, began to question whether such contributions actually represented the views of those who posted them:

It was like they were reading from a textbook to answer the questions rather than actually answering them for themselves. I mean I wanted to say in some cases 'Well could you explain that?' But I didn't because I just felt like I wasn't in touch with these people. I didn't have that communication link that you would do if you'd met them before. I don't understand how you could question someone you've never met. I found that quite difficult (Sally, interview).

Yes, you were saying like 'What's your opinion of this?' and I read some of them and there was like a side to them, you know. I thought, 'I don't really feel that that's your opinion per se. I feel that you've researched it, looked it up, checked it out, you know, seen what other people's opinions are and then put your own thoughts into that.' Whereas mine was very much, 'Well here's my opinion', and it was about a paragraph. And when I saw the others' I thought 'urrr' and felt faintly sort of insignificant compared with all their answers. But I thought I was going to answer the question as I saw it, so I still went ahead and did that (Andrea, interview).

Because what I found was where it asked for things, such as, 'What would you give as the definition of an accident', that sort of thing. Well I gave what I felt was my definition of an accident. But when I looked in the Discussion Group afterwards the answers were very structured and they'd obviously had to look them up (Yvonne, interview).

But lots of the responses weren't in that [informal] style, they were more like... a brief academic ... an answer to an essay question or something like that. And I thought 'Oh wow'. You know this stuff is all very, you know, up here

[indicating with hand above head.] Um, that's just my perception anyway! (Christine, interview).

Though they began to question whether or not their original perceptions of their peers were accurate some students still felt intimidated by them. This had a negative impact on their self-confidence and led to feelings of insecurity about contributing to the DG. Graham, Andrea, and Yvonne experienced such feelings:

Level of correspondence within Discussion Group on occasions meant that I didn't feel able to contribute as I felt it would not be at the 'correct' level (Graham, questionnaire 3).

Andrea, who was uncertain about some aspects of the first assignment, explained that she hadn't felt able to raise this issue in the DG because she felt intimidated by other people's contributions, which looked "so good and well thought out". She explained she was quite a shy person and felt "insecure about her position" and unable to express her feelings with people she had not met. She believed that in the traditional classroom she would have overcome this within a couple of weeks, but was "wary of the DG" and didn't want to "look silly". Yvonne described similar feelings:

Well, I've struggled because a couple of times when I've been working I've gone and answered things without looking at others' answers. I've gone from what we've done. But then when I've looked at others' [responses] I've thought, 'Oh my goodness, mine looks you know, it looks a bit sort of pathetic' (Yvonne, interview).

However, Yvonne persevered and gradually gained confidence:

Actually, once I overcame the nervousness of using it, I was okay. But it was mostly my own sort of self-consciousness, and I thought, 'Well, everybody else's is going to be better than mine' and that sort of thing. Once I overcame that, and started using it, I actually quite enjoyed using it and I felt that really we ought to have been talking to each other more (Yvonne, interview).

Joanne's concerns about the level of her contributions to the DG led her to procrastinate before submitting them; her hesitation is recorded through a series of entries in her reflective diary:

This afternoon I did manage some reading. I have written some material for the Discussion Group. This is all very new to me and I have not put it into the computer yet - I have decided to do it next week. I am a coward! (Joanne, reflective diary).

I am wondering about submitting my controversial views on seatbelts for children. I wrote them ages ago but as I am not a great Adam's fan have not dared submit them. Perhaps I will be able to summon up the courage another time (Joanne, reflective diary).

I must find time to make a contribution to the Online Symposium. I have written some thoughts down but feel they are not as good as some of the others so have not sent them in so far. Perhaps, like Heather says, I ought to 'be brave' and send something in (Joanne, reflective diary).

Like Yvonne, Joanne persevered and eventually felt more comfortable with using CMC.

Words 'cast in stone'

A further problem that led to insecurity was the permanency of postings in the DG, with several students expressing anxiety about this. Comments made in the traditional classroom environment are somewhat transient and frequently forgotten. The speaker also has the opportunity to clarify, defend, or retract their comments in the light of the views of others. Whilst online discussions can be added to, original comments remain visible and can be read over and over again, even if the originator has changed their view. Olwen described it in this way:

If you're in a seminar group and you're discussing something, then you'll talk about it, and somebody will respond, and perhaps then you'll then re-consider what you have said, and you'll discuss round it. Whereas I think using that site you feel that its then cast in stone and your words have been put on the system. You have no chance to defend, discuss or adjust what you've said. It's just sort of there and I think that's a little bit off putting (Olwen, interview).

Catherine, one of the more pro-active contributors to the DG, expressed similar concerns:

The other thing is that if you put something up in writing it's not like something that's said and then forgotten by other people. They might go back to it and look at it again and think, 'Well that was a bit stupid'. So yes, I was careful, yes, yes... (Catherine, interview 2).

Sally believed she would have said a lot more in class than she did online, explaining:

Maybe because it's a barrier, maybe it's because somebody could read what I said a hundred times or... I don't know, it was just something that I didn't feel happy doing (Sally, interview).

David, a blunt Yorkshire man, also expressed concerns about his opinions being "put up in lights" for all to see. It was in response to comments such as these that I set up the OLS, an automated email list, on the premise that old emails are less visible than threaded lists, however, this method of communication was also little used.

These anxieties about postings being re-read added to the students' feelings of insecurity and increased their reluctance to use the DG. The situation worsened over time as the students became increasingly aware of both the content of each others' postings and the pace of the discussions. However, the cohort was fairly evenly matched, both academically and professionally. Comments that indicated individuals felt intimidated and 'not at the right level' were by far the most common, yet they came from nearly all the students. What they failed to realise was that their peers felt just the same about them.

Concerns about professional standing

It is possible that those who regularly used the DG may have felt as vulnerable as those who did not and thus felt the need to maintain a formal approach. This sense of vulnerability might have been due to the students' fear of compromising their professional standing in front others in their field and could account for the online persona adopted. On a number of occasions students made reference to their assumptions about each other. Olwen, for example, having overheard a conversation between her husband and I on my interview visit commented:

As I heard you discussing with Stuart at lunchtime, it's not just the ability to understand the work and so forth, it's being used to setting things out and organising your work. It's an important skill and people haven't always got it if they've been out at work for a while. I'd have thought most people on this course, being professional people, shouldn't have any problem with that (Olwen, interview).

A further example of the students' expectations of each other emerged from a conversation I had with Peter. Having a wider range of experience of ICT than other members of the cohort, Peter was surprised by the lack of interaction on the course:

Because obviously anybody who is doing this course has, I should think, got a fairly high level of academic and professional development and ought really to be able to cope with it... I've been a little bit surprised that there has not been a

bit more interaction... I think a lot of people are very nervous. I mean I'm a little bit surprised that people who presumably are working in this field dealing with managers, and managers at factories and such like, should be quite so nervous about participating in a course (Peter, interview).

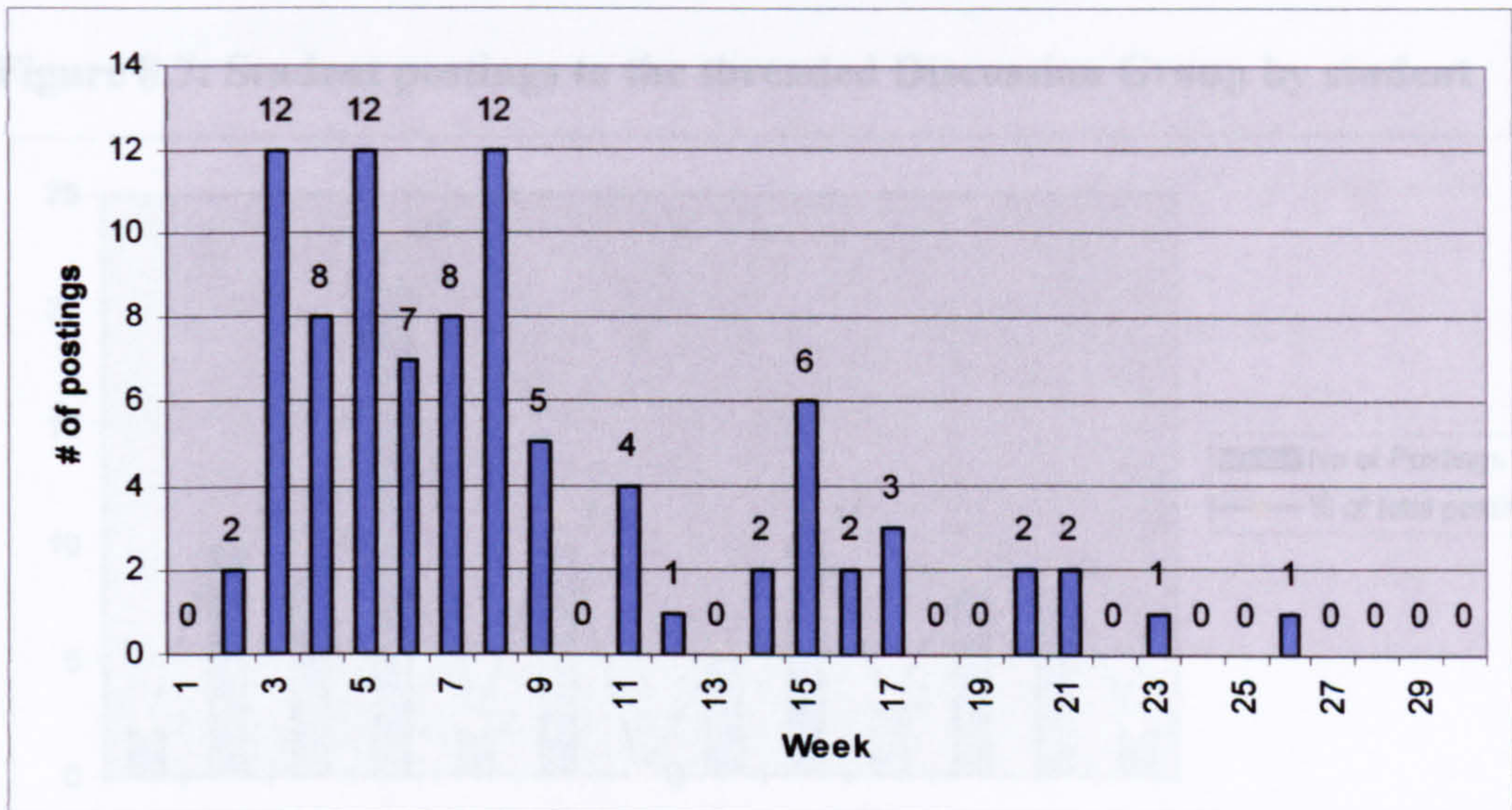
Olwen's and Peter's comments illustrate their expectations of their peers and perhaps belie a slight intolerance towards those who may fall short of these standards. If other students perceived these attitudes this may have contributed toward their reluctance to participate in CMC. Andrea provided a further instance of this perspective. In exploring her feelings about DGs I asked if she would react differently if the DG comprised fellow professionals discussing health and safety issues and did not form part of a course. Her reply revealed a perspective similar to that expressed by Olwen and Peter. However, her response also revealed her own fears about using the online environment to ask questions to which the answers may be obvious to others:

Probably not, because again I'd always be worried I'd be asking something that everyone else thought was obvious. We have an EHC net for Environmental Health Officers and people send through stuff on there and some of it, I just feel sorry for them because they obviously haven't got a clue. Because you do read it and think, 'Why on earth did they ask that?' You know, it's obvious or whatever and then that makes you feel the same about putting something on there, because although you don't know the answer someone else may be thinking, 'Silly person they should have known that'. (Andrea, interview).

If other members of the cohort had similar assumptions and expectations of their peers then they may have found it particularly difficult to raise their own concerns for fear of appearing vulnerable or inadequate. These factors appear to have contributed towards the students' reluctance to engage in online dialogue, and may account for the 'knowledgeable stance' that some took in the DG.

A spiralling effect

Feelings of anxiety were not confined to those who felt intimidated by online communication, as in turn their lack of interaction affected the more proactive members of the group. Eventually the use of the DG went into a downward spiral with few postings being unrelated to the RQs and SAQs. Figure 8.6 shows the number of DG postings per week during the thirty weeks of the online pilot course:

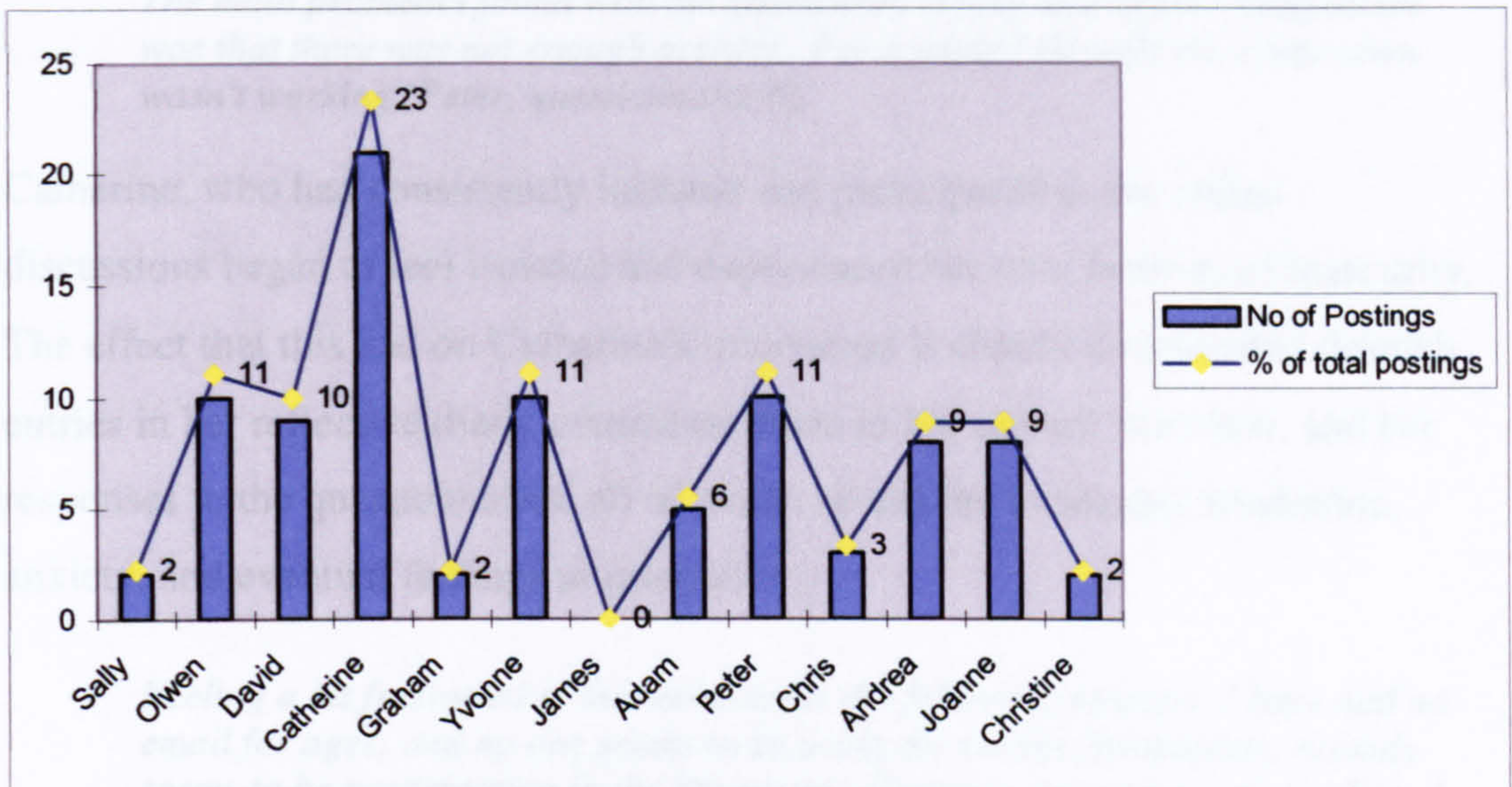
Figure 8.6: Student postings to the threaded Discussion Group by week

Source: analysis of students' postings to the Discussion Group

Ninety student postings were made during the thirty-week period. Sixty-three were RQ or SAQ related, the remaining twenty-seven were of a general less formal nature.

Activity in the DG waned as the course progressed with more than two thirds ($n=66$) of the ninety student postings being submitted in the first nine weeks. After this time there was a general decline, barring a slight flurry of activity around week fifteen when three students engaged in conversation about one of the set readings.

The number of postings per student varied, as shown in Figure 8.7. The columns show the number of postings per student and the line shows that number as a percentage of the total number of postings.

Figure 8.7: Student postings to the threaded Discussion Group by student

Source: analysis of students' postings to the Discussion Group

Twelve of the thirteen students participated in the DG. Catherine was the most pro-active and posted 23% ($n=21$) of the messages. Of the remaining eleven Olwen, David, Yvonne, Peter, Andrea and Joanne submitted between eight and eleven posts, Adam submitted six and Sally, Graham, Chris and Christine submitted two or three each.

The decline in postings can partly be attributed to there being only one RQ in Module 2 that directed students to the DG, and the fact that four students had withdrawn from the course. On the other hand, it was anticipated that by this stage in the course students be initiating their own threads, however, this was not the case and in some weeks no postings were made.

The pattern established in the DG was repeated in the OLS where the same few responded to the four RQs and one SAQ in Module 2 that encouraged discussion there. Five of the nine who studied Module 2 sent a total of seventeen postings to the OLS, though fourteen of these were from just two individuals.

This overall lack of interaction had an effect on those who did engage in online dialogue:

Well I think the Discussion Group is certainly relevant. It's a good way of discussing things but I wish people would use it a little bit more (Peter, interview).

The main problem I found with the Discussion Group and Online Symposium was that there was not enough activity. For a while I thought the symposium wasn't working (Peter, questionnaire 6).

Catherine, who had consistently initiated and participated in the online discussions began to feel isolated and experienced her own feelings of insecurity. The effect that this had on Catherine's motivation is clearly documented through entries in her reflective diary, comments made in her second interview, and her responses to the questionnaires, all of which reveal her increasing frustration, anxiety, and eventual feelings in insecurity:

Feeling a bit frustrated at the moment for the following reasons: I have had no email for ages; and no one seems to be using the Online Symposium; nobody seems to be participating in the Discussion Group to any great extent either. I am finding the stuff we are doing now pretty challenging but I feel that posting my thoughts in the Discussion Group will mean it falling on deaf ears. Because so few people participate I wonder whether it's worth it, or worry that people will think I'm being too pushy... It's so frustrating to log on and there is no email and no new messages. I feel so isolated. I'll send an email to Heather and have a moan (Catherine, reflective diary).

Distance learning is isolating, but I felt frustrated because it didn't need to be in this case with all of the opportunity there was for communicating electronically (Catherine, questionnaire 3).

I think the Discussion Group could have added a whole new dimension to online study, had people used it more.... as it was I don't feel I got a lot out of it. After a while I started to wonder whether the other students thought I was very opinionated, or that my contributions were not worthy of comment, so I contributed less too (Catherine, questionnaire 3).

In her second interview Catherine explained that her isolation was compounded "because there was the avenue for communication and nobody was using it". Her awareness that there were other students out there made her isolation more acute:

I literally felt like I was being ignored. I felt like I was posting stuff up, and I think I mentioned that at one point, didn't I, that either people thought that what I had to say was worthless, or that they weren't reading it at all. So, I was thinking, 'What's the point?'... Yes and I knew about them, because everyone had posted their stuff, so I knew a little bit about them all because they had all put their introductions in. I thought, 'Well why aren't they speaking to me, what's their problem?' And then you start thinking, 'Maybe it's not them, maybe it's me'. (Catherine, interview 2).

Whilst Catherine felt isolated at this stage and considered she had "not got a lot out of the DG" her overall views did not reflect this opinion. Moreover, as 'lurkers', Catherine's peers gained a great deal from her online input, as discussed above under the theme of 'engagement with e-learning'.

Towards the end of her reflective diary Catherine expresses her disappointment about the other students' lack of participation in CMC, commenting that having met them at the exams they "all seemed pretty chatty and confident face to face". She later told me that at one stage she had wondered if she was in fact the only student on the course, perhaps as the subject of some bizarre kind of experiment. On arriving home from the examinations she sent the following email to the group via the OLS:

Just a quick note to say I hope all of you who came in for the exams got home safely, and that Yvonne's back is better soon. I really enjoyed meeting the people who I have been studying alongside – it's nice to know you are real and that Heather didn't just make you up! Wishing you all the best with the exam results, and remember, even if you don't continue with the course just now, you still have my email address! Regards, Catherine (Catherine, OLS).

No replies were received!

Whilst there was a sense of awareness of each other within the online environment and some affinity, the students did not get to know each other in the way that attending students do. This was most likely due to the perceptions that they formed about each other and their subsequent wariness of each other.

Whilst the DG was used there appeared to be a lack of synergy. Catherine's perception seems to aptly describe the use of CMC in this study. Asked whether she felt any sense of community her response was "Yes, yes, but it wasn't really complete. It wasn't lots of people holding hands it was lots of people touching fingertips".

Insecurity in relation to assessment

Assignments were an area of particular concern for members of this group, who, for a variety of reasons appeared to suffer feelings of insecurity in relation to assessment. The first issue to be discussed is their reluctance to seek support.

As the submission date for the first assignment drew close three students contacted me expressing their uncertainty about how to tackle it. I suggested they contact the course tutor, however, all three appeared apprehensive about this. The course tutor therefore sent a group email clarifying the requirements for the assignment. Subsequent analysis of qualitative data revealed that other students experienced similar uncertainties, but had not made contact with the tutor, or raised the issue in the DG.

Andrea appeared agitated when discussing this issue during our interview. Having gained a first class honours degree only three years earlier her assignment mark of 45 per cent was a severe blow to her confidence. In discussing this she explained that she had found the assignment task somewhat vague:

The only other comments I have to make, and they're not really part of the Internet side, they're general comments which affected my reasons for giving up, so they might be of value to people, well sort of for Liz. When I first read the assignment I thought, 'What on earth is this about?' It was just, to me personally, my first reaction was that it was vague. And I came up with several scenarios as to what it could actually mean (Andrea, interview).

Joanne experienced similar problems. Towards the end of our interview I asked if she had any further comments about the online course. She thought about this for some time then tentatively responded:

My personal feeling is that we could have had a bit more information about the assignment. Like you're going to put these notes on [about the Harvard referencing system] ... I found it difficult not having the guidance as to how to do that. It was a shock really. I think it has been for quite a few people because somebody else, I think Olwen, put something on about she was still recovering from her assignment or something (Joanne, interview).

These views reflect those of about half the cohort, however, they did not attempt to resolve the issue through online peer discussion, nor did they attempt to contact their tutor. This issue therefore highlights the reluctance of these e-learners to seek help from either the tutor or their peers. The uncertainty caused by this issue had a significant impact on some students' self-confidence, which in turn may have inhibited their learning.

A further source of anxiety in relation to assignments was the students' fears that their written work may not be of an acceptable standard. Adam, Graham and

Andrea raised this concern on the telephone. Joanne, when ringing to check that her emailed assignment had arrived safely took the opportunity to tell me that she had found the whole assignment experience 'nerve racking' and felt unsure about it. Later, in her interview, she made the point that as an adult learner who had not studied for a number of years she had been uncertain about how to approach the assignment.

Sally made a similar point:

I mean I hadn't written an essay for years. I just hadn't because I'd done a scientific course. I've never done sociology; I haven't done any of those subjects. I mean, you know, for me it is quite difficult to write. I can write essays for food hygiene inspection, but they're totally different from a theoretical essay, they're not occupational health (Sally, interview).

These concerns about the level of work appeared to be increased by the students' false perceptions about the ability of their peers, whom they considered to be more academically able than themselves.

At the end of the pilot course Yvonne highlighted the impact that her lack of self-confidence had on her studies:

I think my lack of confidence in my ability to study also made it harder for me to organise and plan my work for my assignments. I was afraid I would fail, so kept putting it off (Yvonne, questionnaire 5).

The prospect of sitting examinations was a further source of anxiety for these e-learners:

I am very apprehensive about the exams and the format they will take, today more information will appear on the Web site about them. I have never taken a 'seen' or 'open book' exam before (Joanne, reflective diary).

Examinations - never taken an examination where I knew the questions beforehand! Beginning to worry that the level of answer I have researched is not at the appropriate level. Am I condemning myself due to initial failure? Will we receive feedback as to why if we do not achieve? (Graham, reflective diary).

As the examinations were not online, the students' concerns about them cannot be directly attributed to the online environment. However, their existing awareness of each other and their false perceptions of their peers' abilities, gained from the online environment, may have compounded feelings of insecurity. Whilst most students were experiencing similar emotions about the

forthcoming examinations, once again there was no online discussion about this. These feelings of anxiety were not confined to those who experienced difficulty with the level of work but also affected those who achieved high marks.

It was interesting to observe the dynamics of the group when they met for the examinations. The students knew me from their face-to-face interviews, but had not met the tutor or their peers, though they did have an awareness of each other from the online environment. Indeed, to a greater or lesser extent they had exchanged views over a period of six months or more and shared a common experience unique to their group. Yet the virtual common ground they had shared did not appear to stand them in good stead for their face-to-face meeting with each other. There was no evidence of any feelings of comradeship or community. As one of the examination invigilators I had the opportunity to observe the group. The following is an extract from my notes made on the first day:

Tension before the exam was extremely high. All students except one arrived early in the exam room. Couldn't start early because Peter hadn't arrived. During these 10 to 15 minutes the atmosphere was electric. I had expected them to chat about the forthcoming exam and how they felt about it, but there was no interaction. I made a couple of light-hearted comments like 'just think how much spare time you'll have after tomorrow'. These fell on stony ground (Researcher's notes).

Naturally, the students were tense prior to undertaking an examination and an exam room is hardly conducive to friendly exchanges. However, over the two-day period I observed the students in a variety of situations, including coffee breaks, formal examinations, the post course workshop, and, in the case of the four students who stayed over, during dinner on the first evening. As the students got to know each other their initial reserve and apprehension seemed to disappear and as with any group of strangers they started to relax and get to know each other. It could be argued that they already knew each other from their online contact and were not in fact strangers, however, their existing knowledge of each other did not appear to have eroded the initial barriers experienced by the group, or to have accelerated the process of becoming acquainted. If anything, their prior knowledge of each other seemed to increase their unease as they already had preconceived ideas about one another. These

issues appear to be related to the students' heightened awareness of each other and their feelings of insecurity gained in the online environment.

Sensitivity to tutor feedback

One of the strongest dimensions of the theme of insecurity was sensitivity to tutor feedback. This was an unexpected finding and took both the course tutor and I by surprise. The students' sensitivity to tutor feedback related to both RQs and assignments.

The first indication of sensitivity to feedback came early in the course and is related to those RQs that asked students to send their answers via an online form (see Format 1 in Appendix 7). The comments were then summarised and presented in the DG. Though this format was only used twice it was the source of considerable controversy and highlights issues related to the students' perceptions of assessment and feedback. There were two reasons for asking the students to send their comments via an online form. Firstly, due to the nature of the questions posed, it was anticipated that some responses would include confidential information related to the students' places of work. Depersonalising and summarising the responses allowed them to draw on their work experiences without compromising confidentiality. Secondly, as these were the first RQs in the online materials it was further anticipated that some students might naturally experience feelings of apprehension about posting to the online DG and not want to be the first to submit a response. Presenting a summary of responses provided the opportunity for participation without exerting undue pressure on individuals. This method appeared to work well and the students used the online forms and submitted their responses. These were duly de-personalised and synopses of the responses to each question were posted in the DG to encourage further dialogue.

As the course progressed I became concerned that the students might be unsure about their progress and that this could affect their motivation, especially as the course started in June and the first assignment was not due for submission until early September. These concerns about a lack of feedback were fuelled by comments from two students who, during telephone conversations, expressed uncertainty about their progress. Moreover, it was evident, from reading the responses to the Format 1 questions, that a number of students had not fully

grasped the issues under discussion. I therefore asked the course tutor to provide feedback on the students' individual responses. The feedback was then forwarded to the individuals concerned. The purpose of the feedback was to:

- acknowledge individual contributions to the discussion
- provide motivation and encouragement
- help reduce feelings of isolation
- establish two-way communication between the students and their tutor, and
- clarify any misconceptions the students may have about the issues under discussion and therefore direct their learning.

Unfortunately, this action had a negative effect on some students and highlighted issues related to their sensitivity to tutor feedback and the complex reasons for this. Andrea recalled her feelings when she received the feedback, explaining that she felt like a "schoolgirl being told off by the headmistress". At the time she felt the feedback was "highly critical" and that it affected her confidence:

...I was quite put off, purely in that when you don't feel particularly confident, any little thing can sort of knock you further than it was meant to. You know, you're just more sensitive to it I suppose... and because I couldn't just put my hand up and ask... (Andrea, interview).

In reflecting further on this incident she added:

With hindsight it wasn't, [highly critical] but because I was feeling very insecure and unconfident at that time I very much saw it as, you know, it was um, its hard to describe, it wasn't just guidance it was very much like being marked (Andrea, interview).

Andrea went on to explain that this was because she hadn't had personal contact with the course tutor, and that:

When I spoke to her she was fine. We had something in common with the archery and all the rest of it. But until that point she was unknown (Andrea, interview).

Andrea's comment that she "couldn't just put [her] hand up and ask" illustrates that for some students the lack of spontaneity in the online environment can be a

source of anxiety. Her feelings also highlight how sensitivity to feedback may be linked to two other dimensions of insecurity, that is, a lack of confidence, and anxiety.

Olwen's reaction to this form of feedback was stronger than Andrea's:

Shock horror – got my RQ7.1 back, marked!!!! If I'd known that it was going to be marked in this way I'd have been more careful about how I expressed myself (Olwen, reflective diary).

And later when discussing this matter during our interview:

So, I feel I've been picked up for making a mistake about something I didn't know I was supposed to be doing. So it's had the opposite effect. It's not sort of reinforcing support, it's made me feel I don't know what I'm supposed to be doing! (Olwen, interview).

Joanne also reacted negatively and in an email to the tutor defended her original RQ submission by explaining the background and context to the scenario she had originally described:

I just wanted to make the following observations on the comments sent, as you said this would be in order. Firstly though I would like to say that it is quite difficult to give all details of an accident in this way (i.e. in a small answer box), so some confusion may exist purely because of this. However, the following did spring to mind when I read the text... [Joanne then addressed each of the points in the tutor's feedback]. I agree with all the remarks made concerning the other incident, these are now much clearer to me having studied the rest of the module (Joanne, email).

It is interesting that the students felt their contributions had been marked, when they had not. No assessment was involved and the students were informed that such contributions would not form part of their final marks.

Andrea, Olwen, and Joanne clearly felt aggrieved by the tutor's feedback. What we have to ask ourselves is whether the students would have reacted in quite the same way if the comments had been made casually in the classroom environment. Possibly not, as the students would have had the opportunity to question the tutor further and temper the comments with those given to other class members and perhaps not take them quite so personally. In the classroom environment the matter would most likely have been resolved instantly with little after thought. However, as the feedback was written, and not verbal, the

students were unable to contextualise it and this appeared to impact their self-confidence and cause considerable anxiety.

The problem centred around two issues. Firstly, the students felt they had been 'marked' without warning and believed they would have taken more care over their submissions had they been prepared for feedback. Secondly, because they did not know the tutor they were unable to gauge the tone of her feedback, which was intended to be informal and helpful. The feedback therefore had an unsettling effect upon them. However, one of the reasons for giving the informal feedback was that it was evident from reading the contributions that some of the students had failed to understand certain issues. The tutor only knew this because the students had been asked to articulate their understanding in text. Had the discussion taken place in the classroom it would have been more difficult to identify those students who did not fully comprehend the issues. The tutor felt that she learned more in the first few weeks about the online students' levels of understanding than she sometimes does in an entire semester in the classroom. So, though the feedback caused disquiet amongst the students it did in fact help the tutor to pick-up on potential problem areas early on in the course.

Sending feedback without prior warning appears to have been inappropriate for this group of e-learners and lessons were learned from the episode. The incident highlights the need for providing e-learners with a clear statement of what to expect in the e-learning environment and that approaches taken in the traditional classroom may not be entirely suitable in the online environment.

The difficulty recounted above may have been aggravated due to the students' unfamiliarity with submitting RQs. Joanne's reflective diary shows the importance that she attached to the process of submitting these and further illustrates the negative effect of tutor feedback. In the following extracts Joanne is contemplating submitting her written notes for Format 6 to the tutor.

It was early September and the students had recently commenced Module 2 after a two-week break. They had submitted their Module 1 assignments and were awaiting the result. Module 2 discusses risk and presents some challenging

concepts. Having completed the first study block Joanne, reflecting on the RQs, wrote the following:

Continued working on Module 2. Have read the relevant chapters in The Royal Society and Adams. The ideas of qualitative and quantitative analysis seem to be very complex and I will have to think hard about the RQ replies (Joanne, reflective diary).

A week later whilst still reflecting on these issues Joanne wrote:

Some of the issues seem to be very daunting and deep, particularly the Royal Society reading. The Adam's book in contrast seems to take a more light-hearted approach. I have started to make some notes for the RQs at the end of the last block. The first set of these we have to e-mail to Liz. I am not sure how much depth she wants us to go into, but have decided to do a précis with some thoughts (Joanne, reflective diary).

The RQs to be emailed to the tutor occurred in Block 1, at this stage Joanne was well into Block 2 but evidently preferred to consider the RQs before submitting them. Having reflected on the issues for about two weeks she submitted her RQ responses:

Craig at nursery all day today, so I have time to think some more about answers to RQ 7.2(1). Decided to submit these today. I am not used to this kind of participation and I am a little unsure of just what is required, but I suppose I must get used to it (Joanne, reflective diary).

The following morning Joanne received the mark for her first assignment, which was lower than she had hoped, that evening she made the following entry in her diary:

Perhaps I am just not up to this type of course. I have spent quite a lot of time on the answers to the first two RQs, so I will await the replies from these. I hope they are more encouraging than the assignment result! (Joanne, reflective diary).

Joanne's diary entries tell us that she found it difficult to summon the confidence to submit her RQ responses to the tutor and that feedback from her first assignment eroded her self-confidence further.

The results of the first assignment further highlighted the students' sensitivity to feedback and added to their feelings of insecurity. The assignments were submitted via email, marked using the review facility in Word, and returned via email. The human element of the feedback, that is the tone, style, and level of

the tutor's comments, was similar to that used for marking the assignments submitted by the paper-based distance learners and the part-time attending students. Nevertheless, the reactions of the e-learners were surprising. Once again Joanne's diary provides us with an insight to this issue. The entry in her diary on the evening that she received her assignment result continues as follows:

My mark was only 40 per cent so it seems it must have been pretty pathetic. I don't think I have ever received such a low mark for an assignment! Also it is subject to review by an external examiner! I don't seem to do anything right on this course, maybe distance learning is just not for me ... It is quite a disappointment as I took a lot of time with it, perhaps my main handicap is a lack of good library facilities, and I am not in a position where I can discuss anything directly with anyone else (Joanne, reflective diary).

Joanne's comment that she was unable to discuss the assignment with anyone highlights her reluctance to engage in online discussion, even though she suspected that her peers may have been experiencing similar emotions:

I went into the Discussion Group last night and noted someone had made a comment about everyone must be recovering from the effects of the assignment! In my case this is very true. I do not think I will be continuing the course after January somehow! (Joanne, reflective diary).

The above illustrates that Joanne's self-confidence declined further after she received the assignment feedback. A few days later whilst anxiously awaiting a reply to the RQ responses that she had emailed the night before receiving her assignment mark she wrote the following:

Maybe in my case no news is good news! Everything I get back seems to be very highly criticised. I don't seem to be able to do anything right. Perhaps that's why I was chosen for this course - as one of its predetermined failures! Or perhaps reading about bias all the time has made me more paranoid (Joanne, reflective diary).

Joanne's self esteem evidently remained low for some time because two weeks later when I rang to arrange a date and time for our interview I noted that she sounded apprehensive and concerned. The entry in her reflective diary that evening reads as follows:

I decided to do some gardening today as this really helps me relax - about the only thing that does these days! Heather phoned as I was in the middle of my wall-flower bed. She telephoned to make arrangements to come over here to see me. We talked about the assignment; I thought at first that she had rung to

take me off the course, as my work seems to be very poor! I'm glad she did ring, however because I was beginning to feel quite low about the whole course (Joanne, reflective diary).

Joanne echoed these concerns during the interview when she at first appeared tense and anxious. As the interview progressed and she began to understand my neutral role she relaxed and spoke freely about her online experiences. She also responded to reassurances that first assignments can be difficult and that marks frequently improve as the course progresses and students' skills improve.

The assignment feedback also had a strong impact on other members of the cohort who appeared to be hyper sensitive and easily demoralised. Some seemed to suffer from a form of post feedback depression, as the following extracts illustrate:

It totally de-motivated me. I mean I probably would have continued if I'd done okay in that. But the fact that I'd struggled and had to re-do it, I thought, 'Well, what's the exam going to be like?' You know, it's bad enough doing the essay but exams are hard enough (Sally, interview).

When I had my mark back I was disappointed because I put, as I thought, a lot of effort in because it was the first one. But I found the actual question was ambiguous and you could have answered it in more than, well several ways. And you would discuss it more prior to the assignment I think if you'd been in class... But I think, to be fair, there is the facility to do that, it's just that we're not necessarily using that facility. Or at least I didn't (Yvonne, interview).

Assignment feedback - sense of deflation, although I was aware it was not at the level that I would have preferred, thought it might scrape through. Led to a feeling of disillusionment, enthusiasm waned and level of site access diminished, consideration given to 'dropping out' (Graham, reflective diary).

Graham's depression was understandable because he had failed his assignment. He was not the only one to fail, but then again he did not know that. This was part of the problem, the e-learners did not have a benchmark or the benefit of 'out of class' discussion to normalise both their marks and their feelings. Adam, who attained a fairly good mark on his first assignment, also felt de-motivated and wondered how his result compared with those of others:

I think one thing I did miss, if it's possible to miss, is that when I got my essay back, the results of it as just sixty per cent and there were a few comments, about why it was sixty per cent. I just thought, 'Well I wonder how everybody else did? Is that good or bad?'. Sixty per cent sounds low (Adam, interview).

Adam's uncertainty about his result and his curiosity about the other students' levels of achievement highlight a complex issue that lay at the heart of this theme of insecurity and is linked to the previously discussed theme of heightened awareness. Unlike paper-based distance learners the students in this study had an awareness of their peers. This awareness of each other differs from the kind of peer relationships that are formed in the traditional classroom where the students get to know both the strengths and weaknesses of their peers. Because this group of students' knowledge of each other was superficial, they appeared to pick up on each other's strengths whilst remaining unaware of their weaknesses. This awareness was mostly gained from the DG and whilst it had a positive impact, in that it provided an incentive to participate in formative assessment, it also had a negative impact because the students inflated views of one another made them feel vulnerable, hence their reluctance to discuss their concerns with each other. This means that the students had no benchmark against which to measure their own progress. Though the opportunity to discuss these issues was available the situation was made difficult by the students' perceptions of each other. Previous generations of distance learners did not encounter this problem as they worked in isolation with few pre-conceptions about their peers and little concern for each other's rate of progress.

8.8 Discussion

The findings related to Question 2 illustrate that the students had an overall positive experience of e-learning. However, the findings from quantitative data present a more optimistic view than those from qualitative data, which reveal a somewhat complex picture. As discussed at the start of this chapter this may be because the online questionnaires, from which the bulk of quantitative data was drawn, were completed at the end of the course, and end of course questionnaires tend to yield positive results. It is, however, evident from all data sources that the students had both positive and negative experiences of the six elements of e-learning and that these engendered both barriers and enhancements to learning.

8.8.1 Enhancements

Many positive experiences of online learning were identified. Whilst most students were apprehensive about engaging in the process they quickly adapted

to the online environment and found it easy to navigate. All the students reported that they were able to interact with the learning materials and found them stimulating and interesting, thus illustrating the effectiveness of the Internet as a medium for their delivery. Further benefits included the ability to find resources via the WWW to support learning and the students' enthusiasm for this method of information seeking. The ease of access to 'given' course related information, via the Information Centre, was also considered to be of value. Of particular interest was the way in which the interactive elements of virtual learning lured the students to, and engaged them in, their studies. An unexpected finding was the way in which they used hypertext to develop learning strategies, such as looping, which helped reinforce learning and facilitated higher order thinking. Moreover, there was evidence to suggest that incorporating online technologies in the RQs and SAQs encouraged reflective thinking and aided conceptualisation of the learning materials. The use of CMC was also found to enhance learning. The students acknowledged that online communication was an important part of the course and valued the opportunity to learn about one another and to view each others' postings, however, CMC also created some barriers, as discussed later. The written assignments were acknowledged as a valuable part of the course that helped the students to contextualise the learning materials. The ability to submit these via email and have them returned with the tutor's comments set in context using annotations, were considered positive aspects of summative assessment. Finally, learning outcomes were comparable to those of attending students.

8.8.2 Barriers

However, whilst there were many advantages, e-learning was not without its drawbacks, and a number of issues that engendered barriers to learning were also apparent. Though searching the WWW enabled students to locate learning resources, this was also a source of frustration, as some were overwhelmed by the volume of information available and initially lacked the skills necessary to refine searches, although most appeared to overcome these difficulties as their search skills improved. Difficulty in accessing the University's library facilities and online databases were also a cause for concern. An unexpected barrier to learning was engendered by the practice of printing out learning materials, which

highlighted that this reduced their interactivity and resulted in whole sections of text being overlooked. Summative assessment also engendered barriers for these remote learners, many of whom expressed uncertainty about how to approach the written assignments. Two further issues created barriers to learning, and these were the most surprising and unexpected. The first was way in which the students' awareness of each other, gained from CMC, had a negative impact on some e-learners. The second was their negative reactions to tutor feedback. These issues are discussed in more detail later.

Examination of these enhancements and barriers reveal that the enhancements were largely technologically based, whilst the barriers were mostly sociological. For example, the following enhancements were largely facilitated by the use of technology:

- interaction with the learning materials;
- seeking learning resources via the WWW;
- accessing given information from the Information Centre;
- engagement with the online environment;
- using hypertext to develop e-learning strategies;
- receiving computer aided feedback on some RQs and SAQs;
- sending and receiving assignments via email, and
- marking of assignments using annotations.

On the other hand, the chief barriers to learning, that is, the impact of peer and tutor awareness, the students' sensitivity to tutor feedback, and their feelings of insecurity, were mostly sociological and related to human rather than computer factors.

8.8.3 Themes

Four main themes related to the students' experiences of online learning emerged. The first two chiefly relate to the technological element of e-learning,

these are 'engagement with e-learning' and 'e-learning strategies'. The second two relate to the sociological element of e-learning, these are 'heightened awareness of others' and 'feelings of insecurity'.

It is difficult to determine the precise reasons for the students' success in interacting with the learning materials, though analysis of data suggests some contributory factors. The first of these is the learning strategies they developed. The students were able to approach the learning materials according to their individual preferences, for example by taking an initially holistic view and then returning to appropriate sections, or by taking a linear approach, thus selecting their own learning pathway. The effect of learning styles on approaches to learning is discussed in more detail in the next chapter. Secondly, students were able to study the materials at their own pace, an approach made more difficult in the traditional lecture theatre or classroom where the uni-directional transmission model (Laurillard, 1993) is used and students have little control over the speed of delivery. Moreover, e-learning enabled the students to assess their own levels of understanding before progressing through the materials, and to reinforce learning where necessary, whereas in the traditional environment the tutor has to make assumptions about the students' prior levels of knowledge Ehrmann (1995). A further reason for the students' high levels of engagement with the learning materials might be attributed to the lack of need to take notes. Mayes (1997) argues that students attending lectures frequently fail to listen for meaning, as they are preoccupied with note taking. Having the lecture notes available online freed the students from this task and allowed them the opportunity to engage with the content and to reflect upon it. The online lecture notes also provided the chance to re-visit the 'lessons' according to need, which may have further contributed to the students' ability to interact with the online materials. Finally, students were able to focus on the learning materials in privacy without interruption from those who sometime monopolise classroom discussions.

The themes of 'heightened awareness' and 'feelings of insecurity' provide us with a unique insight of students' experiences of distance e-learning. However, as discussed above they were affected in different ways by the varying dimensions of these themes. Whilst the students did not know their peers or tutor, as in the face-to-face situation, they knew that each other existed from their introductions

and their DG postings, from which they started to form impressions of each other. This initial awareness created a sense of pressure. The students were able to gauge each other's progress by viewing their responses to the RQs in the threaded DG. This knowledge of others' progress motivated some to keep apace, however, others were demotivated as they feared their contributions might not be good enough and saw little point in adding to the discussions. The students were also aware of the tutor as they were asked to send her their responses to some RQs. Again there were mixed reactions to this, some found it motivated their learning whilst others believed it enabled the tutor to track their progress. Regardless of the stance they took on this, most felt observed by the tutor and aware of her presence.

The students' awareness of others led to feelings of insecurity, which was evidenced in a variety of ways. Most were hesitant to contribute to CMC, initially because they were uncertain about the appropriate tone and style to adopt online. However, as the course progressed the less proactive students began to perceive those who regularly contributed to CMC as being more academically able. This led to feelings of uncertainty, inadequacy and a lack of confidence. However, over time the less proactive began to question whether their peers were expressing their own views or whether they had adopted an online persona. Those who regularly engaged in CMC appeared to be unaware of the effects that their online persona had on others. Nevertheless, the less proactive continued to feel intimidated and lack confidence. Those who posted occasionally found the process emotionally difficult and spent considerable time deliberating and perfecting their postings. The lack of interaction eventually had an impact on the more proactive who began to lack confidence themselves and wondered why few people responded to their contributions.

A further aspect that revealed the students' feelings of insecurity was assessment. Whilst some were uncertain about how to approach the written assignments they did not use CMC to discuss this with their peers, again for fear of appearing inadequate. Nor did they contact the tutor for support and guidance. The false perceptions of others' superior knowledge, gained from CMC, also left some fearing that their work might not be up to standard. Finally, this group of e-

learners showed greater sensitivity to tutor feedback than do attending students. This sensitivity led to feelings of deflation and added to their sense of insecurity. These findings raise a number of issues and indicate that e-learning may be more complex than at first envisaged.

Online interaction

A number of authors (Pitt and Clark, 1997; Phillips *et al.*, 1998; Pincas, 2000) suggest that CMC has the potential to facilitate interaction for distance learners. Whilst this was the case in this course, its success was limited. Moreover, the finding that most students in this study were reluctant to engage in CMC is contrary to the claims of many (Carlson, 1992; Ehrmann, 1995; Rudenstine, 1997; Palloff and Pratt, 1999) who suggest that online learners are less inhibited and more likely to join discussions and reveal their thoughts online.

Whilst it is true that those who monopolise conversations can be more easily ignored online than in the classroom their dominance still appears to have an impact in the online environment. Furthermore, in the classroom it is possible for peers to convey their irritation through visual cues and body language, or even by light-heartedly reprimanding someone to 'take a back seat', thus encouraging those who dominate to modify their behaviour. However, in the online environment the students found it difficult to take this course of action, as expressing such an opinion in writing is more permanent than a passing comment or gesture, and consequently more likely to be interpreted as being rude and thus cause offence. Hence, those with strong opinions may be just as likely to dominate in online dialogue as in the physical classroom.

A further point to consider is that those who seemed to adopt an online persona may have been unaware of the impressions they were creating and of their impact on others. Sherman *et al.*, (2001) conducted a study of 'impression meta-accuracy' in the online environment. Metaperception refers to our perceptions of how others view us, and 'impression meta-accuracy', refers to the extent to which we are correct in our assumptions about how others view us (Sherman *et al.*, 2001). Sherman *et al.*, found that people's impressions of how others viewed them were frequently more positive than was actually the case. Moreover, this

discrepancy between how people thought they were perceived, and actually were perceived, was found to be greater in the online environment than in the face-to-face situation. This was thought to be due to a lack of visual cues, which allow individuals to have a higher degree of control over the self-image that they project. The implications of this are that in order to avoid misunderstandings, online users need to take account of metaperception limitations when presenting themselves online, as their assumptions of how others view them may be inaccurate (Sherman *et al.*, 2001). The findings of Sherman *et al.*'s study might account for the proactive students' lack of awareness of how others perceived them. This is an important issue, as an awareness of metaperception may help tutors to gain a deeper understanding of online dynamics, enabling them to convey this to e-learners and thus facilitate more effective interaction.

The extent to which CMC helped create a sense of community in this study was limited. Whilst it enabled the students to learn about one another and discuss course related issues their perceptions of one another, which resulted in feelings of discomfort, suppressed interaction. This supports Lovell's (1980) argument that in order to establish social cohesion members of a group need to interact with each other and that for such interaction to take place individuals need to feel comfortable within a group.

However, the contention of Wegerif (1998) that the extent to which online learners feel connected to one another can influence success or failure in online courses is of interest. Whilst little sense of community was apparent amongst this group of learners and there was little interaction, this did not appear to negatively impact learning, as the e-learners achieved learning outcomes comparable to those of attending students. However, it is difficult to determine the extent to which the e-learners' lack of interaction affected their learning. If, as Wegerif suggests, it had a negative impact then we can assume that had online communication been more successful then the students' learning outcomes would have been even higher. Thus, as little interaction via CMC was achieved on this course, this suggests that the students' success can be attributed to other factors, such as their high levels of interaction with the learning materials and their access to online resources.

Whilst the students' perceptions of each other prevented them from fully participating in online dialogue they did, however, learn a lot from the DG and from each other. Every student, including one who after six months still had not contributed, commented that they benefited from reading others' postings and that the DG enhanced their learning. Those who rarely contributed said they felt disappointed when there was nothing new to read in the DG and that this was their first port of call when they logged on. This raises the issue of the distinction between participation and engagement. Even though some did not participate in CMC it would appear that they were engaged in the debates merely through observation. This mirrors the way in which some students in the traditional classroom contribute little but still learn from being there. It is the difference between active and passive learning. Whilst experience of traditional learning has taught us that learning in groups enhances learning, the findings presented here suggest that we do not really know enough yet about the dynamics of virtual groups to fully exploit their use for e-learning.

Thus, an important finding to emerge from this study is that one of the features often identified as lacking in distance education, that is, a lack of communication, was the element that when made available was the source of most concern. Moore (1993) identifies three types of interaction in distance education: learner-content, learner-instructor, and learner-learner. Though the students in this study engaged in all three forms of interaction their interaction with the learning materials appeared to be more effective than their interaction with each other and the tutor. The communication gap between the tutor and learner and between learner and learner, as identified by Peters (1994f), still existed here and was not entirely bridged by CMC. As Peters anticipated, strengthening these links might prove more difficult than at first thought.

Assessment

Two aspects of the findings in relation to assessment were unexpected. The first was the students' sensitivity to tutor feedback, the second was their enthusiasm for computer aided assessment and feedback, which raised self-confidence and increased learner autonomy.

As Thorpe (1998) points out, feedback is critical to student motivation, especially on first assignments where students may be uncertain and positive tutor comments can encourage perseverance. The course tutor was especially taken aback by the students' reactions to her feedback on their assignments. She felt that the written feedback was given in the same way as that given to attending students and paper-based distance learners. She had been running the course for a number of years without being accused of being harsh or insensitive. However, she felt that the findings in relation to feedback helped her to recognise that online distance learners may require a more sensitive approach to help address their specific needs and that she would take account of this in the future.

Nevertheless, the RQs and SAQs helped the tutor to assess the students' understanding of the concepts presented, and to a lesser extent, as the students suspected, their rate of progress through the course. Moreover, she considered that she learned more about this group of students in the first few weeks than she would about attending students in an entire semester. The tutor was able to assess the students' understanding because they were required to articulate their thoughts at an early stage in the course. Students studying the course by part-time attendance are not required to submit any written work until the end of the first semester when they submit their first assignment. Therefore, any misconceptions or lack of understanding may go undetected until this stage. The same applies to the paper-based distance learners, who do not submit their RQ responses to the tutor, therefore neither their rate of progress nor their understanding can be gauged. The GOLDPhase students, however, through the RQs and SAQs, articulated their thoughts both in the DG and through online submissions to the tutor, thus providing an opportunity for individual feedback and support. So, though the feedback caused disquiet amongst the students it did in fact help the tutor to pick-up on potential problem areas early on in the course.

The students' sensitivity about feedback appeared to be related to their lack of benchmark. It can be argued that paper-based distance learners do not have a benchmark either, but there is a difference, and in this case that difference appeared to stem from peer awareness. Analysis of data indicates that the students were intimidated because they had a false perception that their peers had

a superior level of knowledge and expertise. That perception was drawn from the way in which some presented themselves in the DG. This is probably similar to the way in which we all present ourselves the first time we meet with new acquaintances, or in the first week of a face-to-face educational programme, where we aim to promote our strengths and disguise our weaknesses. However, in the face-to-face situation our peers soon root out the real person and as relationships are formed barriers are eroded and benchmarks are established. In the online environment false impressions can persist over a longer period of time. This situation may be unique to e-learners; paper-based distance learners do not encounter this problem as they work in isolation with no pre-conception about the ability of their peers. But e-learners see the 'virtual personality' rather than the 'human personality', which can lead to feelings of inadequacy and self-doubt. In such a situation a student is unlikely to enter a DG and say, 'By the way I failed my assignment', in order to establish a benchmark.

It is hoped that the findings presented here will help course designers and e-tutors to gain a greater awareness of how e-learners use human and computer elements of e-learning and enable them to maintain a balance between the two. Thus helping reduce the transactional distance (Moore, 1993) between the tutor and learner. The transactional distance being the theoretical or psychological distance, rather than the physical distance. The following strategies are therefore suggested as methods that might help reduce the transactional distance between learner and tutor and improve learner-learner interaction:

- A strategy that might help overcome student reluctance to engage in CMC is to initially avoid any association between assessment and online discussion, but rather to first set the scene for informal discussion. Once again it is restated here that peer assessment was not the intention in the GOLDPhase course. However, as this is how the students interpreted discussion of the RQs, then this approach is perhaps best avoided until students feel more comfortable about engaging in online dialogue. Initial attempts at CMC could therefore be centred around personal introductions and general discussion, which would also help eliminate

the feeling of insecurity that were generated by the formal introductions in the Communication Centre.

- Learners appeared to benefit from computer aided assessment and feedback because it was non-judgmental and allowed them to monitor their progress without being observed. This being the case, it might be appropriate to use CAA in the early stages of e-learning courses and to introduce tutor assessment and feedback more gradually. This approach would allow students the opportunity to gain confidence as e-learners and may reduce their sensitivity to subsequent tutor feedback.
- To take account of the apparent vulnerability of distance e-learners, tutor feedback on assignments should be more explicit and display greater sensitivity than that used for attending students.

8.8.4 Andragogical issues

Chapter 4 introduced the concept of andragogy, a theory of adult learning. Knowles' (1980; 1990) theory of andragogy is underpinned by six assumptions about adult teaching and learning, as displayed in Table 4.1. The findings presented in this chapter have revealed issues related to some of these assumptions. Knowles (1980; 1990) argues that adults generally have a need to be self-directed in their learning, but that different people move towards self-directedness at varying rates. The distance e-learning environment differs from the traditional learning environment, as the physical separation of the tutor and learner allows the tutor fewer opportunities to control and direct learning. This means that tutors are less likely to use behaviouristic teaching methods, thus reducing opportunities for students to adopt a passive role. As a consequence, e-learners need to become more self-directed and develop constructivist learning strategies. To help address these issues the GOLDPhase VLE was designed to encourage self-directedness by providing opportunities for the students to develop constructivist learning techniques.

Examination of the students' experiences of the six elements of distance e-learning revealed that they demonstrated self-directedness and other characteristics of andragogy in some aspects of their learning. Jarvis (1995) and

Hanson (1996) suggest that whilst some adults prefer an andragogical approach, others may find this to be a difficult process. However, the findings here show that in contrast to taking an overall andragogical or pedagogical approach to their learning the individuals in this study rather took one or other of the two approaches to different elements of the course. Moreover, most students took the same approach to the same elements. Table 8.21 shows those student attitudes and behaviours that typify an andragogical or pedagogical approach to learning and the elements and aspects of the VLE to which these relate.

Table 8.21: Andragogical and pedagogical student attitudes and behaviours

Element	Aspect of element	Andragogical attitudes/ behaviours	Pedagogical attitudes/ behaviours
Online environment	Interactive elements	Motivated to study.	
Materials	Hypertext	Developing own pathway through learning content. Exercising control over learning pace. Selective learning. Engaging in reflective learning.	
Information		Organising own learning.	
Resources	External links, databases and search engines.	Engaging in constructivist learning by seeking course related resources. Seeking appropriate resources to address learning needs.	
Communication	CMC	Sharing experiences. Engaging in constructivist learning.	Feelings of insecurity. Lack of confidence. Need for reassurance.
Assessment	Reflecting on materials (SAQ, RQ Formats 4 and 5).	Monitoring own level of understanding.	
	Emailing a response to the tutor (SAQ, RQ Format 6).	Monitoring own pace of learning.	Need for tutor approval
	Individual Self Assessment RQs and SAQs that provided CAF (Formats 7, 8 and 9).	Monitoring own progress. Identifying own learning needs. Improved self-motivation.	
	Assignments		Lack of self-direction.
	Tutor feedback		Need for sensitive approach from tutor.

The students' attitudes and behaviours show that an andragogical approach was taken towards all six elements of e-learning, however, a pedagogical approach was also taken to some aspects of communication and assessment. Self-directedness and self-motivation were those characteristics of andragogy that were most apparent. Self-directedness was characterised by the way in which students approached the learning materials, organised their learning, identified their learning needs and engaged in constructivist learning. Self-motivation was characterised by their engagement with the learning environment and learning content and their reactions towards CAF. There was also evidence to show that the role of experience provided a resource for others, as whilst some students were reluctant to share their learning experiences via CMC, most benefited from those who did. However, feelings of insecurity, lack of confidence and self-direction, and the need for tutor approval and greater sensitivity, in relation to CMC and assessment, demonstrate a pedagogical approach.

These findings in relation to andragogy thus identify those areas where this group of distance e-learners required the most tutor support, these areas being CMC, and assessment and feedback. Knowles (1980) stresses the importance of a comfortable and appropriate learning environment for adult learners. Though he was at the time referring to the physical environment, it is just as important that such an environment should be fostered within the VLE, as feelings of discomfort may engender barriers to learning.

The findings therefore show that whilst the VLE provided tools to encourage an andragogical approach, the benefits might be eroded if the human element is not carefully managed.

Conclusions

This chapter has focussed on the students' experiences of the virtual learning environment and in so doing has attempted to answer the second and third questions that guided this study. The first six sections presented in turn the findings from quantitative and qualitative data that revealed the students' experiences of the six elements of e-learning that comprised Question 2. Section

seven presented the themes that emerged from these elements and the final section discussed the implications of these findings. The andragogical issues arising from the students' experiences were presented and discussed throughout the chapter.

The students in this study found that using the Internet for e-learning engendered both enhancements and barriers, however, their overall experiences were positive and learning outcomes were comparable with those of the part-time attending group who studied the same modules in the same semester.

Whilst some of the findings were expected, others were unexpected, for example, the online strategies that the students developed to help them conceptualise the learning materials, their reluctance to use CMC, and their feelings of insecurity. It was anticipated that the students would embrace the opportunity to engage in CMC with their tutor and peers; the complex difficulties that this engendered were scarcely imagined. On the other hand, it was envisaged that students might experience difficulty in engaging with the learning materials, as this was an entirely new way of learning for members of this group. Surprisingly, it was the students' engagement with the learning materials and the ways in which they utilised these that proved to be the most positive aspect of e-learning. Moreover, their lack of engagement in CMC did not appear to impact their learning outcomes, which leads us to question whether we over-estimate the value of peer interaction. These findings further highlighted that whilst the students took an andragogical approach to most elements of e-learning they adopted a pedagogical role in relation to some aspects of online communication and assessment issues, thus identifying those areas where tutor support may be most beneficial to e-learners.

The overall conclusions to be drawn from this chapter are that the students in this study had a largely positive experience of the technological aspects of e-learning, but a less positive experience of the sociological aspects. These findings show that in this study of distance e-learning the online dynamics differed from those in the traditional classroom and people's perceptions and their expectations differed from those of classroom based learners. Therefore, approaches taken in the traditional classroom may not be entirely suitable in the e-learning

environment. The tools to facilitate e-learning are available, hence, we need to learn how to make good use of those elements that technology enhances and use those that create barriers with greater sensitivity.

This chapter has focused upon the students' experiences of the virtual learning environment and the andragogical issues that arose from these, thus answering the second and third questions that guided this study. The next chapter attempts to answer the final question that guided this study, that is, 'What are the students' learning style preferences and what issues arise from these?'

Chapter 9

Learning Styles

This chapter presents and discusses the findings from the analysis of both qualitative and quantitative data that help answer the fourth and final question that guided this study:

What are the students' learning style preferences and what issues arise from these?

Chapter 8 examined and discussed the students' experiences of six elements of distance e-learning and explored the andragogical issues that arose from the study. This chapter presents the findings from the Kolb Learning Style Inventories (LSIs), which were self administered in order to determine the students' individual learning style preferences. The findings presented in this chapter provide an insight into certain aspects of the students' behaviour in the VLE, as described in the previous chapter. It is hoped that gaining an understanding of how and why the students formed some of their perceptions and experiences will assist those who design and facilitate e-learning courses to provide appropriate support for students from all phases of the learning cycle.

The first section in this chapter presents and discusses the findings of the Kolb LSIs. Section two examines the extent to which the GOLDPhase students' self assessment of their learner characteristics match those of the learning styles category into which they were placed. The third section explores the students' learning styles in relation to their sustainability on the course. The final section discusses the implications of these findings.

9.1 Student learning styles using Kolb's LSI

Two groups of students from the MSc OSH completed Kolb's Learning Style Inventory (LSI). The first comprised fourteen students studying via paper-based distance learning; the second comprised the thirteen members of the GOLDPhase cohort. The results of the Kolb LSIs for both groups by learning style category are displayed in Table 9.1, the individual raw scores are shown in Appendix 10.

Table 9.1: Students' learning styles on Kolb's LSI

Learning Style	Paper-based distance learning group (n=14)	GOLDPhase distance e-learning group (n=13)	Overall average (both groups)
Diverger		23% (n=3)	11% (n=3)
Assimilator	71% (n=10)	38% (n=5)	56% (n=15)
Converger	21% (n=3)	38% (n=5)	30% (n=8)
Accommodator	7% (n=1)		3% (n=1)

Source of data: student's self completed Kolb LSIs

In the paper-based distance learning group seventy one per cent (n=10) were assimilators, 21% (n=3) convergers, and 7% (n=1) fell into the accommodator category. No members of this group fell into the diverger category. Members of the group were asked if they considered their learning styles to be a valid reflection of the way in which they like to learn. Half the group definitely agreed that the learning profile scores seemed valid, the other half more or less agreed. None disagreed with the assessment.

In the GOLDPhase group thirty eight per cent (n=5) were assimilators, a further 38% convergers, and 23% (n=3) divergers. No members of the group fell into the accommodator category. Eight members of this group definitely agreed that the learning profile scores seemed valid, two more or less agreed and a further two disagreed. The remaining student, Peter, did not return his feedback sheet and therefore did not express an opinion.

9.1.1 High proportion of assimilators

The findings show that more than half (n=15) of the twenty-seven occupational safety and health postgraduates who undertook the Kolb LSI fell into the assimilator category of learning style. Given that a more or less equal distribution of learning styles would normally be expected this figure appeared high and unlikely to be caused by chance. Therefore, to test the observed and expected frequencies a chi-square significance test was calculated. A chi-square significance test is appropriate for non-parametric tests where data falls into categories, as with learning styles, rather than quantities (Rowntree, 1981) and is therefore apposite here. A chi-square test has limitations in that it is somewhat less reliable if the expected value in any category is less than five (McLaughlin, 1996). The test may therefore be inappropriate for use with the individual groups where the expected values are 3.5 for the paper-based distance learning group and 3.25 for the GOLDPhase group, but reliable for use across the two groups where the expected values are 6.75. The accepted threshold of statistical significance for a chi-square test is .05, which means that only a 5% probability exists that the observed results are due to chance. Values of less than .05 are considered statistically significant and values above .05 are considered statically insignificant because of an unacceptably high likelihood that the observed association occurred by chance (McLaughlin, 1996).

On the basis of a null hypothesis that: the learning styles of the combined group of distance learning students would be divided equally between the four learning style categories, that is, 25% divergers, 25% assimilators, 25% convergers, and 25% accommodators, the predicted result would be that six or seven (6.75) students would fall into each of the learning styles categories. The result of the chi-square test is:

Chi squared equals 17.296 with 3 degrees of freedom

The two-tailed p value equals 0.0006, $\chi^2 = 17.296$ p < 0.0006

The difference between the expected and observed frequencies is statistically significant, thus allowing us to reject the null hypothesis. It can therefore be

safely concluded that the high number of assimilators within this group is not due to chance alone but that other factors must be involved.

A person's learning style can be shaped by various circumstances including academic training, career choice and current employment (Smith and Kolb, 1986) and these factors may account for the large discrepancy between the observed and expected values. Firstly, it could be argued that as postgraduates this group were to some extent self-selecting, in that students of this level are encouraged to develop strengths that typify the assimilator style of learning. Such strengths include inductive reasoning, the ability to assimilate wide-ranging ideas, theoretical model building, and the ability to undertake analytic, abstract and quantitative tasks (Jonassen and Grabowski, 1993). Therefore, those with a preference for the assimilator style of learning are more likely to undertake postgraduate study than those with a preference for one of the three remaining learning styles. Concomitantly, divergers, convergers, and accommodators who undertake postgraduate study might, in order to accomplish the tasks required of postgraduates, gravitate over time towards the assimilator style of learning. Indeed, the session in which the paper-based distance learners undertook the Kolb LSI was held during a study skills summer school, as this was the only opportunity to gain direct access to this group of distance learners. The students had therefore been immersed in matters related to literature search skills and research methodology, which may have altered their mindset, thus influencing their responses to the LSI and contributing to the high proportion (71%) of assimilators within this group. The possibility that academic training might have impacted the learning styles of members of both groups has therefore to be considered.

A second factor that could account for the high proportion of assimilators across the two groups is the students' shared occupation as health and safety professionals. Various studies have identified the learning style orientations of different professions, however, no studies were found to have focussed on the field of occupational safety and health. A cautious approach is one of the characteristics of the assimilator style of learning and this may be an approach that health and safety professionals develop as a consequence of their

occupation. Furthermore, assimilators are considered to be suited to careers in information or science, including biology (Kolb, 1985), which provides a good fit with health and safety enforcement officers whose role includes providing health and safety advice both to organisations and the public, and whose training will have been grounded in biology. Thus the career paths of the students in the two groups might also have been related to the high number of assimilators, firstly because those who were assimilators may have been drawn to the field of health and safety, and secondly because those who entered the field as accommodators, divergers or convergers could have changed their preferences due to the requirements of their chosen career. Nevertheless, the high proportion of assimilators was unexpected and raises a number of issues in relation to how this group of professionals approach learning situations.

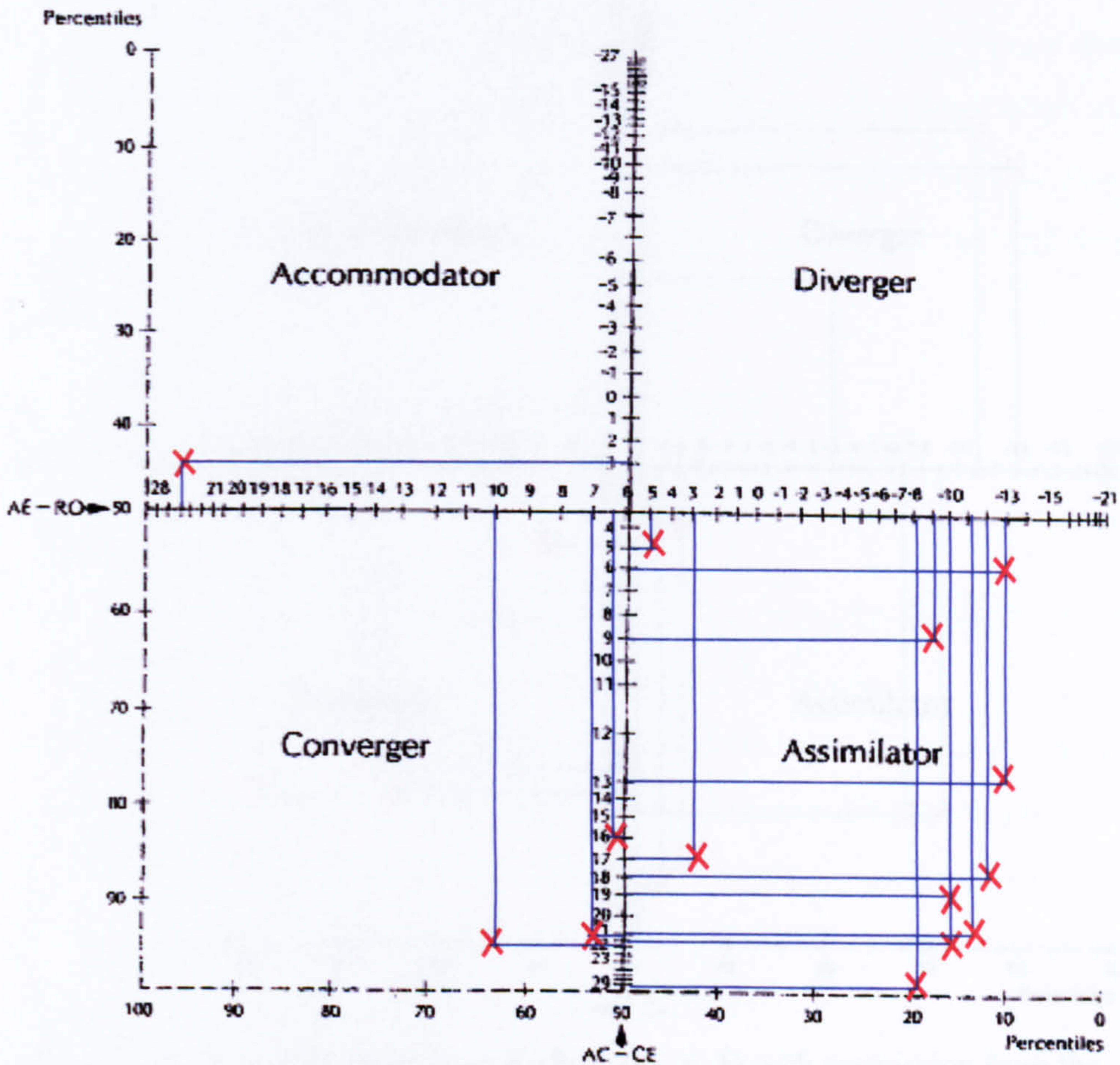
One of the aims in undertaking the Kolb LSI session with the paper-based distance learners was to gain an understanding of how those with differing learning styles approached learning situations and to discover whether they considered that their experience as occupational safety and health professionals influenced their styles of learning. However, the predominance of assimilators meant that splitting the group according to learning styles in order to draw comparisons was unworkable. Nevertheless, whole group discussion revealed that most considered that they approach situations in a somewhat cautious manner, though one or two were uncertain whether this could be attributed to their learning style as the concept was new to them. Whilst the session failed to proceed as planned, in that it did not have the mix of learning styles anticipated, it highlighted the similarities that existed within this group of occupational safety and health professionals. Moreover, the finding that the majority were of the assimilator style of learning placed a new perspective on the study.

9.1.2 Preference for abstract conceptualisation over concrete experience

A further finding to emerge from the Kolb LSI scores is the students' overall preference for abstract conceptualisation (AC) over concrete experience (CE). Figures 9.1 and 9.2 show the combination scores on the AC-CE and AE-RO

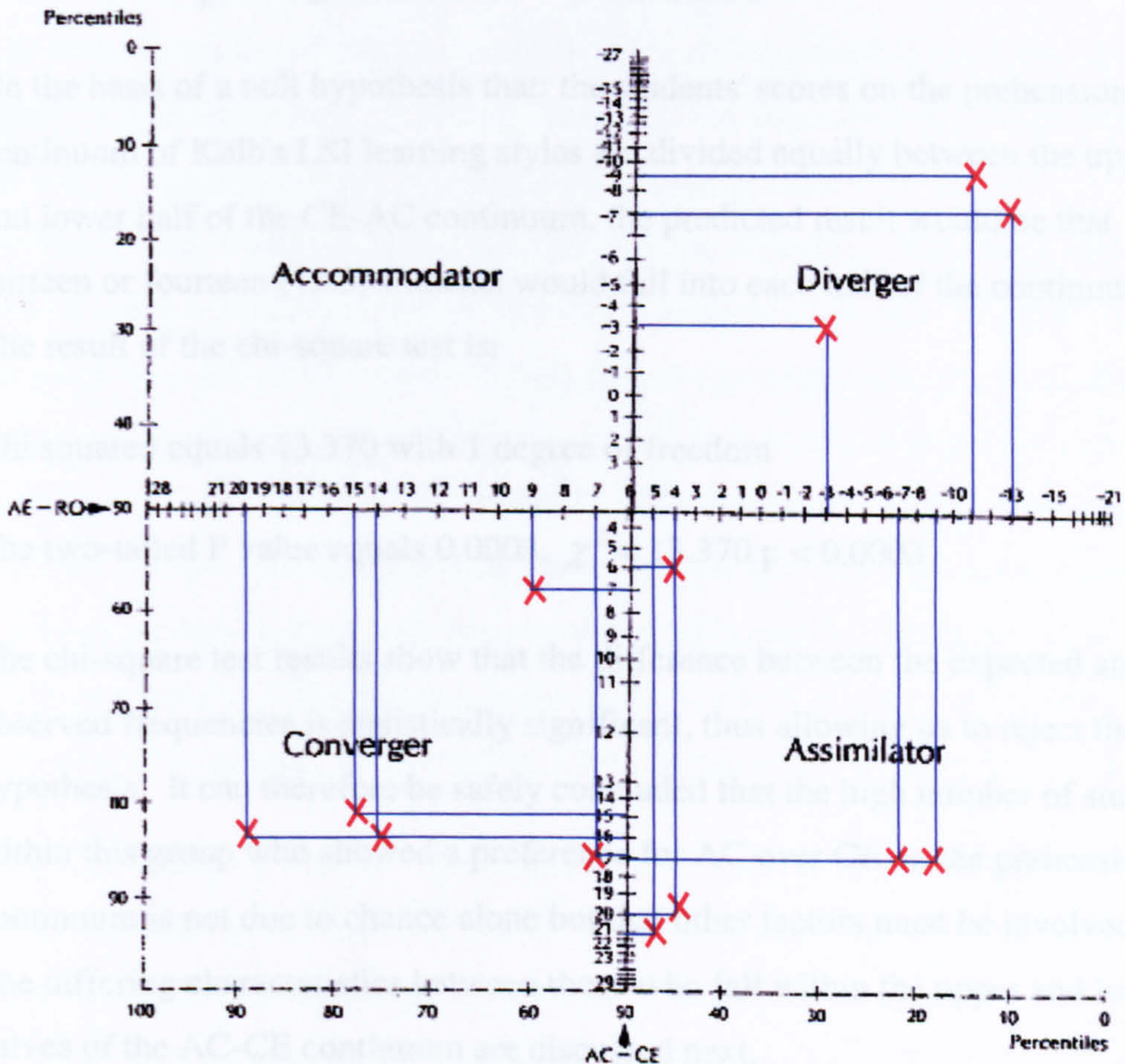
continuums for the respective groups. The points of interception for each student have been plotted, thus showing the learning style quadrant into which they fall.

Figure 9.1: Paper based distance learners' preferences for abstract conceptualisation over concrete experience



Learning-Style Type Grid taken from Kolb (1985, p. 6) with permission from the publisher.

Figure 9.2: E-learners' preferences for abstract conceptualisation over concrete experience



Learning-Style Type Grid taken from Kolb (1985, p. 6) with permission from the publisher.

Though the proportion of assimilators in the GOLDPhase group was not as high as in the paper based group, similarities existed between the two groups in that both had few students who showed a preference for the diverger and accommodator styles of learning, as illustrated in Figures 9.1 and 9.2 above. Ninety two per cent of the paper-based distance learning group and 76% of the GOLDPhase group were assimilators or convergers whilst only 7% of the paper-based distance learning group and 23% of the GOLDPhase group were divergers or accommodators. Thus both groups had a higher proportion of assimilators and convergers than divergers and accommodators.

The number of students who showed a preference for AC over CE appeared to be high given that one would normally expect an equal distribution along the prehension continuum. Therefore, to test whether this finding was due to chance a further chi-square significance test was calculated.

On the basis of a null hypothesis that: the students' scores on the prehension continuum of Kolb's LSI learning styles are divided equally between the upper and lower half of the CE-AC continuum, the predicted result would be that thirteen or fourteen (13.5) students would fall into each half of the continuum. The result of the chi-square test is:

Chi squared equals 13.370 with 1 degree of freedom

The two-tailed P value equals 0.0003, $\chi^2 = 13.370$ $p < 0.0003$

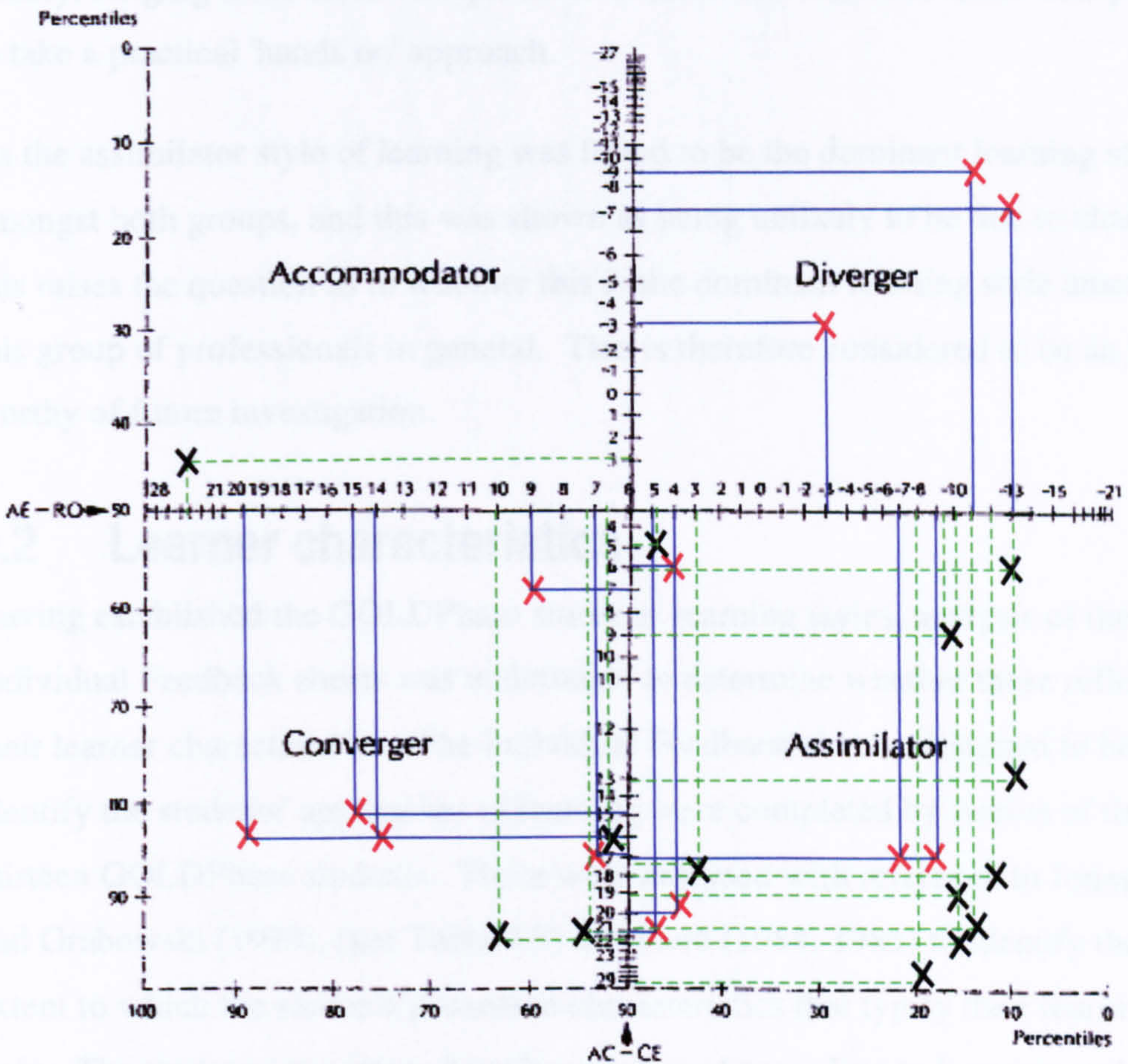
The chi-square test results show that the difference between the expected and observed frequencies is statistically significant, thus allowing us to reject the null hypothesis. It can therefore be safely concluded that the high number of students within this group who showed a preference for AC over CE on the prehension continuum is not due to chance alone but that other factors must be involved. The differing characteristics between those who fall within the upper and lower halves of the AC-CE continuum are discussed next.

Accommodators and divergers fall within the upper two quadrants of Kolb's LSI. Kolb (1985) describes the characteristics of those who tend towards the upper half of the vertical continuum. Accommodators tend to act on 'gut' feelings rather than on logical analysis, and are frequently risk takers, so perhaps it is not surprising that only one of our twenty seven occupational safety and health practitioners showed a preference for this style of learning. Divergers are sensitive to the feelings of others and listen with an open mind. Therefore, both accommodators and divergers tend to rely upon feelings and typically have well developed people skills (Kolb, 1985).

Assimilators and convergers fall within the lower two quadrants of Kolb's LSI. People who show a preference for these two learning styles tend to have less developed personal and social skills than those who fall within the upper two quadrants, preferring to deal with things and concepts than with people (Kolb, 1985).

The finding that the majority of students were either assimilators or convergers is significant, as those who fall within these two learning styles show a preference for abstract conceptualisation over concrete experience on the vertical prehension continuum of Kolb's LSI. Therefore, regardless of learning style, 85% of these occupational health and safety postgraduates showed a preference for perceiving the environment through abstract conceptualisation, thus taking a systematic approach to understanding problems or situations rather than relying upon intuition and feelings. Furthermore, and of particular significance here, assimilators and convergers tend to have less well developed people skills and are therefore less likely to rely on interaction with others. The implications for this study being that the learning styles of the students might have contributed to their overall reluctance to take part in CMC, as discussed in the previous chapter.

Whilst the majority showed a preference for AC over CE on the prehension continuum their preferences for active experimentation (AE) or reflective observation (RO) as a strategy for processing incoming information, shown on the horizontal transformation continuum, were more varied. Figure 9.3 shows the plotted interception points for both groups of students thus illustrating the similarities between the two.

Figure 9.3: Learning styles of the paper-based and GOLDPhase groups

Learning-Style Type Grid taken from Kolb (1985, p. 6) with permission from the publisher.

Key:
----- X = paper-based distance learning students
————— X = GOLDPhase distance e-learning students

The learning style interception points for the students in both groups fall predominantly into the lower half of the vertical AC-CE continuum, but are more evenly scattered along the horizontal AE-RO continuum, thus indicating that whilst the majority perceived information in a similar way they took a variety of approaches in transforming, or acting upon, what they perceived.

In summary, the findings of the Kolb LSI show that similarities existed between members of the two groups of distance learners, with the majority showing a preference for the assimilator style of learning. Furthermore, this finding

indicates that the majority of students across the two groups grasp information in a similar way, which is by using logic rather than instinct (thinking rather than feeling), but the way in which they process or act upon information differs more widely, ranging from those who prefer to observe and reflect to those who prefer to take a practical 'hands on' approach.

As the assimilator style of learning was found to be the dominant learning style amongst both groups, and this was shown as being unlikely to be due to chance, this raises the question as to whether this is the dominant learning style amongst this group of professionals in general. This is therefore considered to be an area worthy of future investigation.

9.2 Learner characteristics

Having established the GOLDPhase students' learning styles, analysis of their Individual Feedback sheets was undertaken to determine whether these reflected their learner characteristics. The Individual Feedback sheets, designed to help identify the students' approaches to learning were completed by twelve of the thirteen GOLDPhase students. These were analysed with reference to Jonassen and Grabowski (1993), (see Table 4.3) and Kolb (1984; 1985) to identify the extent to which the students possessed characteristics that typify their learning style. The students' responses have been grouped according to learning style and are shown in Table 9.1. Responses that typify the students' preferred learning style are colour coded blue, those that are atypical are colour coded red. The students' learning styles are reflected in many of these self assessment comments.

Table 9.2: Students' responses to Individual Feedback Sheets

Question	Response by learning style		
	Diverger	Assimilator	Converger
<p>What do you consider to be your greatest strength as a learner?</p>	<p>I pick up new concepts quickly. Feel enthusiastic about ideas (Christine). Listening with an open mind. Gathering information. (Sally).</p>	<p>A good memory and a tendency to think a lot about the things I learn (Catherine). Concentration (Chris). Logical conceptualisation (James).</p>	<p>The ability to link parts of a subject (Adam). Practical application of theories (Andrea). Problem solving ability and being able to relate what is being taught to a practical level (David). I can plan out my studies and work fairly closely to my schedule (Olwen). Enthusiasm, willingness to learn (Yvonne).</p>
<p>What do you consider to be your greatest weakness as a learner?</p>	<p>Lack of attention to detail – tendency to skip details and reply on intuition and first impressions of ideas and theories (Christine). Not making decisions or choosing the best solutions and time management (Sally)</p>	<p>Lack of imagination (Catherine). Communicating my ideas to others (Chris). I am sometimes slow to accept new concepts (Joanne). [Dislike of] touchy, feely emotives [sic] (James).</p>	<p>I am too worried by the prospect of failure, and I'm not prepared to take risks (Olwen). I can give up too easily if I feel I may fail, or have worked hard and under achieved (Yvonne).</p>

Response by learning style			
Question	Diverger	Assimilator	Converger
In which areas would you like to improve your skills as a learner?	<p>I would like to retain more (Christine).</p> <p>Organisational skills could be improved, they fluctuate often depending upon circumstances (Sally).</p>	<p>Maintaining enthusiasm, following through (Catherine).</p> <p>Communication (Chris).</p> <p>Practical ability, - i.e. trying things out more - access to range of Internet provision should assist with this (Graham).</p> <p>I would like to be able to think quicker – be more confident (Joanne).</p>	<p>Enjoying following things through rather than just finding out about them (Adam).</p> <p>I would like to be able to express myself more fluently so that I could take more advantage of discussing ideas with other people (Olwen).</p> <p>Evaluating possible results and implementing the solutions (Yvonne).</p>
What kind of learning situations help you to learn?	<p>Listening to others helps me to reinforce my learning.</p> <p>Agreeing or disagreeing helps develop my understanding (Christine).</p>	<p>Where I have the opportunity to discuss what I'm learning with others (Catherine).</p> <p>Hands on approach – experimentation, problem solving (Chris).</p> <p>Summarising information in writing – note form for retention (Graham).</p> <p>A combination of note taking, videos, listening to others, enthusiasm of the tutor (Joanne).</p> <p>Those which build and follow a logical systematic sequence, i.e: if $A + B = C$ then $c + \dots$ etc (James).</p>	<p>A challenge, questions, competition (Adam).</p> <p>Where the material being taught is related to practical situations/practices (David).</p> <p>Clearly defined goals (Olwen).</p>

Response by learning style			
Question	Diverger	Assimilator	Converger
<p>What makes it difficult for you to learn?</p>	<p>Lack of time. Boredom with subject. (Christine). Feeling stressed, anxious and tired. I have a limited amount of concentration time, depending on the time of day (Sally).</p>	<p>Too many distractions. Not enough interest in the subject matter. Isolation from other students (Catherine). Abstract ideas – I like to have the evidence/data (Chris). Distractions, noise, time pressure (Graham). Distractions (Joanne). Illogical outcomes/conclusions (James).</p>	<p>Sitting down writing and going slowly through a topic logically in a group at the pace of the slowest (Adam). Lack of practical implementation (Andrea). When the material being taught is abstract, difficult to understand what it's application is (David). Lack of feedback and encouragement (Olwen). Other commitments, time management (Yvonne).</p>
<p>In your opinion, which aspects of the GOLDPPhase online distance learning course <i>least</i> supported the way you like to learn?</p>	<p>Didn't enjoy learning on my own (Christine).</p>	<p>The lack of interaction with other students, though the opportunity was there (Catherine). The case study (James).</p>	<p>The Discussion Group (David).</p>

Response by learning style	
Question	
<p>In your opinion, which aspects of the GOLDPPhase online distance learning course helped support the way you like to learn?</p>	<p>Diverger</p> <p>Case study, I could identify with the Piper Alpha report. The material was well prepared – no need to make reams of notes (Christine).</p>
	<p>Assimilator</p> <p>Helped to motivate me by forcing me to apply myself to the work, you can't watch TV and work online at the same time! (Catherine).</p> <p>I enjoy and I am used to solo studying. The online course fitted in with the mode of studying I like best. But it's reassuring to know that support is there is you need it (Chris).</p> <p>Clear information. The RQs and SAQs. (Graham).</p> <p>Excellent notes, references provided (Joanne).</p> <p>The reflective questions (James).</p>
	<p>Converger</p> <p>One could overview a topic quickly and then look at interesting parts of it. You could review lessons without having to look at hand written notes (Adam).</p> <p>I could take as much time as I liked to analyse/consider my input (Andrea).</p> <p>Audio tapes, videos and the handouts (David).</p> <p>We were given information on the structure and content of the course so that we could plan ahead and see how parts of the course fitted together (Olwen).</p> <p>The flexibility of the system, it allows you to work at a pace to suit you, i.e. those with time could work ahead etc (Yvonne).</p>

Analysis of the students' responses highlight that those with the same learning style preference displayed similar characteristics, which in the main were typical of their learning style. However, a small number of differences, atypical of the learning style category were also identified. These similarities and differences are explored below.

Two of the three who fell into the diverger category returned their feedback sheets. Most of their self-assessment comments show that they possessed characteristics typical of their learning style, none of the comments were atypical. Both considered themselves to be open minded and receptive to new ideas but acknowledged that they lacked concentration and organisational skills.

All five assimilators returned their feedback sheets. Their comments were largely typical of their learning style and showed that they took a logical, considered approach to learning, found note taking and reflective learning beneficial, and favoured working on their own in a quiet environment, being less focussed on people and more concerned with ideas and concepts. There were, however, two exceptions. Chris, whilst showing many of the characteristics typical of the assimilator style of learning, such as, a preference for individual learning and a lack of communication skills, differed slightly in that he showed a preference for situations that allow for active experimentation. However, examination of his learning style scores show that his score on the AE-RO continuum is four, which is fairly close to the dividing line between converger and assimilator. As convergers tend to take a more 'hands on' approach the AE-RO score may therefore account for this atypical preference. The second exception was Catherine, who despite possessing many of the strengths typical of her assimilator learning style, for example, the ability to assimilate wide-ranging ideas, was atypical in that she considered herself to be people orientated and enjoyed dialogue with her peers. This view is supported by qualitative data gathered throughout this study. It could, therefore, be expected that Catherine's score on the AC-CE continuum would be towards the upper end of the assimilator quadrant, veering towards the diverger quadrant. This is not, however, the case as her AC-CE score of twenty-one is well towards the lower end of the assimilator quadrant, which is often an indication of less well

developed communication skills. The reason for Catherine being atypically people orientated is therefore unclear and this deviation cannot be explained by reference to Kolb's LSI.

Five of the thirteen students were of the converger style of learning and all five returned their feedback sheets. Once again the students' comments were largely typical of their learning style with none of the students displaying any atypical characteristics. Students in this group preferred the practical application of theories, were skilled in problem solving, and in common with assimilators, acknowledged communication skills and being one of their weaker areas.

In summary, with the exception of Catherine, the students' self assessment of their learning style characteristics were largely typical of the learning style quadrant into which the Kolb LSI placed them. This finding strengthens the validity of the Kolb LSI assessments for these students.

9.3 Student retention

The GOLDPhase students' learning styles were examined to see whether a pattern existed between their learning styles and student retention rates. Of the thirteen who formed the cohort for this study nine completed the online phase of the pilot course and four withdrew. Seven of the nine who completed the online phase attended the university to sit the examinations, six of the seven gained full accreditation for Modules 1 and 2, the seventh gained accreditation for Module 2, but failed the Module 1 examination. Two students, despite having sustained the pilot course, were unable to attend for the examinations and therefore did not gain accreditation for the two modules. Three of the six who gained full accreditation continued with the MSc OSH by transferring to the paper-based version of the course. Figure 9.4 shows the differing levels of sustainability throughout the pilot course by learning style, in Figure 9.5 these are mapped on to Kolb's learning cycle.

Figure 9.4: Student retention rates on GOLDPhase

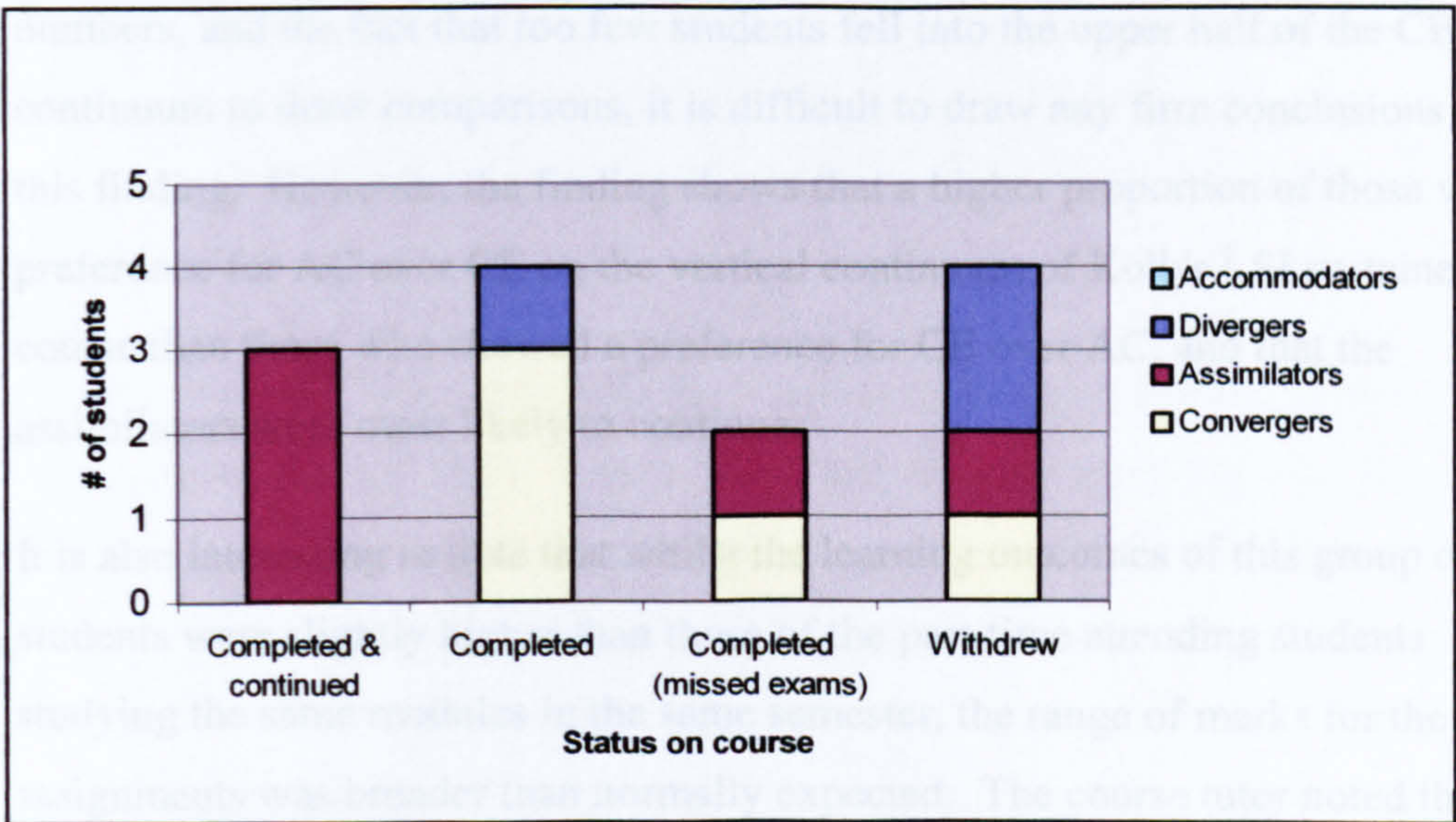
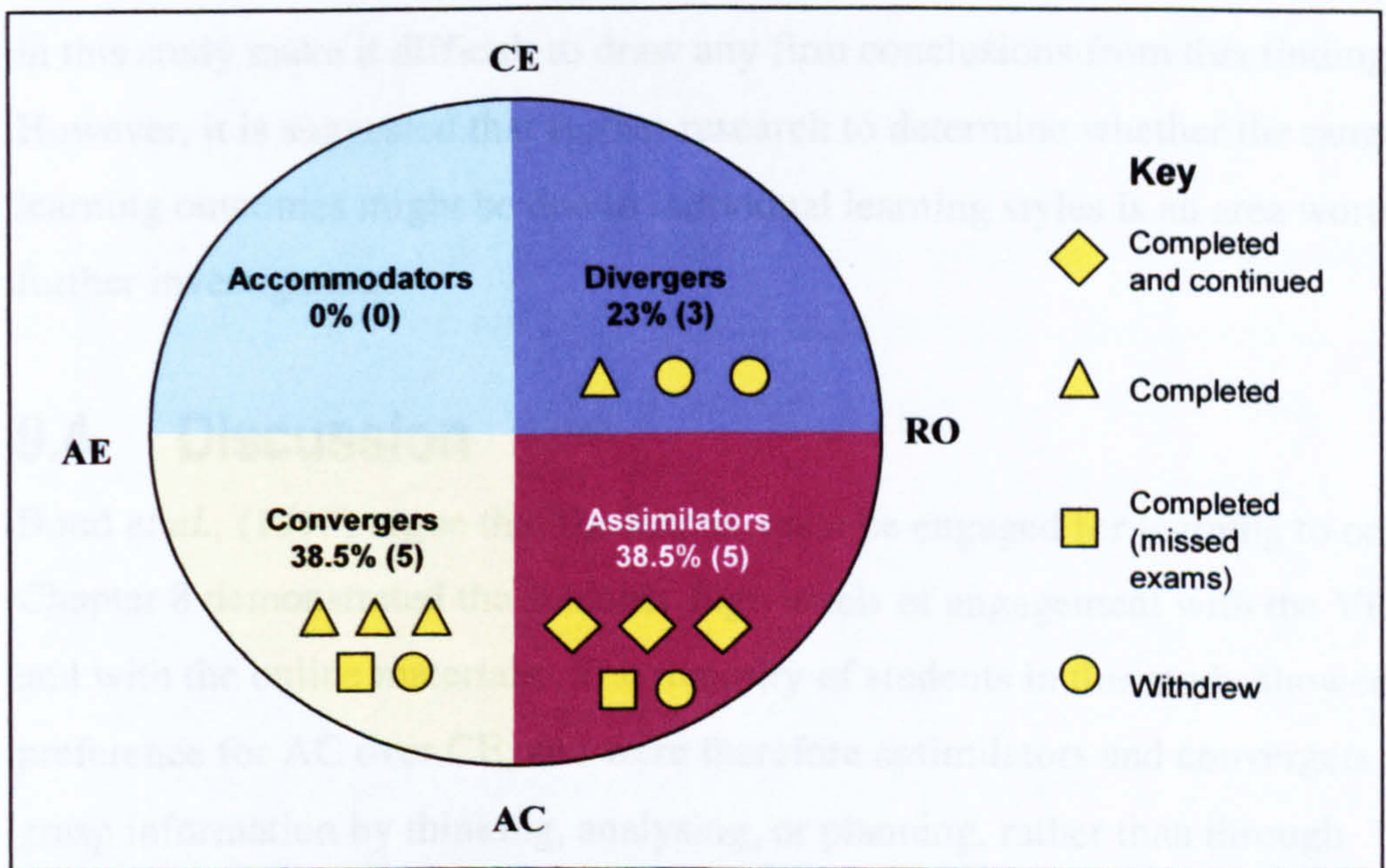


Figure 9.5: Student retention rates by learning style



Two of the divergers withdrew from the course, the third completed the course but failed one of the examinations. Four of the five assimilators completed the course, three of these continued with their studies and the fifth withdrew. Four of the five convergers also completed the course, the fifth withdrew. Thus, eight of the nine who completed the course were assimilators or convergers and all three who chose to continue with the course were assimilators. Moreover, none

of the divergers gained full accreditation for both modules. Due to the low numbers, and the fact that too few students fell into the upper half of the CE-AC continuum to draw comparisons, it is difficult to draw any firm conclusions from this finding. However, the finding shows that a higher proportion of those with a preference for AC over CE on the vertical continuum of Kolb's LSI sustained the course than those who showed a preference for CE over AC, and that the assimilators were most likely to continue.

It is also interesting to note that whilst the learning outcomes of this group of students were slightly higher than those of the part-time attending students studying the same modules in the same semester, the range of marks for the assignments was broader than normally expected. The course tutor noted that whilst one student achieved the highest mark she had ever given for an assignment on this course, the marks of those who were referred were lower than usual (see Table 8.17). Once again the small number of students who took part in this study make it difficult to draw any firm conclusions from this finding. However, it is suggested that further research to determine whether the range of learning outcomes might be due to individual learning styles is an area worthy of further investigation.

9.4 Discussion

Boud *et al.*, (1993) argue that the learner must be engaged for learning to occur. Chapter 8 demonstrated the students' high levels of engagement with the VLE and with the online materials. The majority of students in this study showed a preference for AC over CE, and were therefore assimilators and convergers who grasp information by thinking, analysing, or planning, rather than through intuition (Smith and Kolb, 1986). They have the ability to learn by logical analysis and deductive reasoning, as such they prefer learning situations that present structured and clear ideas and prefer to study alone (Smith and Kolb, 1986). Therefore, the learning styles of the majority were compatible with the design of the learning materials, which were largely text based and presented in a linear format. In contrast, those with a preference for CE over AC prefer to learn through new experiences, role play, and peer discussion and feedback (Smith and Kolb, 1986). However, the inclusion of hypertext enabled the students to use

the materials adaptively by taking either a discursive or recursive approach, for example, by using the 'looping' strategy discussed in the previous chapter. The opportunity to utilise the materials according to individual learning preferences might therefore have contributed to the high levels of engagement reported by all students.

Eickmann *et al.*, (2002) compared the learning styles of art students and management students using Kolb's LSI. Their findings aptly illustrate the differing approaches to teaching and learning of those from different ends of the CE-AC continuum and the way in which course design and teaching strategies are influenced by teaching objectives. The art course took a recursive approach to teaching by integrating demonstration, practice, production, and feedback, with learning being demonstrated through performance. The management course took a discursive text driven approach with learning being assessed through tests and written work. The findings of the Kolb LSIs showed that the art students were predominantly accommodators and divergers, whilst the management students were predominantly assimilators and convergers.

The learning styles of the students in this study also appear to have contributed to the lack of interaction in CMC. Unlike accommodators and divergers, assimilators and convergers are less focussed on people and tend to lack interpersonal skills, (Kolb, 1984; Eickmann *et al.*, 2002). Furthermore, as assimilators and convergers prefer abstract conceptualisation they are less likely to engage in brisk exchanges, preferring to reflect upon issues and incubate ideas before stating their opinions. On the other hand, divergers and accommodators favour interaction and feedback. Therefore, the high number of assimilators and convergers may have contributed to the lack of online dialogue. Moreover, students from both ends of the CE-AC continuum appear to have been disadvantaged in this situation as those who favoured CE were unable to stimulate the degree of interaction and feedback they desired, and those from the AC end of the continuum felt intimidated by the tone and pace of others' postings.

Singham (2004) discusses the issue of unbalanced participation in discussions. Working with a class of undergraduates he examined the characteristics of

'listeners' and 'talkers'. Listeners reported that they preferred to stay silent because they felt their ideas were somewhat obvious and therefore they did not want to waste others' time. They also found it difficult to find pauses in conversation and liked to take time to absorb information, develop their ideas and carefully word their views before speaking out. However, they often found that by the time they were ready to contribute the conversation had moved on. The talkers however, considered their views to be important and felt the urge to share them. They also felt uncomfortable during silences, found it difficult not to express their opinions and enjoyed the attention they received. They further reported that speaking out got them noticed by the tutor. Both groups felt that forcing themselves to adopt the alternative role, by talking more, or listening more, would improve their communication skills. The talkers decided that they should avoid dominating discussions and the listeners began to attach importance to their own viewpoints (Singham, 2004).

Whilst Singham's (2004) study focussed on face-to-face classroom discussion it has implications for the online environment. The purpose of his study was to encourage dialogue without coercion. Singham's description of 'talkers' mirror the characteristics of those who prefer CE, whilst his description of 'listeners' mirror the characteristics of those who prefer AC. Acknowledging the needs of others helped the students in Singham's study to modify their behaviour and improve their communication skills. Helping e-learners to recognise the needs of others in the online environment by gaining an understanding of their own and others' learning styles might encourage all students to participate in CMC and thus help avoid misunderstandings. The learning styles of the students in the GOLDPhase study may therefore have contributed to their patterns of behaviour in the VLE, thus leading to their heightened awareness of others and their feelings of insecurity.

Examination of the students' learning styles in this study raises a number of issues in relation to online delivery of the MSc OSH and that will be of interest to others who wish to implement online courses. The finding that ninety two per cent of the paper-based distance learning group and 76% of the GOLDPhase group showed a preference for AC over CE raises the issue of whether MSc

OSH students in general show this preference. If this is the case the implications for online learning are that in order to establish effective CMC, students might benefit from being made aware of their own learning style preferences and of the mix of learning styles within the group.

Raising student awareness of learning styles can encourage learners to develop a balanced learning style by developing other modes of learning (Smith and Kolb, 1986), which might be achieved through using online tools such as hypertext and CMC. It is therefore important that course designers should ensure that VLEs provide a variety of teaching strategies to accommodate all learner types by offering a variety of online media. Raising the students' awareness of learning styles might also foster a better understanding of the needs of others in the online environment and thus facilitate the development of a course community. Moreover, tutors should carefully manage online discussions by taking account of different learning styles and providing opportunities for all learners to participate in CMC.

As students develop learning style preferences they naturally favour learning resources in that style (Kolb, 1984), thus when presented with a VLE that does not include learning strategies that match their learning style are more likely to be disengaged. Research has shown that where an individual's learning style and their choice of career are incompatible the individual will leave the field or seek a change of career (Smith and Kolb, 1986). This raises the question as to whether students who find a virtual learning environment incompatible will also withdraw from the learning programme.

Conclusions

This chapter has presented and discussed the findings from qualitative and quantitative data that help answer the fourth and final question that guided this study. Section one presented the findings of the Kolb LSI inventories for two groups of students studying the MSc OSH, the paper-based distance learners and the GOLDPhase online distance learners. Section two examined the extent to which the GOLDPhase students' self-analysis of their learner characteristics matched their learning style preferences on Kolb's LSI. This was followed in

section three by an analysis of student retention rates by learning style. Finally, the implications arising from the students' learning styles analyses were examined and discussed.

The findings presented in this chapter show that the assimilator style of learning was dominant amongst the paper-based and online MSc OSH distance learning students who undertook Kolb's LSI. Moreover, there was an overall preference amongst both groups for AC over CE. The GOLDPhase students' self analyses of their learning style characteristics largely matched those of the learning style quadrant into which they were placed, thus adding validity to the Kolb LSI results. The findings also suggest that those with a preference for CE over AC, that is accommodators and divergers, may be more willing and more virulent contributors to CMC than those with a preference for AC over CE, that is assimilators and convergers. As the Kolb LSIs showed that the majority of OSH students tested had a preference for AC over CE the implications of this are that the majority of students studying the MSc OSH via e-learning are more likely to take a considered and reflective approach to CMC and to contribute less frequently. Gaining an understanding of these differing approaches to CMC will help e-learning tutors to take a considered and sensitive approach to moderating online discussions. Furthermore, by making their students aware of others' learning style preferences e-learning tutors might encourage greater interaction amongst e-learners. In turn this would help create a course community where all learners can feel valued, thus facilitating learner-learner and learner-tutor interaction (Moore, 1993) and facilitating constructivist learning at the expertise level (Jonassen *et al.*, 1993) through sharing experiences.

Whilst learner-learner and learner-tutor interaction was lacking in the GOLDPhase course, learner-content interaction was found to be effective. The high levels of interaction with the online materials appears to have been facilitated by hypertext, which enabled the students to take either a discursive or recursive approach to suit their differing learning styles. These approaches were described under the theme of e-learning strategies in the previous chapter.

This chapter also presented quantitative data that showed that a higher proportion of those with a preference for AC over CE sustained the online course and that

assimilators achieved more successful learning outcomes than the divergers and convergers, (no accommodators took part in the course). It is difficult to determine the reasons for this due to the small number of participants involved, however, this is considered to be an area worthy of further investigation.

The findings from the Kolb LSIs therefore show that whilst assimilators and convergers are more reluctant to engage in CMC, the students who showed a preference for these learning styles achieved greater success on this e-learning course. This finding suggests that the assimilators and convergers lack of participation in CMC did not seriously impact their learning in the VLE. This raises the issue of whether we place too greater an emphasis on interaction with humans in the learning process.

Having presented the findings of this study in this and the two preceding chapters the next and final chapter will conclude by reflecting on the findings, drawing final conclusions, and making recommendations.

Chapter 10

Conclusions

This final chapter consolidates all of the material presented and focuses the aims and achievements of this thesis. In so doing it presents a summary of the study's main findings in the area of distance e-learning and highlights the original contribution to knowledge that has been made. In addition, the strengths and limitations of the study are discussed and recommendations for future research are offered.

It is not intended at this stage to further discuss detailed conclusions, which have received extensive consideration in the three findings chapters that precede this final chapter. Rather, the main points are brought together from all of the foregoing.

10.1 Summary of main findings

The first part of the review of the literature presented the background to traditional distance education and discussed the metamorphosis that took place in order for the field to become established. This was followed by a discussion of the transition from correspondence based distance education to online distance education. This second chapter highlighted that in the brief history of distance e-learning there has been an emphasis on the technology itself and that few studies have focused on the students' perspectives of distance e-learning. These two chapters identified the gap in the research that this study set out to investigate. The third and final part of the literature review examined learning theory and its application to e-learning. The chapter argued that andragogy and learning styles theory might help provide a deeper understanding of how students experience e-learning. These three chapters thus helped identify the purpose of this study and the research questions that guided it. The next part of the thesis, that is Chapters 5 and 6, set out the approach and methodology used to answer these questions and introduced the context of the GOLDPhase study.

The overall purpose of the study was therefore to facilitate an understanding of how students studying modules from the University of Salford's MSc/Postgraduate Diploma in Occupational Safety and Health experience distance e-learning. This aim has been achieved. The findings of the case study were presented in Chapters 7, 8 and 9 and are summarised below.

1. The students' overall experiences of e-learning were positive.
2. Access to e-learning from home and work comprised four key dimensions: technology, space, time, and support.
3. E-learning had a positive impact on the students' personal and professional development.
4. The interactive elements of e-learning motivated students to study and maintained their interest.
5. There was a high level of engagement with the learning materials.
6. Students developed e-learning strategies that facilitated reflective learning and higher order thinking.
7. Students experienced a heightened awareness of others in the VLE and feelings of insecurity.
8. Students demonstrated an overall andragogical approach to e-learning.
9. The assimilator style of learning was identified as being dominant amongst the paper-based and online distance learners who undertook Kolb's LSI. Moreover, the learning styles of the e-learners appeared to influence levels of participation in CMC, and retention rates.
10. Learning outcomes were slightly higher than those of attending students studying the same modules.

The study revealed an overarching theme, that of the 'human-to-human and human-to-computer relationship', which shows that the overall barriers to e-learning were sociological and the enhancements were technological.

The overall finding that the technological element of e-learning was less problematic than the human element was surprising. After careful examination of the literature I had expected to find that the technology would engender barriers to learning and that the human element would enhance learning. Instead, I found the opposite. The barriers were largely sociological and the enhancements were mostly technological.

10.2 Contribution of the thesis

Having summarised the conclusions of the thesis this section highlights how the work makes an original contribution to knowledge. The following four points are offered as the contributions that have been made to the field of distance e-learning:

- 1. A thorough literature review of the area of distance e-learning, including the background and context of the field of distance learning, and the application of learning theory.**
- 2. The identification of those factors, in the home and workplace, that might impact access to distance e-learning.**
- 3. A deeper understanding of how distance e-learners engage with the learning environment and the learning materials.**
- 4. A greater awareness of how students' perceptions of others within the VLE might impact their learning.**

Though the study does not seek generalisation to other cases it is considered that the case may have wider resonance within higher education, and that there may be some areas of commonality between this case and others and that the findings may be generalisable to some other settings. It is also hoped that the case will increase overall understanding in this young area within education and contribute towards others' cumulative understanding of the student perspective of distance

e-learning, thus adding to the growing body of knowledge in this area. It is envisaged that this work will be of value to educational institutions, course designers, and tutors who wish to implement online courses at a distance. It is further envisaged that the findings will help determine how best to support e-learners studying at postgraduate level.

The work is significant in that as far as can be discerned it differs from that of previous studies in the following aspects. Firstly, the study focussed on the perspective of the student, rather than on that of the tutor or institution. Secondly, it concentrated on distance education at postgraduate level. Thirdly, by taking a largely qualitative approach the work avoided the comparative type study frequently adopted by others in the field and often criticised as telling little about the learning process and students' experiences, thus leaving too many questions unanswered. The study yielded data that has revealed how and why the virtual learning environment enhanced learning for some yet engendered barriers for others. This has provided an insight into the student experience of distance e-learning, thus filling the previous gap in the literature.

The GOLDPhase VLE was specifically designed and constructed to facilitate this PhD study. As a result of the initial findings of this project the School of Environment and Life Sciences at the University of Salford considered that the Internet was a viable medium for the delivery of the MSc/Postgraduate Diploma in Occupational Safety and Health and decided to pursue this new pathway to the course. In the summer of 2000, having secured funding from the University's Education Development Unit, the course tutor and I developed the entire course for online delivery, with the interim findings of this study informing our approach. By this time MLEs had become more widely available and the University subscribed to Blackboard, which was the platform we used. Since the online learning route was developed the course has attracted students from a wider geographical area, both within the UK and overseas, thus widening access to those wishing to enter the field of OSH at postgraduate level and to existing OSH professionals wishing to study the subject in greater depth.

10.3 Strengths and limitations of the study

The investigation used a case study strategy. In so doing it has demonstrated the value of this approach for investigating studies of this nature, which seek to gain an understanding of students' experiences of distance e-learning. The case study strategy strengthened this study by enabling me to conduct an in-depth study of a complex social issue by focussing on a specific group, in a specific situation, yet in a variety of physical locations. The nature of the study, that is, the investigation of real people in day-to-day situations, meant that there were few opportunities, as researcher, to have control over events (Robson, 1993; Yin, 1994), however, the case study strategy facilitated research under these conditions. It also assisted the wide variety of data collection methods used. Using mixed methods of data collection allowed for triangulation of data, which I believe strengthened the reliability and validity of the study. Furthermore, the case study approach made it easier to gain a holistic view of the differing aspects of distance e-learning. Moreover, by utilising the case study approach the thesis was able to fulfil the purpose of the study and facilitate an understanding of the student experience of distance e-learning, an outcome that would have proved more difficult to achieve had an alternative approach, such as surveys, been selected. Finally, and most importantly, the case study approach enabled the study to develop theoretical generalisations about distance e-learning so that people can learn from this case and add to their existing knowledge of other cases (Stake, 1995), thus increasing their overall understanding of distance e-learning.

A further strength of the research was the neutral role that I was able to adopt as researcher. Because online learning is still in its infancy most research to date has been conducted by subject tutors, who as early adopters of the technology, have been eager to learn more about its benefits and drawbacks. Indeed, without such advocates the area of e-learning would not have progressed so rapidly. However, such situations, where the inquirer may be deemed to be in a position of power over the research participants, may adversely affect participants' responses and hence the validity of the research. This was not the case in this study where I believe my neutral stance encouraged the participants to provide more open and honest accounts of their experiences. However, my previous

teaching experience also enabled me to empathise with the course tutor, thus allowing me to gain an overview of both the teaching and learning aspects of this study.

One of the drawbacks to the qualitative approach to this study was perhaps the large volume of data that was amassed. The ease with which data generated via electronic sources can be captured led to the temptation to retain and analyse every communication 'event'. This approach necessitated additional data screening in order to eliminate surplus data. Whilst qualitative research aims to make use of multiple data sources future researchers working with computer generated data may wish to be more selective by carefully defining the parameters of the data they retain for analysis. Nevertheless, the wide range of data that was selected for analysis served to enrich the study and organising such data was made easier by the NVivo CAQDAS package.

A limitation of the study was that during the online phase of the pilot course, time constraints prevented me from conducting detailed analysis of data as it accrued. This was due to the necessity to develop the content for the VLE, administer the course, and conduct interviews. Ongoing data analysis might have highlighted issues at an earlier stage and provided opportunities for exploring these in greater depth.

10.4 Directions for future research

This final section of the thesis makes suggestions for future research. The study has identified a wide range of issues, many of which are worthy of separate study. There is, therefore, a great deal that could be investigated further. However, four topics are offered here as allowing the most potential for further research.

An area considered worthy of further investigation is the feasibility of workplace e-learning. This study identified a lack of support for e-learning in the workplace and further highlighted the pressure that e-learning exerts on individuals' time and domestic commitments. The research could conduct a broader investigation into workplace e-learning than was undertaken in this study. It might include a cost benefit analysis of workplace e-learning compared

to funding externally based courses. This could explore, for example, the possible advantages of having employees who undertake work related courses readily available in the workplace in case their expertise should be required at short notice, especially in small-to-medium sized enterprises where staff resources are often limited. Such a study might benefit both employers and employees and help identify how work-based e-learning can be best accommodated.

A further area identified as warranting further investigation is e-learning strategies. This thesis identified the way in which students used hypertext to gain a holistic view of the course and to aid revision; and how they used the RQs to reinforce their learning. This finding has implications for the design of online courses. It raises the issue of where RQs are best placed within learning materials to prompt reflection and how hypertext can be used to encourage higher order thinking. Further research might investigate this topic in greater detail across a range of disciplines with increased student numbers.

Another area of research that would be of value is a wider ranging study to examine whether the themes of heightened awareness of others, and feelings of insecurity, identified in this study, typify the experiences of postgraduate e-learners in other disciplines. Such a study could explore whether these feelings are more intense in situations where students engaging in postgraduate e-learning are drawn from the same professional background and whether being part of a professional community inhibits collaborative learning. The outcomes of such a study might usefully inform future teaching and learning strategies in online courses.

Finally, more extensive research to evaluate the extent to which individual learning styles impact students' attitudes and behaviour in the virtual learning environment would be of worth. This study identified a dominant learning style amongst the occupational health and safety professionals studying the course via distance learning. It is possible that people in other professions might show a similar preference for one particular learning style, which course designers and tutors may wish to take into account in designing e-learning courses. Particular

attention might be paid to how such learners interact with online materials and their approaches to CMC.

10.4.1 Developments in software for e-learning

Due to the rapid development of ICT it is considered appropriate to draw attention here to the latest trends in e-learning since the literature review in Chapters 2, 3 and 4 was written. Whilst many universities have invested in commercially developed managed learning environments (MLEs), and course management systems (CMS) others are utilising Open Source Software (OSS) and free software for e-learning.

Free software can be obtained free of charge, is not copyrighted, and may or may not make the source code available. Public domain software is also free but may impose some restrictions on use and again may or may not provide access to the source code.

Open Source Software allows users greater freedom in the way that they apply the software. The source code for the program is accessible for modification and copies of the original or modified program can be redistributed without incurring costs. This approach differs to buying commercially available software where the source code is considered to be valuable intellectual property that is unavailable to the end user (Krishnamurthy, 2003).

The Joint Information Systems Committee (JISC, 2003), identify a number of benefits in relation to OSS. Firstly, OSS is often freely available or can be purchased for a nominal fee, though the costs involved in installation, maintenance, and user support have to be considered. A further advantage is that as the source code is accessible any bugs in the software are more likely to be detected and rectified. Open Source Software programs are also likely to develop more rapidly due to the wide range of input from the user community. Furthermore, OSS provides opportunities for users to operate independently without being tied to a commercial vendor, which might cease to support a particular product (JISC, 2003).

Education is increasingly making use of OSS and free software for e-learning. A variety of tools that support VLEs and online communication are available. Examples of these are Moodle, OpenOffice and Sendmail. It is therefore suggested that those seeking software solutions for e-learning should explore a range of options including commercial software products, Open Source Software, and free software before making their decision.

Overall conclusion

This chapter has summarised the main findings of this study, highlighted its contribution to knowledge, examined the strengths and limitations of the study and suggested a number of areas where further research would be of value. It is hoped that the key impact of the GOLDPhase study will be the unique insight that it has provided into the postgraduate experience of being a distance online learner and that the findings will help others to identify how this group of learners can best be supported. Though the thesis highlighted both barriers and enhancements to e-learning it is clear that the enhancements outweighed the barriers. However, whilst the technological tools to facilitate e-learning are available, maximising the human element in the online environment may require new skills and understanding.

Appendix 1

GOLDPhase Study CD-ROM

A CD-ROM accompanies this thesis. It can be found on the inside back cover. On accessing the CD-ROM you will see a folder named 'GOLDPhase Study'. The folder contains a 'Read Me First' document and a further 'GOLDPhase Study' folder.

The GOLDPhase Study folder contains three linked Web sites:

1. GOLDPhase - the virtual learning environment (VLE) in which the thirteen distance learning students studied modules from the University of Salford's MSc in Occupational Safety and Health.
2. goldphasediscu – the GOLDPhase Discussion Group used to support student learning. This can be accessed via the goldphasediscu folder and from each page within the GOLDPhase VLE.
3. Evaluation2 - a Web site comprising the six online questionnaires used in this study.

The 'Read Me First' document provides further information about accessing these files and tips for viewing.

Appendix 2

Reliability of Kolb's LSI

Smith and Kolb (1986) provide the following data to support the reliability of the revised 1985 version of Kolb's LSI.

The four basic scales and two combination scores all show very good internal reliability as measured by Cronbach's α . (n=268). The combination scores show almost perfect additivity (1.0) as measured by Turkey's test.

	Cronbach's Standardized Scale Alpha	Turkey's Additivity Power
Concrete Experience (CE)	.82	.91
Reflective Observation (RO)	.73	1.09
Abstract Conceptualisation (AC)	.83	1.07
Active Experimentation (AE)	.78	1.03
Abstract-Concrete (AC – CE)	.88	1.00
Active-Reflective (AE – RO)	.81	.99

(Smith and Kolb, 1986, p. 97).

Appendix 3

Interview Guide

GEMISIS PILOT STUDY

Department of Environmental Management

University of Salford

Date of Interview Location

Name of Interviewee

1) What were your reasons for applying to take part in the Pilot Study?

- a) To expand existing knowledge of health and safety issues
- b) Would like to go on to gain a postgraduate diploma or Masters degree
- c) To maintain Continuing Professional Development (CPDs)
- d) To learn more about the Internet
- e) Other (please specify)

2) Why do you wish to expand your existing knowledge of health and safety?

- a) To improve job prospects
- b) To improve knowledge in one or more specific areas of health and safety (please specify)
- c) To enable you to move into a different field of health and safety (please specify)
- d) Other

3) Why do you wish to gain a postgraduate qualification?

- a) To facilitate promotion
- b) For self development
- c) To gain letters after your name
- d) To enable you to move into a different area of health and safety
- e) Other (please specify)

- 4) **Why do you wish to learn about the Internet?**
- a) To keep up with technological advances
- b) To be able to help children or other family members who use the Internet
- c) Other (please specify)
- 5) **Why didn't you choose a part-time course at a local institution of higher education?**
- a) Lack of time to attend classes
- b) The type of course you required was not available in commutable distance
- c) Type of course you required available but there were other difficulties, eg, parking (please specify)
- d) Lack of support from employer
- e) Don't know
- f) Other (please specify)
- 6) **Do you think that the difference between studying via the Internet and in the traditional classroom will be:**
- a) Considerable
- b) Significant
- c) Slight
- d) Negligible
- 7) **Do you think that the difference between studying a traditional, paper based, distance learning course and studying distance learning via the Internet will be:**
- a) Considerable
- b) Significant
- c) Slight
- d) Neglibigle
- 8) **Where, in terms of your career, would you *like* to be in 5 years time? (ignoring any potential barriers).**
- 9) **Is there anything which you think may prevent you from achieving this goal?**
- a) Yes (please specify)
- b) No

10) How do you intend to achieve this goal?

Comments

11) How would you rate your level of Internet experience prior to starting the Pilot Study?

- a) No experience
- b) Limited experience
- c) Fair amount of experience
- d) Quite a lot of experience

12) Have you experienced any difficulty accessing the GOLDPhase web site?

- a) Frequently (please expand)
- b) Sometimes (please expand)
- c) Never

13) When you first accessed the GOLDPhase web site did you feel:

- a) Confused
- b) Fairly confused
- c) Fairly confident
- d) Confident

14) What did you do the first time you entered the web site?

- a) Follow the induction programme then access the study blocks
- b) Follow the induction programme and browse the web site then access the study blocks
- c) Browse through the study blocks
- d) Go directly to Module 1, block 7 without browsing the site or following the induction programme

15) Having explored the web site do you find the layout:

- a) Logical
- b) Fairly logical
- c) Fairly illogical
- d) Illogical

16) Did you look at the materials for forthcoming weeks?

- a) Yes
- b) No

- 17) **Having looked ahead were you tempted to start studying materials intended for future weeks?**
- a) Yes
- b) No
- 18) **Have you used the GOLDPhase Discussion Group?**
- a) To respond to RQs or SAQs
- b) To initiate discussion
- c) Not used the Discussion Group
- 19) **How relevant to your studies do you think the Discussion Group will be?**
- a) Very relevant
- b) Quite relevant
- c) Of little relevance
- d) Of no relevance
- 20) **Have you followed any of the links provided in the Resource Centre?**
- a) Yes
- b) No
- 21) **On average how long per week do you spend studying the course?**
- a) Less than 3 hours
- b) 3 - 6 hours
- c) 6 - 10 hours
- d) More than 10 hours (please specify)
- 22) **How much of your weekly study time is spent on-line?**
- a) Less than 1 hour
- b) 1 - 2 hours
- c) 2 - 4 hours
- d) More than 4 hours (please specify)
- 23) **Do you study at:**
- a) Regular times
- b) Irregular times

24) What time do you most often study?

- a) Morning
- b) Afternoon
- c) Early evening
- d) Late evening or during the night

25) Where do you study

- a) Home
- b) Work
- c) Both
- d) Other (please specify)

26) Have you had to make any special arrangements, at work or home, to facilitate your studies?

- a) Yes
- b) No

27) Has taking part in the Pilot Study caused you any problems either at work or home?

- a) Yes (please expand)
- b) No

28) Since starting the course have your studies been delayed for any reason?

- a) Yes
- b) No

29) Were your studies delayed due to:

- a) Illness
- b) Pressure of work
- c) Domestic reasons
- d) Other (please specify)

30) Did you manage to 'catch-up' with the course?

- a) Yes
- b) No

Comments

31) How did you manage to 'catch up'?

Comments

32) Are you currently in line with the suggested Study Schedule?

- a) Yes
- b) No

33) Are you:

- a) Ahead
- b) Behind

34) What do you plan to do about this?

35) To what extent do you think the following contribute to effective support for distance learners:

1 = not at all

2 = to a certain extent

3 = quite a lot

4 = a great deal

- a) Easy access to materials
- b) Peer support
- c) Regular contact with tutors
- d) Contact with peers
- e) The opportunity to meet tutors face to face
- f) The opportunity to meet peers face to face
- g) Regular feedback from tutors
- h) A suggested study timetable
- i) Quick response to queries

36) To what extent do you think the facilities provided in the *Information*, area of GOLDPhase will support your learning? These include: The Site Guide, The On-line Study Guide, The FAQs, Building Site, Credits.

- a) Not at all
- b) A little
- c) Quite a lot
- d) A great deal

36 To what extent do you think the facilities provided in the *Resource Centre* area of GOLDPhase will support your learning? These include: Past exam papers, Handouts, External Links, eg Web guides, OSH links, Newspapers, References – which include: Rogets Thesaurus, Dictionaries, British Library, Encyclopaedia Britannica.

- a) Not at all
- b) A little
- c) Quite a lot
- d) A great deal

36 To what extent do you think the facilities provided in the *Communication*, area of GOLDPhase will support your learning? These include: The Notice Board, Introductions, Contact Details.

- a) Not at all
- b) A little
- c) Quite a lot
- d) A great deal

Additional Questions:

- Can you, in your own words, try to describe your experience so far of using the Internet for study?
- How do you feel about the fact that the main learning materials are delivered on-line and not orally in a classroom?
- Do you think that reading the lecture notes is an advantage or a disadvantage, compared say to using your listening skills.
- Do you think the materials allow sufficient opportunities for interaction and discussion with other group members?
- Do you think that communication with your peers is an important part of the course?
- Why, or why not?

Are there any comments or suggestions you would like to make about the pilot course?

Appendix 4

Individual Feedback Sheet

GOLDPhase

GEMISIS On-line Distance-learning Pilot Health and Safety Environment

Kolb Learning Style Inventory

Name

Date

1. Which learning style did you fall into on the Kolb Learning Style Inventory?

Please tick the appropriate box.

Accommodator

Converger

Diverger

Assimilator

2. Having read the Learning Style Inventory booklet do you consider that the above learning style is the most appropriate to you? *Please tick the appropriate box.*

Yes

No

3. If you answered 'No' to the above question please state why you think the score is not valid.

4. What do you consider to be your greatest strength as a learner?

5. What do you consider to be your greatest weakness as a learner?

6. In which areas would you like to improve your skills as a learner?

7. What kind of learning situations help you to learn?

8. What makes it difficult for you to learn?

9. In your opinion, which aspects of the GOLDPhase on-line distance learning course *least supported* the way you like to learn?

10. In your opinion, which aspects of the GOLDPhase on-line distance learning course *helped support* the way you like to learn?

Please use the space below if you would like to make any additional comments. If necessary please continue on the reverse of this sheet.

**Thank you for completing this form.
Please return the form in the SAE provided.**

Appendix 5

Comparison Questionnaire

MSc/PG Dip in Occupational Safety and Health

Please look at the statements below and respond to each based on how you feel.

Tick one box only for each question.

1. Did the paper-based materials stimulate your learning?	Yes	
	No	
Please explain your answer below:		

2. Did the online materials stimulate your learning?	Yes	
	No	
Please explain your answer below:		

The paper-based and online materials include Reflective Questions (RQs). The purpose of the RQs is to encourage you to pause at certain points in the text to consider a particular issue.

3. Did the RQs in the paper-based materials encourage you to pause and consider the issue under discussion?	Yes	
	No	
Please explain your answer below:		

4. Did the RQs in the online materials encourage you to pause and consider the issue under discussion?	Yes	
	No	
Please explain your answer below:		

The paper-based and the online materials include Self Assessment Questions (SAQs). The SAQs are designed to test your knowledge and understanding in particular areas and help you to assess your own progress through the module materials.

5. Did the SAQs in the paper-based materials help you to assess your own progress?	Yes	
	No	
Please explain your answer below:		

6. Did the SAQs in the online materials help you to assess your own progress?	Yes	
	No	
Please explain your answer below:		

7. Do you think that the online discussion groups enhanced your learning?	Yes	
	No	
Please explain your answer below:		

8. Did the Internet help you to find information relevant to the course, e.g. academic papers and library resources?	Yes	
	No	
Please explain your answer below:		

9. Did the paper-based method of distance learning engender any barriers to your learning?	Yes	
	No	
Please explain your answer below:		

10. Did the online method of distance learning engender any barriers to your learning?	Yes	
	No	
Please explain your answer below:		

11. Do you think that using the Internet for study provided any advantages over paper-based study?	Yes	
	No	
Please explain your answer below:		

12. Please comment on three positive aspects of using the Internet for postgraduate study.

13. Please comment on three negative aspects of using the Internet for postgraduate study.

14. Which mode of distance learning study did you prefer?	Paper-based	
	Online	
Please explain your answer below:		

Additional comments

**Thank you for taking the time to complete this questionnaire
Please return the form in the SAE provided**

Appendix 6

Module Descriptions

MSc/Postgraduate Diploma in Occupational Safety and Health

The following are brief descriptions of the rationale and content of the modules.

MODULE ONE "Setting the Context"

This programme of study is essentially of the effects of "work" in its broadest sense, on the physical and emotional well being of individuals. Views of what constitute acceptable effects vary over time as functions of social and economic conditions. By addressing historical and current attitudes, policies and social structures, this module sets the context of the rest of the study. It also examines the results of current research into the size of the problem of occupational injury and ill health, as well as theories of accident causation, systems failure and the role of human error.

MODULE TWO "Risk - its Nature and Assessment"

This module aims to provide the student with an understanding and appreciation of the nature of risk and its subjective and objective elements. The measurement of human and mechanical systems reliability forms an appreciable part of this module, particularly with regard to probability and the estimation of low-level risks. The design of error tolerant systems of work is also studied.

MODULE THREE "Occupational Health"

This module addresses the identification, assessment and control of risks of disease, as distinct from risks of injury. Recent statistics point to industrial disease now being a greater cause of loss and suffering than

industrial injury. Examples of likely sources of risk, aetiology of industrial diseases and the effects of emotional and physical stressors are studied. The more positive promotion of well being at work, as opposed to the purely preventive approach, is also addressed.

MODULE FOUR "Occupational Safety"

Rapidly changing technology results in correspondingly rapid changes in risks of accidental injury to workforce and public alike. Safety professionals, enforcement officers and students of occupational safety and health require an understanding that allows them to adapt to those changes and apply concepts of prevention. This module therefore involves a study of the design and manufacture of work equipment and systems with particular emphasis upon ergonomics and how people make sense of potentially hazardous situations. Other issues related to safety technology, such as the causes and controls of fire and explosion are also addressed here. A study of the Piper Alpha fire as a case example forms a significant part of this module.

MODULE FIVE "Research methods/Literature review"

The aim is to determine the nature of OSH research and suitable research methods for achieving results. The module will endeavour to help students recognise matters within their own experience, which are suitable for research. It will particularly address the effective use of existing literature and published research to establish the current base line. Each student will be required to undertake a literature review of a topic of his or her own choice. For MSc students, this work will contribute towards their research work to be undertaken in Module 8.

MODULE SIX "State Regulation"

This module firstly studies the current philosophy of state regulation through legislation, codes of practice and the activities of the enforcement agencies. Then the scope and influence of the major enactments and regulations and the influence of Europe on UK legislation and philosophy

are addressed along with the role of common law in compensating individuals and setting legislative standards.

MODULE SEVEN "Self Regulation"

The regulation of occupational safety and health can be divided into two areas - that undertaken by industry itself and that undertaken by the state. This module investigates the reasons why self-regulation is a fundamental tenet of injury and illness prevention at work, using real-life case studies. The techniques, both pro-active and reactive, which employers and managers could use are then addressed, along with the influences of organisational structures and cultures on the ability to self-regulate

MODULE EIGHT "Research methods/MSc Dissertation"

This module will build upon the basic understanding of research and research methods developed in Module 5. It will assist students in designing and implementing an appropriate and sound methodology to research an OSH area of their own choice. The topic selected will normally be based upon the literature review that was undertaken in Module 5. There will be a 3-4 day school offered at the beginning of the module that will support the student's dissertation work. The taught element of the Module will emphasise the practical, rather than wholly theoretical aspects of research methodology. It will focus upon project design, the implementation of research techniques and the analysis of data, including the application of statistical techniques and the use of computer packages to facilitate analysis.

(University of Salford, 1998, p. 11-13)

Appendix 7

Formats for Reflective and Self Assessment Questions

Format	Description	Example	Number of RQs or SAQs
Peer Discussion			
1	<p>Discussion Group (Moderated)</p> <p>Response typed into online form and sent directly to GOLDPhase co-ordinator for inclusion in Discussion Group</p>	<p>'From your own experience, can you think of any examples where an accident has been put down to "human error" when it would be more accurate to call it "human limitation"?' [RQ 7.1 (1)]</p> <p><i>The above question may give rise to matters of confidentiality regarding your area of work. Please consider the question and submit a brief answer to the GOLDPhase Co-ordinator by completing the form below. You do not need to mention specific names and places. The GOLDPhase Co-ordinator will de-personalise the answers and use them as a basis for further discussion in the GOLDPhase Discussion Forum. You can then view the answers and discuss the matter in more depth with your GOLDPhase colleagues by selecting the Discussion Group button on the left-hand toolbar.</i></p>	2 RQs
2	<p>Discussion Group (direct contribution)</p>	<p>'Are you aware of other accidents which have served as a vehicle for legislative or statutory response?' [RQ 8.2 (1)].</p> <p><i>At this point please select 'Discussion Group' from the left-hand toolbar. Follow the thread labelled 'Legislative or Statutory Responses' and post your contribution to the discussion. When you have finished in the GOLDPhase Discussion Group click the back button on your browser toolbar to return to this page.</i></p> <p><i>You can return to the Discussion Group at frequent intervals to consider other people's definitions of the term.</i></p>	8 RQs 1 SAQ

3	Discuss in Online Symposium (automated e-mail list)	Place yourself in the 4 part world view typology discussed in Adams, Ch 3. (Do you fit into one of the categories exactly?) Using examples from your work and life generally, write notes about how your world view affects your perception of risk. Has your view changed as a result of your experiences of life? If so, how? Do you fit into different parts of the typology depending upon what your role is at the time, e.g. manager, inspector, parent, spouse? ... [RQ 2.1 (2)]. <i>Use the Online Symposium to discuss these issues then add to your notes. Review the notes and see if your initial perceptions have altered in the light of discussion.</i>	3 RQs 1 SAQ
Individual Reflection			
4	Revision link	'Bird and Loftus use the term 'loss' as opposed to the narrower term injury. Can you remember the distinction between accident and injury that we introduced at the start of this block?' [SAQ 8.1 (1)] <i>At this point stop to consider the above question, make a note of your answer, then follow the hyperlink to refer back to the relevant section on <u>Loss and Injury</u>.</i>	1 SAQ
5	Reflect and continue	'Point out some problems often recognised with accident prevention approaches which mainly focus on active failures or unsafe acts.' [SAQ 10.1 (1)] <i>At this point you should pause to consider the above. Make a note of the problems you can identify then follow the hyperlink to the next section.</i>	6 RQs 5 SAQs
6	Submit response to tutor	Having considered the relative balance of qualitative and quantitative approaches in risk assessment techniques, what do you feel are the strengths and weaknesses of both these approaches? Word process your notes and send them to... [RQ 1.2 (2)]	3 RQs

Individual Self Assessment			
7	Multi-choice question submitted online with automated response	<p>A variety of multi-choice mathematical questions were presented.</p> <p><i>Work out your answer then click the downward arrow to make your selection from the drop-down box. You will receive an automated reply to tell you whether or not your answer is correct.</i></p> <p>[Examples: SAQs 6.1 (2), 6.2 (2), 6.3 (2)].</p>	7 SAQs
8	Solutions button	<p>Students were asked to solve a mathematical problem. By clicking the 'Solutions' button they could then compare their answer with the model answer or diagram provided.</p> <p>In some instances printable forms were included to enable students to complete diagrams.</p> <p><i>Answers not submitted</i></p> <p>[Examples: SAQs 6.4 (2), 6.6 (2), 6.7 (2)].</p>	12 SAQs
9	Online form with diagrammatic response	<p>Students were asked to consider a problem and submit their answer via an online form. The form returned a page showing the solution in a diagram. [SAQ 6.5 (2)].</p>	1 SAQ
10	Make notes or complete diagram and retain for revision	<p>Select a situation from work, home or, for example, a part of a car (e.g. carburettor, water pump, oil filter) and print off and complete a copy of the form shown in <u>Figure 8.4</u>. Use the example of <u>Figure 8.2</u> as a guide. Retain the form for insertion in your Revision Workbook. [SAQ 8.2 (2)].</p>	2 RQs 1 SAQ

Note: Underlined text indicates where hyperlinks were included in the original text.

The above Table includes an example, or in the case of mathematical questions, an explanation, of each format, together with examples of typical notes to students (shown in italics).

The RQ or SAQ number shown after the sample questions indicate their location within the study materials.

Appendix 8

Thank You Letter and Certificate to Study's Participants

Dear

GOLDPhase Pilot Study

Thank you for participating in the GOLDPhase (GEMISIS On-line Distance Learning Pilot Health and Safety Environment) research project into on-line distance learning.

The overall purpose of the research is to determine the value of using the Internet for postgraduate distance learning. As you are aware the research focussed on postgraduates studying two modules from the MSc/Postgraduate Diploma in Occupational Safety and Health (OSH) via the Internet. The online phase of the study would not have been possible without your hard work and commitment. Your contribution to the project on an individual basis and at group level is highly valued and appreciated.

The combined task of learning at a distance, using new technology, and contributing to a research project presented quite a formidable challenge which demanded a great deal of personal time and attention on your part. Your contributions will form a valuable part of the research.

I would like to take this opportunity to reassure you with regard to anonymity and confidentiality. When the research is written up the thoughts and comments of individual participants will be anonymous and their personal details will remain confidential.

The thesis is presently under construction (remember the little yellow man?), and data analysis is still taking place. However, if you have any concerns or queries regarding your role in the research project and would like to discuss these please do not hesitate to contact me.

Liz and I send you our congratulations for being one of the first students to achieve Modules One and Two of the MSc/P.G. Dip in OSH by on-line study, in what can only be described as 'pioneering' circumstances.

Once again sincere thanks for all your support, time, and dedication to the GOLDPhase project.

Yours sincerely,

Heather Williams
GEMISIS Doctoral Researcher



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Management
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GOLDPhase PROJECT

**GEMISIS ON-LINE DISTANCE LEARNING PILOT HEALTH
AND SAFETY ENVIRONMENT**

This is to confirm that

[Student name]

successfully completed the following modules from the
MSc/P.G. Diploma in Occupational Safety and Health:

Module 1 – Setting the Context:

Introduction to some central issues in Occupational Safety and Health
(15 credits)

Module 2 – Risk:

Nature and Assessment
(15 credits)

The above modules are accredited at level M on the Masters course in Occupational Safety and Health.

The Modules were studied by online distance learning from April 1998 to January 1999 as part of a research project into postgraduate online distance learning.

[Student name] successfully completed all assignments and final examinations and contributed to the research by participating in interviews, completing questionnaires and providing evaluative feedback.

.....
Liz Falconer, Course Leader

January 2000

Appendix 9

Responses to Online Questionnaires

Key: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree.

Table 1: Responses to Questionnaire 1 – The Learning Environment

Item	Question	SA	A	D	SD
1	The GOLDPhase Web site was easy to navigate.	4	5	-	-
2	The different sections of GOLDPhase were easy to find.	5	4	-	-
3	I felt disorientated in GOLDPhase.	-	-	6	3
4	The colour scheme was easy to work with.	1	7	-	1
5	The font type was difficult to read.	1	1	3	4
6	The arrangement of the pages (headings, subheadings, layout of text) was useful to me.	3	6	-	-
7	The Contents pages helped me to locate specific points in the text.	4	5	-	-
8	The pages were well laid out.	4	4	1	-
9	I disliked reading the study block notes from the screen.	2	3	1	3
10	I frequently printed hard copies of the study notes.	4	2	2	1
11	The pages were in manageable chunks for accessing via the Internet.	4	5	-	-
12	I found it useful that the Homepage used links to draw my attention to new items.	7	2	-	-
13	I liked the overall style and presentation of the Web site.	5	4	-	-
14	I found it easy to link to the Case Study.	3	6	-	-
		A	B	C	
15	When you were asked to link to the Case Study did the activity: A: <i>Stimulate your learning</i> , B: <i>Interrupt your learning</i> , C: <i>Neither</i> .	5	1	3	
16	Did you find the use of images on the pages: A: <i>Added interest</i> , B: <i>Distracting</i> , C: <i>Neither</i> .	8	-	1	
17	The amount of images included on the pages was A: <i>Too much</i> , B: <i>About right</i> , C: <i>Insufficient</i> .	0	8	1	
		SA	A	D	SD
18	I frequently used the revision links.	2	4	3	-
19	The revision links helped me to understand the materials presented.	2	5	2	-
20	The revision links were of no use to me.	-	2	1	6
21	I didn't understand the purpose of the revision links.	-	1	3	5

		Yes	No
22	Did you feel comfortable in the GOLDPhase learning environment?	8	1

Source of data: analysis of responses to online questionnaire 1.

Table 2: Responses to Questionnaire 2 – The Learning Materials

Study Blocks					
Item	Question	SA	A	D	SD
1	The aims and objectives of the study blocks were clear.	6	3	-	-
2	The materials presented in the blocks met the stated objectives.	4	5	-	-
3	The introductions to the blocks were stimulating and interesting.	3	5	1	-
4	The block summaries helped to reinforce my learning.	5	4	-	-
5	I found the content of the study blocks engaging.	4	5	-	-
6	The level of difficulty of the materials was consistent.	1	3	5	-
7	I had difficulty understanding some of the concepts presented in the study blocks.	-	5	4	-
		Number of students who selected each option			
8	What do you think of the tone and style of the learning materials? Please select any of the words below.				
	Friendly		5		
	Irritating		-		
	Patronising		-		
	Reassuring		-		
	Readable		9		
	Formal		-		
	Informal		5		
	Pleasant		1		
	Chatty		-		
	Interesting		9		
	Boring		1		
	Lively		2		
	Longwinded		-		
	Clear		7		
	Stimulating		5		
	Cold		-		
		A	B	C	
9	Did you find the length of the study blocks: A: <i>too long</i> , B: <i>About right</i> , C: <i>Too short</i> .	-	9	-	

Reflective Questions					
		SA	A	D	SD
10	The RQs contributed to my understanding of the materials.	5	4	-	-
11	Completing RQs was a waste of time.	-	-	3	6
12	I found it useful to discuss the RQs in the Discussion Group.	2	5	2	-
13	I frequently visited the Discussion Group to view other people's responses to RQs.	4	4	1	-
14	The RQs interrupted the flow of my learning.	-	-	7	2
		Too Many	About Right	Not enough	
15	What do you think about the amount of RQs?	-	9	-	
16	The RQs were presented in a variety of ways. Please indicate the extent to which you agree or disagree that each of the following question styles helped you to learn				
		SA	A	D	SD
a.	Using the Discussion Group to discuss issues.	5	2	2	-
b.	Linking to the next page to read the discussion in the text.	3	6	-	-
c.	Making notes and e-mailing them to the tutor for a response.	3	2	4	-
d.	Discussing issues in the Online Symposium.	1	3	5	-
e.	Making notes and retaining them for revision.	3	5	1	-
f.	Working out a problem then moving to the next page to check the answer.	6	3	-	-
g.	Printing out a blank table, completing the table and retaining it for revision.	3	2	4	-
		A		B	
17	Some RQs were placed at the bottom of a page and asked you to consider an issue before linking to the next page to read the discussion. What did you do when you came to such an RQ? <i>A: Stop and think about the question posed before linking to the next page.</i> <i>B: Link to the next page and think about the question in the light of the discussion.</i>	6		3	
		A	B	C	D
18	How much did you learn overall from using the RQs? <i>A: A great deal, B: Quite a lot, C: A little, D: Nothing.</i>	1	6	2	-

Self Assessment Questions					
		SA	A	D	SD
19	The SAQs contributed to my understanding of the materials.	4	4	1	-
20	Completing SAQs was a waste of time.	-	-	5	4
21	I preferred not to include my name on SAQ online submission forms.	-	3	4	2
22	When I submitted the correct answers to online questions the automatic response was reassuring.	4	5	-	-
23	When I submitted an incorrect answer to online questions the automatic response provided adequate guidance about what to do next.	1	7	1	-
24	The SAQs interrupted the flow of my learning.	-	-	6	3
		A	B	C	
25	What do you think about the amount of SAQs? <i>A: Too many, B: About right, C: Not enough.</i>	1	7	1	
26	The SAQs were also presented in a variety of ways, especially for the maths elements in Blocks 6, 7, and 8 of Module 2. Please indicate the extent to which you agree or disagree that each of the following question styles helped you to learn.				
		SA	A	D	SD
a.	Making notes then following a hyperlink back to the relevant section to check against your notes.	3	4	2	-
b.	Selecting an option from a multi-choice question and submitting a form which returns an immediate response.	5	4	-	-
c.	Working out an answer then clicking the 'Solutions' button to see the model answer.	6	3	-	-
d.	Submitting an answer in a form and receiving an automated response showing the correct answer.	6	3	-	-
27	How did you use the Self Assessment Questions and Responses?				
		A	B	C	D
a.	I thought about the questions, then looked at the responses. <i>A: Always, B: Frequently, C: Sometimes, D: Never.</i>	-	2	6	1
b.	I had a go at the questions before looking at the responses. <i>A: Always, B: Frequently, C: Sometimes, D: Never.</i>	1	5	2	1
c.	I tended to skip the questions, and read the responses. <i>A: Always, B: Frequently, C: Sometimes, D: Never.</i>	-	1	3	5
d.	I skipped the questions altogether. <i>A: Always, B: Frequently, C: Sometimes, D: Never.</i>	-	-	3	6
28	How much did you learn overall from using the SAQs? <i>A: A great deal, B: Quite a lot, C: A little, D: Nothing.</i>	2	5	2	-

Case Study					
		SA	A	D	SD
29	The Case Study contributed to my understanding of the material.	5	3	1	-
30	I found the Case Study irrelevant to my learning.	-	-	4	5
31	The Case Study helped to engage my interest.	4	3	2	-
		A	B	C	
32	How did you use the Case Study? <i>A: I usually read the relevant sections of the Case Study materials at the appropriate time, B: I read the entire Case Study all at once, C: I usually skipped the Case Study.</i>	3	5	1	
Assignments and feedback					
		SA	A	D	SD
33	The task for assignment 1 was clear.	1	5	3	-
34	The task for assignment 2 was clear.	2	5	2	-
35	The tutor provided feedback to me in a timely manner.	4	4	1	-
36	The quality of feedback provided by the tutor met my needs as a learner.	1	5	3	-
37	The assignments helped to set the course materials in context.	5	4	-	-
38	The assignments helped to prepare me for the exams.	4	4	1	-
39	The tutor's use of the word processor to insert comments in my assignments helped me to understand those comments in the context of the assignment.	7	1	1	-
40	Being able to submit assignments by email was convenient to me.	8	-	1	-

Source: analysis of responses to online questionnaire 2.

Table 3: Responses to Questionnaire 3 – Communication

Discussion Group					
Item	Question	SA	A	D	SD
1	The Discussion Group was easy to use.	4	5	-	-
2	I accessed the Discussion Group to read messages on a regular basis.	5	2	2	-
3	I enjoyed contributing to the Discussion Group.	3	3	3	-
4	I found other people's contributions to the Discussion Group intimidating.	-	3	4	2
5	The Discussion Group was a valuable means of communication during the course.	3	5	1	-
6	I felt confident using the Discussion Group.	1	5	3	-
7	Other people's contributions to the Discussion Group helped my learning.	2	6	1	-
8	I felt that people's contributions to the Discussion Group did not necessarily reflect their own opinions.	-	3	5	1
9	I would have liked the Discussion Group to have been used on a more informal basis.	2	5	2	-
10	I felt that my postings to the Discussion Group may be read out of context.	-	4	5	-
11	I don't feel that the Discussion Group supported my learning.	-	3	5	1
12	I didn't feel comfortable using the Discussion Group.	-	4	3	2
Online Symposium					
13	The Online Symposium was easy to use.	4	4	1	-
14	I liked receiving messages on the online symposium.	2	6	1	-
15	I enjoyed contributing to the Online Symposium.	1	3	5	-
16	I didn't feel comfortable using the Online Symposium.	-	6	2	1
17	Other people's contributions to the Online Symposium helped my learning.	1	6	2	-
18	The Online Symposium was a valuable means of communication during the course.	-	5	4	-
19	I would have liked the Online Symposium to have been used on a more informal basis.	2	5	2	-
		A		B	
20	Which method of online communication did you prefer? A: The Discussion Group (threaded linked to the Web site). B: The Online Symposium (email list)	6		3	

General Communication					
Item	Question	SA	A	D	SD
21	Communication between the tutor and myself was effective.	1	7	1	-
22	Communication between the GOLDPhase co-ordinator and myself was effective.	7	2	-	-
23	Communication with other students was an important part of the course.	3	6	-	-
24	I felt isolated.	-	3	6	-
25	I prefer interactive classroom discussion to online methods of communication.	1	4	4	-
26	I learned a lot from other students on the course.	-	6	3	-
27	I prefer traditional forms of communication (eg telephone, letter) to online communication.	-	2	5	2
28	I checked the Notice Board regularly.	6	3	-	-
29	The Notice Board was of little use to me.	-	1	5	3
30	I enjoyed reading the Notice Board.	4	5	-	-
31	The Notice Board added a sense of 'community' to the course.	3	4	2	-
32	The Notice Board helped to support my learning.	3	5	1	-
33	The Introductions page helped to establish a course community.	3	6	-	-
34	I found it useful to know about other course members.	5	4	-	-
35	The Introductions page was too formal.	2	-	7	-
36	Seeing people's photographs helps me to relate to the person.	5	2	2	-
37	I couldn't see the point of the Introductions page.	-	-	2	7

Source: analysis of responses to online questionnaire 3.

Table 4: Responses to Questionnaire 4 – Information and Resources

Information					
Item	Question	SA	A	D	SD
1	The Site Guide helped me to become familiar with the layout of the GOLDPhase Web site.	4	5	-	-
2	The information provided in the Site Guide helped me to use the learning environment more effectively.	4	4	1	-
3	I found the analogy made between the online learning environment and a physical learning environment helpful.	3	5	1	-
4	The information contained in the Site Guide was of little use.	-	-	5	4
5	The information provided in the Online Study Guide helped to familiarise me with the GOLDPhase web site.	3	6	-	-
6	The Online Study Guide helped prepare me for online learning.	4	4	1	-
7	The information on citations and referencing supported my studies.	4	4	1	-
8	The information contained in the Study Guide was of little use.	-	1	4	4
		A	B	C	D
9	How frequently/infrequently did you refer to the Study Schedule? A: <i>Frequently</i> , B: <i>Sometimes</i> , C: <i>Occasionally</i> , D: <i>Never</i> .	4	3	2	0
10	Did the Study Schedule help you to organise your workload? A: <i>Frequently</i> , B: <i>Sometimes</i> , C: <i>Occasionally</i> , D: <i>Never</i> .	4	3	0	2
11	Did you feel pressurised by the Study Guide? A: <i>Frequently</i> , B: <i>Sometimes</i> , C: <i>Occasionally</i> , D: <i>Never</i> .	2	3	3	1
		SA	A	D	SD
12	The FAQ page provided a useful facility.	-	8	1	-
13	I would prefer to ask questions by making personal contact than via the FAQ page.	1	3	5	-
		Yes		No	
14	Do you think that you made the fullest use of the resources provided in the Information area of GOLDPhase?	5		4	

Resource Centre						
Item	Question	SA	A	D	SD	
15	The Resource Centre helped to support my learning.	3	6	-	-	
16	I found the past exam papers helpful	6	2	1	-	
Questions 17 – 21						
<i>'a' questions: A: Frequently; B: Sometimes; C: Occasionally; D: Never.</i>						
<i>'b' questions: A: Very relevant; B: Fairly relevant; C: Of little relevance; D: Of no relevance; E: Don't know, didn't use them.</i>						
		A	B	C	D	E
17	Web Guides					
a.	How frequently/infrequently did you use the Web Guide links?	2	4	2	1	
b.	How relevant were the Web guides to your learning?	2	2	4	-	1
18	Occupational Safety and Health links (eg IOSH, Trading Standards, EHOs site, Royal Society)					
a.	How frequently/infrequently did you use the OSH links?	2	5	1	1	
b.	How relevant were the OSH sites to your learning?	3	5	-	-	1
19	Online Newspapers					
a.	How frequently/infrequently did you use the links to online newspapers?	-	2	3	4	
b.	How relevant were the newspaper sites to your learning?	-	1	4	-	4
20	Reference materials (eg Dictionaries, thesaurus, encyclopaedias, The British Library).					
a.	How frequently/infrequently did you use the links to the reference materials?	-	1	6	2	
b.	How relevant were the Reference site links to your learning?	-	1	6	-	2
21	The Search Engine					
a.	How frequently/infrequently did you use the search engine provided?	2	3	-	4	
b.	How relevant was the Search Engine to your learning?	2	3	-	-	4
22	The materials in Blocks 6, 7, and 8 of Module 2 included a fair amount of maths. In order to extend your learning the Resource Centre included a Maths Links page containing a number of links to maths resources.					
		Yes		No		
a.	Did you follow any of the links to additional maths sites?	6		3		

		A	B	C	D	E
b.	How useful did you find the additional maths sites? <i>A: Very useful; B: Fairly useful; C: Of little use; D: Of no use; E: Don't know didn't use them.</i>	1	3	2	-	3
		Yes		No		
c.	Would you recommend these sites to future students?	8		1		
World Wide Web						
		SA	A	D	SD	
23	The WWW helped me to conduct research for my assignments.	5	3	1	-	
24	The amount of useful information I was able to gather on the WWW for my assignments was disappointing.	-	2	5	2	
25	I expected to be able to conduct all the research for my assignments on the WWW	-	2	5	2	
26	I felt swamped by the amount of information on the WWW.	-	1	8	-	
27	The WWW provided a useful source of information for the course.	2	6	1	-	
28	Using the WWW for research was a waste of time.	-	-	4	5	
29	The WWW is a powerful research tool.	7	2	-	-	
30	When conducting research for assignments I preferred to use books and journals from the library to using the WWW.	1	4	4	-	
31	I would rather use the WWW to find information than use traditional methods.	1	6	2	-	
32	The time I spent surfing the WWW could have been used more productively.	-	3	4	2	
33	I found surfing the WWW for course related information a frustrating experience.	-	2	7	-	
34	The abstracts in online databases helped me to identify useful articles or papers.	2	1	6	-	
35	I had difficulty accessing online databases.	1	4	4	-	
36	I found some useful information in the online databases.	4	1	4	-	
37	I frequently accessed the University of Salford library via the WWW.	-	1	5	3	
Traditional Sources of Information						
		SA	A	D	SD	
38	My local public library helped me to locate useful information for the course.	1	2	3	3	
39	I used my local university library/college library to find information for the course.	4	2	2	1	

Source: analysis of responses to online questionnaire 4.

Table 5: Responses to Questionnaire 5 - Self

Item	Question	VH	H	M	L	VL
1	How would you describe your overall motivation throughout the course? <i>VH: Very high, H: High, M: Moderate, L: Low, VL: Very low.</i>	1	6	1	1	-
		Yes		No		
2	Do you think that your motivation was less because you were taking part in a study than it would have been if you had been taking a full fee paying course?	1		8		
		VE	RE	RH	VH	
3	How hard or easy was it for you to plan for your assignments? <i>VE: Very easy, RE: Relatively easy, RH: Relatively hard, VH: Very hard.</i>	-	1	8	-	
		Score out of possible 9				
4	Which of the following helped to make the course an effective learning experience for you? Indicate all aspects you felt had an influence.					
a.	Being able to study when it suited me.	9				
b.	Not having to travel to study.	9				
c.	Not having to take lecture notes.	5				
d.	Being able to communicate with other course members via the Discussion Groups.	3				
e.	Being able to access study materials when and as required.	8				
f.	Support from my employer.	2				
g.	Support from members of my family.	5				
h.	Other (<i>Qualitative data from this item has been analysed separately.</i>)	6				
5	Which of the following helped to make the course a less effective learning experience for you? Indicate all aspects you felt had an influence.					
a.	Finding enough time to study.	5				
b.	Feeling isolated.	3				
c.	Not being able to attend lectures	5				
d.	Feeling intimidated by other people's contributions to the Discussion Groups.	2				
e.	Gaining access to a computer.	3				
f.	Lack of support from my employer.	1				
g.	Lack of support from my family.	-				
h.	Feeling I wasn't spending enough time with my family.	1				

i.	Other. (Qualitative data from this item has been analysed separately.)	6
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Source: analysis of responses to online questionnaire 5.

Table 6: Responses to Questionnaire 6 - Overall

Item	Question	A	B	C	D
1	To what extent did the following additional resources stimulate your learning? <i>A: A great deal, B: Quite a lot, C: A little, D: Not at all.</i>				
a.	The video tape.	6	1	1	1
b.	The audio tape.	4	2	3	-
c.	The directed reading.	5	3	1	-
		Yes		No	
2	If you didn't understand something did you feel that you were able to get help from the university?	7		2	
		A	B	C	
3	The amount of time allowed for the completion of study blocks was: <i>A: Adequate, B: Too long, C: Insufficient.</i>	9	-	-	
		A	B	C	D
4	How did you find the following resources/elements for supporting your learning? <i>A: Excellent, B: Good, C: Fair, D: Poor</i>				
a.	Learning materials.	6	3	-	-
b.	Using emails.	4	3	2	-
c.	The Discussion Group (threaded).	-	6	3	-
d.	The Online Symposium (email).	-	4	4	1
e.	The course tutor.	-	4	5	-
f.	Self Assessment Questions (SAQs).	2	7	-	-
g.	Reflective Questions (RQs).	2	6	1	-
h.	The telephone.	2	3	3	1
i.	Links to external sites provided in the Resource Centre.	2	4	3	-
j.	The Notice Board.	2	5	2	-

		A	B	C	
5	To what extent did you enjoy participating in online study? <i>A: Very much, B: It was okay, C: Not much.</i>	8	1	1	
6	To what extent did the course correspond to your expectations? <i>A: Better than expected, B: About as expected, C: Less than expected.</i>	7	1	1	
		Yes		No	
7	Did you encounter any obstacles to using the Internet for study?	6		3	
Items 8 and 9 allowed opportunities for free text answers, which have been analysed separately.					
		A	B	C	D
10	To what extent did taking part in the pilot study improve your knowledge of using the Internet? <i>A: A great deal, B: Quite a lot, C: A little, D: Not at all.</i>	4	3	2	-
11	To what extent did taking part in the pilot study improve your general IT (information technology) skills? <i>A: A great deal, B: Quite a lot, C: A little, D: Not at all.</i>	1	4	4	-
12	Overall how would you rate your experience of online learning? <i>A: Excellent, B: Good, C: Fair, D: Poor.</i>	5	2	2	-
Items 13, 14, and 15 allowed opportunities for free text answers, which have been analysed separately.					
The Questionnaires					
		Yes		No	
i	Were any of the questions contained in this Web site unclear or ambiguous?*	3		6	
ii	Were the instructions on the questionnaire clear?	9		-	
iii	Some of the questionnaires included links to GOLDPhase so that you could refresh your memory before responding to questions. Do you find the links useful?	8		1	
* Question i also asked "If 'yes' which ones and why?" and provided a free text response box to allow respondents to give details.					

Source: analysis of responses to online questionnaire 6.

Appendix 10

Students' Learning Styles on Kolb's LSI – Raw Scores

GOLDPhase group

Participant	Learning Style	AC-CE	AE-RO
Adam	Converger	15	15
Andrea	Converger	16	20
Catherine	Assimilator	21	5
Chris	Assimilator	20	4
Christine	Diverger	-3	-3
David	Converger	16	14
Graham	Assimilator	6	4
James	Assimilator	17	-9
Joanne	Assimilator	17	-7
Olwen	Converger	17	7
Peter	Diverger	-9	-11
Sally	Diverger	-7	-13
Yvonne	Converger	7	9

Paper-based distance learning group

Participant	Learning Style	AC-CE	AE-RO
# Student initials			
1 AL	Assimilator	18	-12
2 NB	Converger	21	7
3 GB	Converger	16	6
4 IB	Assimilator	17	3
5 JF	Assimilator	22	-10
6 LH	Assimilator	21	-11
7 VJ	Assimilator	9	-9
8 GN	Assimilator	5	5
9 SP	Assimilator	6	-13
10 NP	Assimilator	13	-13
11 DR	Converger	22	10
12 JS	Assimilator	19	-10
13 JW	Assimilator	30	-8
14 BW	Accommodator	3	25

Appendix 11

Conference Presentations

April 2002 **Human and Computer Elements of Online Assessment: Student Perceptions.** Liz Falconer and Heather Williams. Paper presented at *e-learning exhibition and conference*, G-Mex Centre, Manchester. 23 – 24 April 2002.

(See article in Appendix 12)

Oct 2000 **A tripartite view of online learning: Experiences of implementing online learning for postgraduates.** Heather Williams and Liz Falconer. Paper presented at *Towards the E-learning Community: Challenges for Business and Education*, International Conference, Reebok Stadium, Bolton. 19 – 20 October 2000.

Sept 2000 **Postgraduate perceptions: Evaluating the effectiveness of using learning technology for postgraduate distance learning.** Heather Williams. Paper presented at *ALT-C 2000, 7th International ALT Conference on Integrating Learning Technology*, UMIST, Manchester, 11 – 12 September 2000.

June 2000 **Student perceptions of using the Internet for postgraduate distance learning.** Heather Williams. Presentation at *SPARC Conference*, University of Salford, Salford. June 2000.

Awarded £200 Academic Prize for above presentation.

Nov 1998 **Differentiated learning styles in on-line learners: A case study in asynchronous on-line distance learning.** Heather Williams and Liz Falconer. Paper presented at *Bizarre Fruit Conference*, University of Salford, Salford. 18 – 19 November 1998.

Awarded £500 Conference Travel Award for the above paper and presentation.

Mar 1997 **Distance Learning and the Internet.** Heather Williams. Presented at *Learning in the 21st Century Conference*, University of Salford, Salford. March 1997.

Appendix 12

Article in The Times Higher Education Supplement

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Event looks at e-learning curve

Alison Goddard
Published: 19 April 2002

Creating a welcoming learning community is vital to students' success online, delegates at next week's e-learning conference in Manchester will hear, writes Alison Goddard.

Students work well in small groups - but they can still be intimidated by other group members, according to research to be presented at the conference.

Jonathan Darby, director of technology-assisted lifelong learning at the University of Oxford, said: "Creating a learning community where students interact and contribute experiences from their own work is one way of supporting each other's learning. You cannot do that with a large group.

"Also, students want to build a personal relationship with their tutors. They would prefer to have a response from their tutor a day late than an instant answer from someone they don't know."

Heather Williams, a postgraduate student at the University of Salford, will also present research at the conference. She said: "We found that e-learners were sensitive to human feedback. A lot of that emanated from the false perception that they get from each other. They thought that the others were better than themselves."

Copy of article retrieved from The Times Higher Education Supplement Web site at: <http://www.thes.co.uk> [Accessed December 2003]. Originally printed in Times Higher Education Supplement 19 April 2002.

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