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AN EVALUATION OF ONLINE ASYNCHRONOUS SUPPORT WITHIN E-LEARNING ENVIRONMENTS ACROSS THE INSTITUTES OF TECHNOLOGIES IN IRELAND

Submitted by

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Certificate of Authorship

The author hereby declares that, except where duly acknowledged, this thesis is entirely his own work and has not been submitted for any degree in any other institute.

Noel Carroll

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List of Abbreviations

ALNs	Asynchronous Learning Networks
CIP	Cognitive Information Processing
DERI	Digital Enterprise Research Institute
EVENE	Erasmus Virtual Economics & Management Studies Exchange
FAQ	Frequently Asked Questions
FTP	File Transfer Protocol
ICTs	Information and Communication Technologies
ILT	Informatics and Learning Technologies
HE	Higher Education
HEA	Higher Education Authority
HEI	Higher Educational Institutions
IoTs	Institute of Technologies
IS	Information Systems
IPA	Interpretative Phenomenological Analysis
KM	Knowledge Management
NDLR	National Digital Learning Repository
NQAI	National Qualifications Authority of Ireland
QA	Questions and Answers
RSS	Really Simple Syndication
TCP/IP	Transmission Control Protocol and Internet Protocol
SIOC	Semantically-Interlinked Online Communities
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VLE	Virtual Learning Environment
WYMIWYG	What You Measure Is What You Get

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Appended Papers

This part of the thesis provides a list of the appended papers. These papers constitute an important contribution towards this thesis and all have been presented by the author at international conferences on e-learning design and methodology.

1. Carroll, N. (2011). Evaluating Online Asynchronous Support in the Institutes of Technology Ireland. The All Ireland Journal of Teaching and Learning in Higher Education (AISHE-J) (Forthcoming).

2. Carroll, N. (2007). 'Exploring the Educational Quality of Online Asynchronous Support Tools' Proceedings of the 2nd International Business Informatics Challenge and Conference (IBIC '07), 19th September, Dublin, Ireland.

3. Carroll, N. (2007). 'Enhancing Efficiency and Effectiveness of Online Asynchronous Support using Case-Based Reasoning within an Online Learning Environment', Proceedings of the 16th International Conference on Information Systems Development (ISD 2007), August 29-31, Galway, Ireland.

Abstract

As the uptake of e-learning continues to increase, it has come to light that engaging students in e-learning requires a large time commitment on the part of the lecturer. This burden may be eased by the expedient use of online asynchronous support tools. This research evaluates the use of asynchronous support tools in the Irish Institutes of Technology (IoTs) and their application to the provision of online support to IoT students. This study provides an evaluation of the perception of IoT students as to the adequacy of asynchronous support offered to them and prescribes for improvement of that support.

This research suggests that asynchronous support tools are substantially underutilised within the IoTs and consequently student engagement via asynchronous support is insufficient in meeting students learning needs. While email is identified as the preferred and dominant means of communications, discussion boards and weblogs are not employed to anywhere near potential. The findings suggest that improved use of asynchronous support tools would help redistribute scarce lecturers' time and address the important issue of providing online support to students in a 'just-in-time' learning manner, rather than a 'just-in-case' data repository. In addition it recommends for the integration of e-learning platforms and their constituent tools with a knowledge base. This would facilitate the lecturer in providing 'reusable' and 'in context' online support to be availed of by students if and when required. The findings therefore present two major challenges to IoTs; to enhance student support by substantially improving the current use of online asynchronous support tools and to employ the expedient use of semantic technologies. The findings indicate that there may be an emphasis on e-learning technology to deliver learning content rather

than the learning process. The main findings are categorised into seven main issues identified in this research. These are: the rising expectations of students and lecturers from the affordance of technology; the need for to implement a social learner support environment; the need for greater emphasis on publishing quality learner content; the need to address the variance in students IT skills; the need to explore methods to accommodate for 24/7 demand of online support, the need to implement technologies to provide greater mobility of online support, and the develop design strategies for greater accessibility of online learning content. Facing and surmounting these challenges are a vital step in creating and sustaining a quality online supportive environment for both lecturer and student.

CHAPTER 1

INTRODUCTION

Education is the most powerful weapon which you can use to change the world

-Nelson Mandela

1.1 Research Background

Over the last thirty years, more flexible learning methods have been slowly introduced in place of some traditional educational methods (Jarvis, 2000; Clayton et al., 2010). These methods propose to enhance learning in many forms (Garrison and Anderson, 2003). As a result, there has been increasing investment, research, and development in new learning methods within Higher Education (HE) throughout Ireland (e-Learning Research & Development Roadmap for Ireland, 2004). These new learning methods include the introduction or relatively new concepts into HE such as e-learning. The phenomenal uptake of e-learning is escalating (Kahiigi et al., 2008). HE is now exploiting this substantially to port learning content to the Internet. As a result, e-learning is attracting increasing student numbers within Institutes of Technologies (IoTs). However, Alonso et al., (2005) suggests that HE is facing many uncertainties with the implementation of e-learning. One example where uncertainty lies is in their ability to provide sufficient online support. As the student population through e-learning mediums continues to increase, it is inevitable that the demand for online support will also increase. Asynchronous support is the predominant method of delivering support to students within e-learning environments (Milliron and Prentice, 2004). There has been little research efforts within an Irish context to evaluate students learning experience with regards to online asynchronous support.

1.2 Context and Justification

The starting point and to some degree the overall purpose and scope of this research originates with the interest of exploring student learning experiences while engaging in e-learning. For e-learning to succeed, the IoTs must understand the advantages, disadvantages, and limitations with various tools, and their affects on the students learning experience. This research evaluates whether lecturers and students are exploiting the use of asynchronous tools within an e-learning environment. Thus, the focus of this research is on the perceived effectiveness and efficiency of asynchronous support tools as students engage in e-learning activities. An evaluation explores whether online asynchronous support enhances student learning experiences within an e-learning environment. It also explores whether there is need for IoTs to take more responsibility in providing structure and guidance in e-learning environments. This is critical as students within e-learning environments are reported to assume increased control of their learning (Scheuermann, 2003).

This research reports on students learning experience within e-learning environments across IoTs. There is little insight on the learning experience of students engaging in e-learning in Ireland. From a learning support perspective, as student numbers are expected to grow through e-learning mediums, it is inevitable that demand for support is putting a continuous strain on supply of support from lecturers. As e-learning continues to grow within the Irish third level education sector, there have been no reports on the students learning experiences with the level of online support. Thus, evaluating the current state of e-learning, as experienced by students, and reporting on the availability of asynchronous tool to them while seeking online

support, offers an excellent platform for educators, researchers, and e-learning developers to gain a true snapshot of e-learning experiences within the IoTs.

1.3 Research Objectives and Questions

The objective of this research is:

- To explore students' profile, usage, and perception of their learning experience while requesting online asynchronous support throughout an e-learning course.

The research realises this objective by achieving each of the secondary objectives as outlined below:

1. To develop a profile (average age, discipline of study, etc.) of students undertaking e-learning in the IoTs.
2. To explore the usage of asynchronous tools to gain online support.
3. To develop a profile of the asynchronous tools used by students undertaking e-learning in IoTs, i.e. to determine the range of asynchronous tools used.
4. To report the perceived effectiveness of online asynchronous support tools.
5. To report on the levels of satisfaction of students when using each asynchronous tool to avail of online support.

The research questions posed to realise these objectives are:

- ***RQ1: What asynchronous tools do student currently use for learning tasks within an e-learning environment?***
- ***RQ2: What level of satisfaction do students experience when using asynchronous online tools?***
- ***RQ3: How satisfied are students with the levels of online support provided by lecturers when using online asynchronous tools?***

1.4 Overview of the Thesis

Chapter One – Introduction

This chapter outlines the research background, the research context and justification, and objectives and questions presented within this thesis. In addition to presenting an outline of the thesis the remainder of this chapter presents a summary of the findings of this research.

Chapter Two – Literature Review

This chapter provides a review of the literature. The chapter is divided into four main sections: theories of learning and e-learning, the student learning environment, learning technologies and tools, and the main issues identified throughout literature. This chapter explores learning theories from both a traditional and e-learning perspective. To understand how asynchronous tools support learning tasks, we must account for the underlying learning theories. This chapter also presents a literature review on learning tools and technologies, and the most prominent issues associated with them. This is critical to develop an understanding of the affordance of asynchronous tools within an e-learning environment. Chapter two reports on the

student learning environment to present the challenges students face while seeking online support.

Chapter Three – Research Methodology

Subsequent to a brief discussion on ethnology and epistemology, this chapter provides a discussion on the various strategies of inquiry and justifies the selection of a research methodology appropriate to this study. This chapter also provides a discussion on the research tool selection, structure and limitation, sample size, strategy for research bias, and the contributions of this research.

Chapter Four – Research Findings

This chapter presents the research findings and addresses the research questions adopted in chapter three.

Chapter Five – Conclusion

This chapter discusses the main findings of the research and concludes with recommendations of the findings and identifies areas for further research.

1.5 Summary of Findings and Conclusion

The results of this research indicate that the availability of online asynchronous support to students is insufficient within the IoTs. Mature student are more critical of the effectiveness of use of asynchronous support tools. One of the main reasons which explain the variance in student perceptions is the level of IT proficiency skills between both groups (standard applicant and mature applicant). The findings suggest that asynchronous support tools are substantially underutilised within the IoTs and

consequently student engagement via asynchronous support is insufficient in meeting students learning needs. There is a significant lack of social engagement within the e-learning environments. The findings imply that email, discussion boards and weblogs are the predominantly used tools in an e-learning environment within the IoTs. Email is reported as the preferred means of communicating, and receiving support within an e-learning environment. The findings indicate that discussion boards provide little, to moderate support to students while engaging in learning activities. It is also apparent that Weblogs are under utilised to support students' e-learning activities. It is evident that students enjoy communicating through social networks, although there was no report of a college-wide social network community. The findings suggest that social aspects of learning are not encouraged within the e-learning environment.

The findings suggest that it would be hugely beneficial to implement a knowledge-base within e-learning platforms, and to move away from the content repository standpoint. This would permit online support to be powered by learner and lecturer generated content. Students across IoTs participate in similar e-learning courses (for example, business studies), across Ireland. One of key recommendations which have emerged from the research is to suggest that the IoTs cooperate across a learning network and allow students to participate in a wider national learning community. It is anticipated that as the demand for e-learning courses continue to grow, the availability of online support will continue to weaken if action is not taken now to improve learner support. It is suggested that this will help reduce the dependency on lecturers to provide timely online support, allow and encourage students to collaborate through wider social learning networks. The research findings prescribe the need for new learning developments possibly through the exploitation of

Semantic Web developments. The research findings prescribe the need for new learning developments possibly through the exploitation of Semantic Web developments. For example, the Semantically-Interlinked Online Communities (SIOC)[1] model would be a good platform to semantically enhance the availability of online support within an e-learning environment. The IoTs must improve the level of support and increase the probability that students have a more successful with positive learning outcome, thus promoting a constructive, creative, and social learning experience for students within e-learning environments.

[1] http://sioc-project.org/

CHAPTER 2

LITERATURE REVIEW

"If history repeats itself, and the unexpected always happens, how incapable must Man be of learning from experience?"

George Bernard Shaw

2.1 Introduction to the Literature Review

The purpose of the literature review is to account for what ispublished in e-learning, with greater focus on asynchronous support, by accredited scholars and researchers to date. This literature review establishes the background of the study, which is bounded by the context of e-learning asynchronous support tools and students learning experiences. The various dimensions and complexities of learning theories, online asynchronous support tools, methodologies and techniques are also explored in detail within this chapter. To conclude a summary is provided to highlight the main issues experienced by students while undertaking an e-learning course.

To develop a deeper understanding of education and the evolution of e-learning, one must develop a clear understanding of how students learn and how asynchronous tools supports learning tasks. This chapter is divided into four main sections: learning theory, e-learning, e-learning tools and technologies, and the student learning environment.

2.2 Learning Theory

2.2.1 Overview

This section provides an overview of the most prominent learning theories, and discusses approaches to teaching and learning that are applicable to particular practices in e-learning. Learning theory can be defined as an interpretative account for change in behaviour, including; cognitive, emotional, and environmental factors and experiences, to make sense of the world around us. Bernard (1956) defines learning (pp. 118) as:

> *"...change in performance through conditions of activity, practice, and experience"*

McCormick and Paechter (1998) provide a definition of learning as:

> *"...a persisting change in performance or performance potential that results from experience and interaction with the world. Learning is also a knowledge construction process".*

These definitions provide us with a base for discussion to develop an understanding of what learning is. Learning can largely be acknowledged through the change in ones performance (for example, Maeroff, 2003). In addition, Williams (2002), explains that over the last three decades, several new approaches to the theory and practice of learning evaluation have emerged to address concerns within the learning process. Kolodner et al., (2005) explores the question of what learning is and how it takes place. According to Bernard (1956), learning includes not only the acquisition of subject matter but also that of habits, attitudes, perceptions, preferences,

interest, social adjustments, skills of many types, and ideals. The following section, in an effort to better understand how learning occurs, provides a discussion on the most prominent learning theories.

Behaviourism, cognitivism, and constructivism are the three fundamental learning theories often utilised in the creation of learning environments (Siemens, 2004). These are further discusses in the following sub-sections.

2.2.2 The Behaviourist Approach

Behaviourism, which was the predominant instructional paradigm for the first half of the 20th century, is firmly rooted in the positivist and objectivist tradition. According to Cohen and Manion (1989), behaviourism originates from hard science and maintains that '*knowledge is hard, objective and tangible*'. Monari (2005) explains that behaviourism is the product of mans' experiences, and mans' behaviour *"...as the result of a stimulus reaction mechanism."* McCormick and Paechter (1998), define behaviourism as:

> *"...an approach to psychology which implies that learning is the result of operant conditioning."*

Monari (2005) and McCormick and Paechter (1998) indicate that behaviourism can be demonstrated through the change in ones behaviour. Thus, the change in ones behaviour indicates that learning has occurred. According to Ally (2004), the behaviourist claims that it is the observable behaviour that indicates whether or not the student has learned something new, and not what is going on in the student's head. Learning under the behaviourist approach is seen as the change in behaviour in

order to make a specific response following a certain stimulus. Ally (2004) identifies four requirements for behaviourism:

1. Learners should be informed of the expected learning outcomes, in order to form expectations to allow them to make judgments on whether or not they have reached their objectives.
2. Learners must be examined to establish whether they have achieved the learning outcome.
3. Learning material must be sequenced correctly to promote learning.
4. Learners should be provided with feedback so that they can monitor what they are doing (doing right, wrong, or both) and take appropriate action.

Therefore, from a behaviourist viewpoint, behaviour indicates whether a student has learned by demonstrating change in their performance and teachers can provide feedback on where students can improve, to advance their learning experience.

2.2.3 The Cognitive Approach

Cognitivism became the central theory in learning in the late 20th century, replacing behaviourism as the most popular paradigm for understanding learning. Cognitivism, also known as Cognitive Information Processing (CIP), claims that learning involves the use of memory, motivation and thinking. Reflection also plays an important part in learning (Ally, 2004). According to Jarvis et al., (2003) cognitivism refers to;

> *"...a learner's preferred way of processing information, which suggests that it can be individualised based on a learners personality, for example, their attitudes, values and social interactions."*

This suggests that personality plays a significant part in learning, and varies with different individuals, and thus people may have different learning experiences. Monari (2005), states that cognitivism takes place when the mind processes information to make sense of it, and learning is achieved by constructing a relationship between existing and new information. According to Rohall (2002), Ally (2004), and Kay (2006), cognitivism involves:

1. Allowing learners to retrieve existing information from long-term memory. This allows them to make sense of the new information, and to create a link between new information and stored information in memory (Ally, 2004).
2. Greater ownership of learning should be encouraged, i.e. apply, analyse, and evaluate information to promote higher-level learning (i.e. meta-cognitive) (Kay, 2006).
3. Learning materials should include activities for different student learning styles, with adequate support available to students (Ally, 2004; Rohall 2002).
4. Motivating learners to increase their attention, relevance, confidence, and satisfaction through feedback (Ally, 2004).

Cognitivism is concerned with the method in which students' process information. Students must understand the relationship between what they know and what the new information presents. Students' new understanding assures that learning has occurred through the application, analysis, and evaluation of the information.

2.2.4 The Constructivist Approach

Constructivism is an approach to teaching and learning based on the principle that learning is the result of mental construction. Constructivists believe that learning is

influenced by the context in which a student is taught as well as by students' beliefs and attitudes. Monari (2005) explains that the theory of constructivism sees knowledge as:

> *"...being actively constructed by individuals while working together to solve problems."*

This suggests that knowledge is constructed from personal and other peers' experiences which highlight the importance of social interaction to create knowledge. McCormick and Paechter (1998) define constructivism as:

> *"...a set of assumptions about the nature of human learning that guide constructivist learning theories and teaching methods of education."*

This indicates that constructivism may guide the development of learning methods. However, McKenna and Laycock (2004), states that constructivism envisages:

> *"...a learning process which does not lend itself to quick fixes, i.e. internal cognitive models of a problem domain are constructed and refined over a period of time based on experience and reflection."*

This suggests that knowledge creation is an evolving process and becomes more refined with time and learner experience. Ally (2004), states that e-learning must create challenging activities to enable learners to link new information to old (constructivism), acquire meaningful knowledge and use their meta-cognitive ability. Constructivists claim that people learn by observation, processing, and interpretation,

and then personalise the information into personal knowledge (Jarvis et al., 2003). Constructivist learning, therefore, is a very personal undertaking, whereby concepts, rules, and general principles internalised may consequently be applied in a practical real-world context. Reeves et al., (2002), states that there is renewed interest in constructivist philosophy and in the technological impacts on educational design and practice. According to Felix (2003b) this is not surprising since new technologies offer sophisticated synchronous and asynchronous communication environments which allow students to construct and re-construct new meaning. Ally (2004) suggests that learning is moving away from one-way instruction to construction and discovery of knowledge. Constructivism values the development of appropriate teacher-supported learning which can be initiated and directed by students (Reeves et al., 2002).

Within a constructivists approach, a lecturer acts as a facilitator who encourages students to discover principles for themselves and to construct knowledge by working to solve realistic problems. Students are also exposed to the views of their peers. This also enables them to learn of defects and discrepancies in their own logic. According to McCormick and Paechter (1998) constructivism has many variations, such as generative learning, discovery learning, and knowledge building. Regardless of the variety, constructivism promotes student exploration within a given framework. This is often reported to be encouraged in HE, especially within a collaborative e-learning environment. Ally (2004) states that the key factors influencing learning under the constructivist's theory include:

1. Learners actively construct knowledge by creating hypothesis.
2. Learners experiment with hypotheses.
3. Learners need to explore environments to make sense of them.

4. Learners should be encouraged to reflect and restructure knowledge.
5. Learning involves socially negotiated meaning to promote higher-level learning and social presence, to help develop personal meaning.
6. Learning must be made meaningful for learners, i.e. the learning material should have some meaning or relevance to students' experience.
7. Learners should be given control of the learner process, in the form of guided discovery, which allows students to make some decisions.
8. Learners should be encouraged to collaborate and cooperate to provide real-life experience while working in groups

The points listed above help to construct an understanding of how constructivism may be promoted within a learning environment. According to Felix (2003a), during the 1990's there was a move away from instructivist to constructivist theories. This placed an emphasis on engaging students in problem solving, situated learning, co-operative activities, and more importantly, the educational experience.

Ally (2004), states that there are some overlaps of concepts between these three theories, when applied to an e-learning environment; behaviourism, cognitivism and constructivism, if analysed closely. He explains that the design of online materials should include principles from all three, and that the three schools of thought can be used for developing a taxonomy of learning. According to Ally (2004), behaviourists' strategies can be used to teach the 'what' (facts). Cognitive strategies can be used to teach the 'how' (processes and principles). Constructivist strategies can be used to teach the 'why' (higher level thinking that promotes personal meaning). This is a more holistic attempt to integrate learning theories and understand the student learning environment. Within an e-learning environment, there are several tools and technologies which support various learning theories and learning styles. These are discussed in the next section.

2.3 E-Learning

2.3.1 Introduction

E-learning is a relatively new phenomenon within the IoTs, although Bixler & Spotts, (2000) caution that the underlying pedagogical principles have not been implemented within the electronic environment. The pedagogical principles applied within a traditional classroom environment are extended to apply within an e-learning environment, although technology has a significant influence on pedagogical principles. The rapid development of new learning technologies and tools has paved the way for e-learning (for example, Web 2.0 collaborative tools, educational multimedia, and Web-based learning). Teare (1998) argues that it is generally accepted that the dawning of the 'information age' resulted from the phenomenon growth of personal computer access and ownership during the 1990's. The growth in personal computer access and Internet access has propelled the growth to e-learning which has become a global phenomenon. E-learning continues to experience the resurgence of traditional educational methodologies, as learners take more personal responsibility and control for their own learning needs. The next section presents a discussion on efforts to define e-learning within literature.

2.3.2 E-learning Defined

The concept of "e-learning" is not entirely new since 'computer-based training', 'online learning', and 'Web-based learning' have also been explored to facilitate learners' needs. E-learning may be simply defined as the use of information and communication technology (ICT) to deliver educational and training programmes (Garrison and Kanuka, 2004). E-learning is electronically mediated to facilitate and support the process of learning and deliver learning content through ICTs, for example, the Internet, intranet, video, and audio methods. E-learning can also be

defined as "*Internet-enabled learning*" (Cisco, 1999). E-learning is essentially the use of online tools in a distance education mode using the Web as the sole medium for all student learning and communication needs (Nichols, 2003). DiPaolo (2004), defines e-learning as:

> *"...learning facilitated and supported through the use of information and communications technology."*

DiPaolo (2004) draws our attentions to the use of ICT to support learning. This is also evident as Lee et al., (2005) define e-learning as:

> *"...the appropriate blend of information and communication technologies (ICT) to enhance student-centred, collaborative and lifelong learning, combining face-to-face and web-based approaches in teaching and learning."*

Lee et al., (2005) state that e-learning adopts a blended approach using ICTs and face-to-face approaches. McNamee et al., (2007) describes e-learning as consisting of:

> *"...materials (such as lecture notes) and processes (such as assignment submission) are electronic, and communication can be either synchronous (for example, via chat-rooms or videoconferencing facilities) or asynchronous (for example, via email or discussion boards).*

McNamee describes the methods (synchronous and asynchronous) which support e-

learning. It is clear from these definitions that e-learning consists of the delivery of learning material, through ICTs, and supports collaborative activities within a Web-based learning environment.

One prominent theoretical framework to consider elements of this environment is the Community of Inquiry (CI) model, established by Garrison and Anderson (2003). The CI model encapsulates the critical factors within a learning environment; social, cognitive and teaching presence.

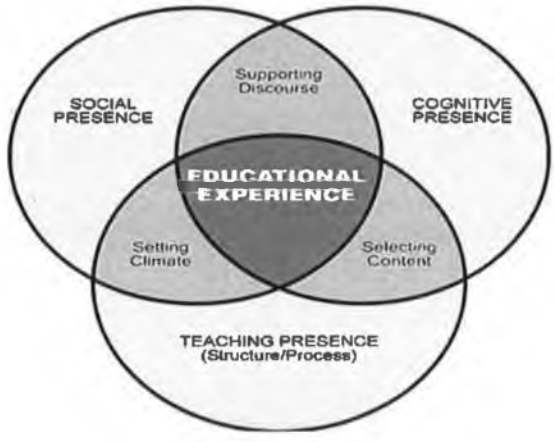


Figure 2.1 Community of Inquiry (Garrison and Anderson, 2003)

As depicted above in figure 2.3, the student's learning experience is central to the sense of a community of inquiry. Fostering a sufficient level of communication among students enhances the sense of a community and contributes to students learning experience (Lorenzetti, 2002). Effective learning depends upon the appropriate balance and interaction of all three factors (social, cognitive, and teaching presence). Garrison et al., (2000) defines cognitive presence as:

> *"...the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry'*

Cognitive presence reflects the intellectual environment which is associated with the facilitation of critical reflection and discourse. These do not occur in isolation. Garrison et al., (2000) defines social presence as:

> *"...the ability of participants in a community of inquiry to project themselves socially and emotionally, as 'real' people (in their full personality), through the medium of communication used".*

Social presence (personal and emotional) is necessary in any community of inquiry. This is a particular challenge for virtual communities. An e-learning environment asserts a unique social context, different from that of a classroom (Swan, 2001). Anderson et al., (2001), defines teaching presence as:

> *"...the design, facilitation and direction of cognitive and social processes for the purpose of realising personally meaningful and educationally worthwhile learning outcomes".*

The success of e-learning strategies hinge upon the three factors illustrated in figure 2.1, and the appropriate balance and interaction of these factors.

2.3.3 Evolution of E-Learning

From a historical perspective, e-learning is among the latest evolution of education. According to Monari (2005), distance learning began in the first years (first generation) of the twentieth century, when printed material was delivered through the postal service. The printed material was distributed and studied individually. There was no interaction among peers or lecturers (application of behaviourism). The second stage (second generation) of the evolution took place in the 1960's when the

widespread use of radio and television made it possible for educational institutions to adopt them as educational tools. Starting from the 1980's, e-learning also made wide use of video and audiotapes, followed by audio CDs and CD-ROMs. McKenna and Laycock (2004), explain that until the early 1990s, educational software development was strongly influenced by behaviourist principles. This generally manifested itself as a structured exposition of information followed by testing with immediate feedback. Maeroff (2003) and Monari (2005) explain that as a consequence of technological influences, theories of learning, and the role of lecturers and students has changed over the years.

Nowadays, students have greater access to the Internet (third generation) for everyday uses inside and outside the classroom (Guess, 2007). The advent of the Internet made it possible for e-learning to move towards the constructivist approach (fourth generation). The Internet also facilitates the development of computer mediated communications and Virtual Learning Environments (VLEs), for example Moodle and Blackboard. Whitehouse et al., (2002) define a Virtual Learning Environment (VLE) as:

> *"...an integrated software system, which combines within a package facilitates for the delivery of learning...."*

The use of interactive Internet software and VLEs are a commonly selected medium of e-learning (Devedzic, 2004). A VLE is designed to support teaching and learning through online tools and resources in an educational setting. VLEs, such as Moodle and Blackboard, have the tools to host, manage, track and set out a learning experience. E-learning developers may opt to use templates available through VLEs, which is a method of systematically arranging the course content by pre-designed

formats for text and graphics on which content can be presented (Reeves et al., 2002). Students must be able to depend on a variety of e-resources. The Internet, libraries, discussion boards, and instructor-provided materials are all common resources of online instructional materials available through VLEs.

The importance of the evolution of e-learning is reflected through the continued investment in e-learning projects, the increase in e-learning research, publications, and conferences. These developments support the development of e-learning and the exploration of technologies for learning. There was a significant shift around a decade ago, mainly due a number of national and international initiatives and policy drivers. For example, the EU Lisbon European Councils and the Memorandum of Life Long Learning, was brought forward as part of the Lisbon Agenda (*Education and Training 2010 – Diverse Systems, Shared Goals, and Higher Education in the Lisbon Strategy*). In addition, the EU also supports continued investment in e-learning, for example, "*EVENE – Erasmus Virtual Economics & Management Studies Exchange*" project amongst numerous others. Bourke (2005) of the European e-Learning Industry Group has identifies e-learning as one of the mechanisms to help Europe become the:

> *"...most competitive and dynamic knowledge-driven economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion. In a few years time we will have created a huge database on which most European schools will be registered, greatly helping us to develop joint projects on any theme, in any area of knowledge."*

Learning technologies and tools have undergone many evolutionary changes over recent years (Maeroff, 2003). According to Monari (2005), e-learning platforms allow students to interact with each other in a synchronous and asynchronous ways, and can therefore constitute as a good method to support collaborative learning activities. The evolution of e-learning is supported by the development of innovative tools, technologies, e-learning initiatives and policy developments to guide the continued growth of e-learning. The growth in e-learning is complemented by two significant technological developments – the Internet and multimedia developments. Through the integration of both, this brought about the development of hypermedia (Rogerson-Revell, 2007). There are several approaches to e-learning. Figure 2.2 illustrates a model developed by Anderson (2004a) which outlines a number of approaches to interact with students in an e-learning environment.

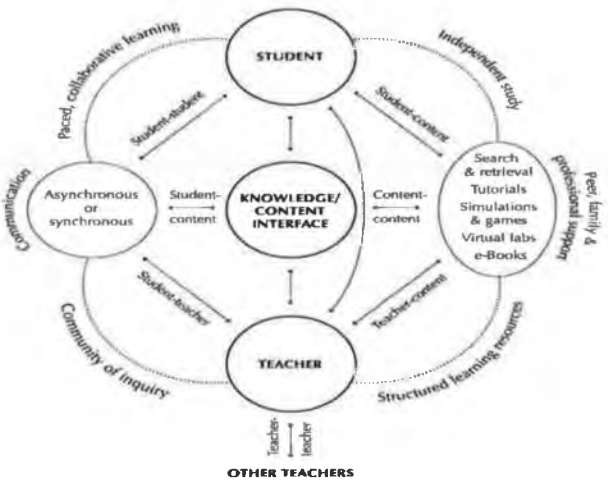


Figure 2.2 Model the various approaches to e-learning (Anderson, 2004a)

Figure 2.2 above, illustrates how both students and lecturing staff interact and engage with the educational content through various communication and electronic means. According to Nichols (2003) the selection of educational approaches or philosophies are more important than the

selection of the technology itself. Figure 2.2 above, illustrates the various approaches to encourage interaction among students and lecturers. The selection of technology should facilitate student collaborations, content accessibility, and support within an e-learning environment. Gagne et al., (1992) argues that learning is caused by the instructional methods embedded in the media presentation. The phases of critical thinking (practical inquiry) are the triggering events of exploration, integration and resolution within learning activities (Garrison and Anderson, 2003). The poor implementation of technology can reflect poorly implemented pedagogy, or an over-estimation in the learning technology's potential. This is evident throughout the literature, with reports of the unfulfilled promise of technology in learning as highlighted previously (for example; Kock et al., 2002; Jenkins 2004; Valentine 2002). The dimensions of higher-order learning within e-learning emerge from the concepts of reflective enquiry, self-direction and meta-cognition (Garrison, 2003). Self-directed learning addresses issues of management, monitoring and motivation. According to Åkerlind (2007), self-directed learning is emerging as an important conceptual model towards understanding issues raised by technology and has the potential to transfer control to the student. The rapid technological developments and continued investment has paved the way for HE to implement a number of innovative approaches towards e-learning and its various classifications.

2.3.4 E-learning Classifications

E-learning adopts many classifications. According to Jansen et al., (2002), there are three main categories of e-learning: (1) e-learning as a learning environment, (2) e-

learning as a development environment, and (3) e-learning as a management environment. These classifications were chosen as they encapsulate three fundamental factors: learning, development, and management. In addition, Jansen et al., (2002) cautions that it is extremely difficult to define e-learning classification or description based on the e-learning technology as it is a continuous state of change. This research is primarily concerned with students learning experiences and is therefore focused on the experience of e-learning as a learning environment. Falch (2004) identifies four main classifications of the learning environment as: (1) e-learning without presence and without communication, (2) e-learning with presence but with communication, (3) e-learning with some presence, and (4) e-learning as a classroom learning tool. Negash and Wilcox (2008) build on these classifications, and derive six classifications. These are summarised in table 2.1 as follows:

Classification Type	Real-time Presence (physical or virtual)	Electronic Communication	Alias
One	Yes	No	Face-to-Face
Two	No	No	Self-Learning
Three	No	Yes	Asynchronous
Four	Yes	Yes	Synchronous
Five	Occasional	Yes	Blended/Hybrid Asynchronous
Six	Yes	Yes	Blended/Hybrid Synchronous

Table 2.1 E-learning Classifications (Negash and Wilcox, 2008)

As outlined in table 2.1 above, there are six main classifications of e-learning. These are summarised as follows:

- The first classification is face-to-face. Face-to-face is the typical delivery of instruction found within a traditional classroom environment. The lecturer and student are physically present. The lecturer may use PowerPoint slides or other multimedia technologies to deliver the content.

- The second classification is self-learning. Self-learning allows students to receive or download course content and learn the material on their own. The student has no direct contact with the lecturer and normally learns form material such as e-books, recordings, or slides.

- The third classification is asynchronous. Asynchronous format of learning implies that neither the lecturer nor the student must be present at the same time. There is a time delay in the submission, assessment, and feedback of learning content. This is considered the most common form of e-learning. Communication and collaboration is normally supported through the use of e-mail, discussion boards and/or Weblogs.

- The fourth classification is synchronous. Synchronous e-learning consists of learning in real-time within a virtual space. Learning material, communication is achieved through the use of, for example, instant messaging and teleconferencing tools.

- The fifth classification is blended/hybrid asynchronous. Blended/Hybrid Asynchronous consists of physical presence between the lecturer and student, within scheduled times. Other activities are carried out through e-learning tools.

- The sixth and final classification is blended/hybrid synchronous. Blended/hybrid synchronous which supports both physical and virtual lecturer and student presence at all times. This may comprise of both a traditional learning environment meeting face-to-face, and virtually, through the use of video and/or audio tools.

The next section identifies the most prominent tools and technologies used to facilitate e-learning and provides a discussion on the various methods to support learners.

2.4 E-Learning Technologies and Tools

Carswell et al., (2000), explain how third level educational institutions attempt to respond to societal changes which are often influences by the changing trends in the use of technology. Learning technologies and tools support students to perform learning tasks more efficiently (Oliver, 2000; Koper et al., 2005). Hummel et al., (2004) defines learning technology as:

> *"...specifications of methods and techniques that support the realisation of e-learning."*

These specifications relate to the hardware and software used to support an e-learning system. Bates (1997) identifies four main reasons to implement technology in HE; to improve the quality of learning, improve accessibility to education and training, reduce the costs of education, and to improve the cost-effectiveness of education. E-learning is a term used to describe technological enhanced learning, whereby technology supports the learning process. E-learning technology

encompasses a broad range of technological tools (for example, Wang and Hannafin, 2005). Vega-Gorgojo et al., (2006), defines a learning tool as:

> *"...a software tool that can be used in one or more tasks that eventually leads to learning."*

E-learning tools include, for example, email, discussion boards, Weblogs, Wikis, instant messaging, text messaging, and social network applications. The e-learning tools support communication in educational settings to manage, create and evaluate educational materials and activities. Garrison and Anderson (2003) explain that educational technologies are:

> *"...those tools used in a formal educational practice to disseminate, illustrate, communicate, or immerse learners and teachers in activities purposively designed to induce learning".*

Over the last decade, learning technologies and tools played a significant role in the evolvement of e-learning. For example, as the Internet becomes more pervasive, it changes the way information is transmitted across the world. HE has also benefit from such change. The next section offers a discussion on the Internet and how it facilitates e-learning within HE.

2.4.1 The Internet

The Internet, informatisation, and globalisation, are a new phenomena which has very quickly impacted on people's lives, and on educational systems (Adam et al., 1997). In addition, Adam et al., (1997) suggest that global access of information, for example, through the Internet, has changed the relationship between people and

information. The Internet is a network of computers using the Transmission Control Protocol and Internet Protocol (TCP/IP) to communicate. The Internet is changing the way we communicate, work, conduct business, live, socialise, play, and learn. The Internet is a global communication system, which consists of hardware and software to provide a connection between computers. According to Meško (2007), the Web doubles every 60-65 days. He states that the Internet usage is increasing at a rate of about 140 people per minute. It is estimated that this accounts for an increase of almost 72 million people a year on the Internet. The size, scope and design of the Internet allow users to take part in many activities, for example:

1. *Communication* – e-mail, chat, discussion boards, social networking, texting
2. *Learning* – Virtual Learning Environments, semantic Web, sharing data
3. *Research* – search engines, online journals, e-books
4. *Entertainment* – view videos, listen to music, audio links, gaming

Today, the Internet is the most popular source of information for online learners. A survey carried out by Zao and Yang (2004) concludes that over half of all online students prefer the Internet as their primary source for information. The reasons for this choice include; ease of information retrieval, convenience, and the perceived quality of information. Teare (1998), states that the Internet offers many key characteristics of communications, which enables two-way communication and also facilitates information resources to be acquired or distributed relatively easily. These characteristics also extend the capabilities of e-learning. The Internet is rapidly reshaping HE worldwide (O'Neil, 2006; Capshaw, 2007), as students can now avail of more learning content resources and more communication channels.

Brestenská, (2007) asks how we can prepare students for life in the new knowledge society. The importance of ICT with reference to internationalisation and mobility is growing in today's society and the same trend is reflected in the third level education (Poulová, 2007). Guess (2007) states that students today are more connected to each other through various online mediums. Most students entering third level education today are younger than the microcomputer (Frand, 2000). Meŝko (2007) suggests that students are more comfortable working on a keyboard than writing into a notebook, and are happier reading from a computer screen than from paper in hand. Thus for them, constant connectivity – being in touch with friends and family at any time and from any place, is of extreme importance (Meŝko, 2007).

Students are becoming less restricted, with laptops and mobile phones allowing them to remain connected. Guess (2007) explains that the emerging Web 2.0 paradigm of immersive environments and dynamic information and communication promises (or threatens) to change the traditional learning pedagogies.

2.4.2 The Web

The Web is an application available on the Internet which is interlinked through hypertext documents and hyperlinks via the Internet. Thus, the network of links is the Web. The Web facilitates the exploration of information, for example, interactive information retrieval and self-regulated learning (Vakkari and Järvelin, 2005). Web technologies have begun to shape educational practices. This is evident with the advent of e-learning. The Web has also had an impact on the students' ability to connect on a global scale through many social network activities, such as blogging, media sharing, and social networks. There are also a vast amount of hypermedia-based learning resources available on the Web. These may be used to fuel the growth

of e-learning resources to support student e-learning environments. The Semantic Web is also an evolving addition of the Internet, in which the semantics of information and services on the Web are becoming more defined.

2.4.3 The Semantic Web

The Semantic Web is an extension of the current Web by standards and technologies that can help machines to retrieve information on the Web. W3C describe the Semantic Web as a "web of data". Stojanovic et al., (2001) states that the term 'Semantic Web' encompasses efforts to:

> *"...build a new World Wide Web architecture that enhances content with formal semantics, which enables better possibilities for navigating through the Internet and accessing its contents."*

Berners-Lee (1999) published an article on the promise of the Semantic Web. He explains that the Semantic Web will derive its power through the linking of data rather than documents. He continues by adding that the Semantic Web will integrate data better for both commercial and academic purposes:

> *"Data integration will be the web's next leap forward. The most exciting discoveries will come from the serendipitous combination and integration of data drawn from diverse sources."*

HE is entering an era in which the Web is changing from a medium for displaying content, to one in which content is endowed with semantic meaning (Berners-Lee, 1999). Applying the technologies of the Semantic Web in the e-learning domain can lead to a better understanding of user requirements and needs (Kraver et al., 2005). In

the field of education there are calls for the diversion from an authoritative education model (controlled by the teacher) to models characterised by processes of meta-learning and the students' ability to learn (Bauerová, 2007). Stojanovic et al., (2001) suggest that the Semantic Web may be a promising technology to implement e-learning by allowing content to become "machine-understandable", defining learning content, and structuring learning material.

2.4.4 Classifications of Learning Tools

E-learning tools are electronic tools used to support the function of learning. E-learning tools are used to deliver educational content and facilitate interaction between students and lecturers. Rogerson-Revell (2007), discusses how the current phase of the e-learning evolution is witnessing the emergence of various Web tools and technologies that are relevant to e-learning material development. There are many classifications of tools available to facilitate learning activities. Kellar et al., (2006) divides e-learning tools into four main categories: (1) information creation, (2) information seeking, (3) information exchange, and (4) information maintenance. Kellar et al., (2006) provide a description and categorisation of four classifications which are summarised in table 2.2 as follows:

Information Goal	Information Task	Example of Method to Achieve Goal
Information Creation	Publishing	Creating, publishing, editing, adding, or deleting information on public forums, e.g. Weblogs, discussion boards and social networks.
Information Seeking	Fact Finding	Looking, searching or checking information through the use of a Web browser; (e-library resources, online research papers).
	Information Gathering	Looking and researching information, for example, seeking support of a lecturer through e-mail, search engines, online resources.
	Browsing	Reading Weblogs, news articles, movies, audio, email, browsing websites.
Information Exchange	Transactions	Validating information, document delivery request, online assessment, email, online surveys
	Communications	Email, Discussion boards, Weblogs, Mobile phone text messaging.
Information Maintenance	Maintenance	Ensure links work properly, ensure content is correct, unsure content is updated

Table 2.2 Web Tool Classification (Kellar et al., 2006)

Table 2.2 above outlines the main classifications of tools used within an e-learning environment to support information creation, seeking, exchange, and maintenance tasks. The tools used to facilitate these tasks can be categorised into synchronous and asynchronous tools.

2.4.4.1 Synchronous and Asynchronous Tools

There are two basic forms of e-learning tools: synchronous and asynchronous. Through synchronous tools, the two communicative tools primarily synchronise

themselves to each other, and then continually send data in 'real time', for example, a one-to-one or group chat using Skype. Synchronous communications allows for faster data transfer rates than asynchronous methods i.e., lecturer and student are present in the same time in a virtual space (Mabrito, 2006).

Asynchronous communication implies that neither the sender of the information or the recipient of the information must be virtually present at the same time (i.e. real time). Asynchronous communication is slower than synchronous, for example, e-mail. Therefore, timekeeping through an asynchronous medium requires the coordination of events to operate a system in harmony. Asynchronous learning occurs when a student, or lecturer is not present (physically or virtually) for instruction at the same place and time but communication is successfully achieved.

2.4.4.1.1 Synchronous Tools

The most common form of synchronous learning occurs 'within' the classroom (Cartwright, 1994). In the traditional classroom, synchronous learners interact with their lecturers and participate in classroom discussion. Synchronous learning may also occur at a distance if it facilitates learning in a one-to-one or one to-many learning environment in real time (Deal, 2002). Classes may take place through videoconferencing, interactive television, Intranet, or through other Web-based technologies. As quoted from the University of Maryland, Virtual Resource Website for Teaching with Technology[2], (2005) synchronous communication is:

> *"...communication taking place at the same time. Synchronous, or real-time, communication has yet to emerge as a popular*

2 http://www.umuc.edu/virtualteaching/module1/sync.html

technology in online education, but the likely merging of Web and audio/video delivery formats over time may, if successful and affordable, effectively virtualises education on a global scale."

However, according to Park and Bonk (2007), research indicates that asynchronous methods of communication between lecturers and students, and peers are preferred by students. They suggest that asynchronous learning:

1. is a means to gain confidence in responses to course content,
2. allows for flexibility in their lifestyles (not time or place dependent),
3. increases the level of control and responsibility for one's own educational process.

The next section offers more in-depth discussion on asynchronous methods of learning.

2.4.4.1.2 Asynchronous Tools

There are many benefits of asynchronous learning environments which promote a positive learning experience for students and allow them to achieve their learning goals. These key benefits include, 24/7 access, collaborative group activities, clear and concise course content, sufficient workloads, availability of training, frequent learning evaluation, peer-to-peer learning, physical contact, social presence, through the exploitation of e-learning tools. Farmer (2004), states that the focus tends to be on what can be achieved through particular tools, rather than what it is that these tools themselves can facilitate. The rapid expansion of e-learning as a delivery platform, combined with the increasing investment in lifelong learning and busier

lifestyles, provides an incentive for the IoTs to develop e-learning programmes (Volery et al., 2000). Supportive asynchronous tools are essential within a VLE. The use of asynchronous tools in structured courses breaks the traditional paradigm of time and physical space. This creates new educational possibilities and opportunities (De Souza and Gomes, 2005). Asynchronous instructional materials are accessible from any place at any time. These materials offer students the opportunity to learn at their own convenience (Deal, 2002; Cannings, 2003). A key component of asynchronous learning is interactivity. Students respond to some component of instruction, such as a reading assignment, request to respond to a discussion question, or complete a tutorial assignment. Students may also communicate with lecturers and peers through tools such as email or discussion boards (Laabs, 1997). Another form of asynchronous instruction requires students to participate in some form of online tutorial. Students log into a VLE and participate in a tutorial. Students can also repeat lessons as many times as necessary. They may also have the choice to complete as much or as little of the assignment depending on the time available to them. Thus, supporting students learning needs as they require asynchronous support is an important activity within e-learning. In the HE sector, asynchronous learning is a very powerful method of learning (Milliron, 2004). Milliron, (2004) adds that the associated techniques for using asynchronous learning to support in-class and online instruction attempt to bring learning to life in more innovative ways. According to Clarke (2003), asynchronous learning can promote student exploration and problem solving through:

1. collaborative involvement in authentic methods
2. challenging multidisciplinary tasks by providing realistic complex environments for student inquiry

3. furnishing information and tools to support investigation
4. presenting data to support problem solving learning activities

Sims et al., (2002) and Garrison (2003), suggests that asynchronous e-learning methods can create a rich cognitive presence, capable of supporting effective, higher-order thinking. Critical thinking and self-directed learning align with the defining properties of asynchronous online learning. Attention must be given to the opportunity to reflect upon and monitor knowledge (re)construction as well as the ability to collaborate and manage the learning process (Israel and Aiken, 2007). The properties of asynchronous online learning share similar characteristics of higher-order learning constructs such as reflective inquiry, self-direction and meta-cognition (Sloffer et al., 1999). According to Bourne and Moore (2003), the close mapping of online learning properties and higher-order learning dimensions suggest considerable potential and promise in informing and guiding learning effectiveness and efficiency through online asynchronous technologies. Students can communicate and collaborate asynchronously without needing to have a set time available in their daily schedules. Strollberg et al., (2005), describes collaboration as the '*cooperative interactions of individuals to achieving complex objectives*'. Student activities are often actively mediated by peer groups as strong interactions transcend from the traditional classroom (Kear, 2004). Students in such groups sometimes cooperate to deal with the formal curriculum through collective studying and problem solving techniques within group activities.

According to Pelz (2004), the student is, for most part, in charge of what gets learned. Asynchronous tools possess the advantage of facilitating methods to involve people from multiple time zones. Ashley (2003), documents that the uses of

asynchronous tools are also helpful in capturing the history of the interactions of a group, thus allowing the collective knowledge to be more easily shared and distributed in a supportive manner. Other benefits of asynchronous tools are listed in the following section.

2.4.4.1.2.1 Benefits of Asynchronous Tools

There are numerous benefits to using asynchronous tools. Asynchronous tools can be used to enhance the learning environment. Students can participate in groups. Students find it difficult in the traditional classroom environment to get together in groups to work on activities that promote learning communities. Asynchronous online tools allow students to collaborate at any time, in traditional or online classes, at times suited to their own schedules. Asynchronous tools also provide flexible methods of learning which allows students to learn at their own pace (Deal, 2002). In addition it does not present any opportunities for preconceived notions of race, color, or sex (Maeroff, 2003). Asynchronous tools, as a method of learning, are considered to be time and cost efficient, especially when compared to a classroom setting. It also affords students the opportunity to repeat concepts as often as necessary for learning to occur (Deal, 2002). It is also suggested that students are more comfortable writing than talking in a class and therefore may become more involved in online groups. This allows students to publish comments online having time to reflect and articulate. Through the use of asynchronous tools, online resources can be shared quickly and accurately, for example file transfer protocol (FTP). This offers flexibility on the process of learning through the use of Web technologies. Lecturers and students may feel less anxious about time being wasted, for example, in the event of a class being canceled if they can report such incidence via asynchronous tools. Communications can go beyond the 'bricks and mortar' of the classroom.

Students from all over the world can discuss topics of common interest without regard to differences in time zones. This has the advantage from the college's perspective in offering an online course to a vast number of students situated around the world (for example, EVENE). In addition, students in need of support can be identified by their participation (or lack of participation) within VLEs and personalised attention can be given to them, to enhance a students learning potential. This may be facilitated through the use of online discussions which can be organised by topic which can make the filtration of information easier and allowing more time for the student to digest and contribute to the information (Kay, 2006).

Asynchronous tools, for example email, also afford the use of attachments which allows for increased transmission of data. The advantages of asynchronous tools have paved the way for some developments towards the evolution of e-learning. However there are a number of drawbacks to asynchronous tools.

2.4.4.1.2.2 Disadvantages of Asynchronous Tools

The primary disadvantage of asynchronous tools is that they require some regulation when used within online communities (for example, people must login to participate). This act may feel impersonal to those who favour more interactive synchronous technologies (for example, Walther, 1996). Other drawbacks include the lack of impulsiveness and the lack of a personal touch in communication methods (for example, Paxton, 2003). Paxton (2003) adds that other disadvantages include, the feeling of isolation, the lack of a real sense of a community of learners, the sense of 'disconnectedness', the absence of accountability due to the lack of face-to-face contact, and the lack of logistical support and rapid assistance.

The next section provides an in-depth discussion of the most predominant asynchronous tools identified throughout the literature; email, discussion boards, and Weblogs.

2.4.4.1.3 E-mail

Wilkinson and Buboltz (1998; p 1215) define email as:

> *"the practice of sending the information from one computer user directly to other computer users, allowing nearly instantaneous transmission of messages, to any one or any number of people with personal computers connected to the Internet or mainframe computers."*

Email applications were designed for asynchronous communication. E-mail is a tool used to pass electronic messages from one computer user to another. The message is delivered to the recipient's mailbox which can then be read using an email program. E-mail is the exchange of computer-stored messages by telecommunication networks. Generally, email messages contain text, but you can also send non-text files, such as graphic images and audio files as attachments. Email accounts for a large percentage of the total traffic over the Internet. Martin et al., (2005) reports that email traffic surged to 6 billion messages daily in 2006. According to Radicati (2010), the number of email user's accounts across the world was 1.4 billion in 2009, and estimates that it will increase to over 1.9 billion by 2013.

Email has emerged as the preferred means of communicating in the modern workplace (Moody, 2004). The primary reason for its growth is mainly due to the nature of modern work, especially for supportive requirements and has become increasingly more interactive (Devedzic, 2004). Whittaker's and Sinder (1996),

suggest that email now serves multiple purposes; document delivery and archiving, work task delegation and task tracking.

Students now interact with others to exchange, arrange, manage and discuss ideas with their peers and seek advice of lecturers through email. Interactive activities include communication, data gathering and collaborative problem solving (Devedzic, 2004). Email plays a central role in task management, yet email features have remained relatively static in recent years, lagging behind users evolving practices (Bellotti et al., 2003; Littlejohn et al., 2010).

Email affords one-on-one consultation between student and lecturer. Group email or list servers can be considered the electronic equivalent of the traditional tutorial, enabling students to exchange ideas with each other and their lecturer, i.e. a one-to-many consultation. All messages are received by students registered on a particular list server and registered in the relevant course. Rohall (2002) states that email was originally designed for communication, but later developed additional functions, for example task management and personal archiving. Whittaker and Sinder (1996) also suggest that email has led to the emergence of online communities by supporting asynchronous communication. The next section provides a discussion on the most prominent issues surrounding the use of email.

2.4.4.1.3.1 Issues with Email

The nature of email as an asynchronous tool implies that there is a time delay between the request and provision of online support. A lecturer may delay responding to a question from their students because a careful reply is necessary which takes more time than is available. Email was primarily designed as a

communication tool, but according to Bellotti et al., (2003), an increasing body of literature points to the importance of email as a task management resource.

Lecturers may become frustrated with email, as they may become overwhelmed with the volume, loss of data, or the demands to reply within a certain timeframe (Rohall, 2002). This may affect the speed of delivering student support, and may therefore affect a students learning experience. Rohall (2002) also states that there is no individual feature of an email system that will solve all the users' problems that they encounter. He adds that email should be as individual as the user is. According to Sims et al., (2002), evaluation ispositioned at the end of the instructional development cycle. It is clear that much attention is placed on firstly whether or not the creative effort achieved the original product goals and secondly whether or not the desired learning outcomes were achieved. Feedback through email is therefore a critical learning activity. Mock (2001), suggests that problems are difficult to explore until a prototype exists to elicit student feedback. Email group discussions can serve a learning purpose but they are not the best method to use for asynchronous communication. The main reason for this is that they do not lend themselves well to threading. Threaded discussion is much better for following topic based discussions and following the thread of the conversation. Mock (2001) addresses two main problems with the use of email, as a supportive tool:

1. Managing the inbox by automatically classifying email based on user folders.
2. Searching and retrieval functions by providing a list of email relevant to the selected item.

As highlighted by Wilkinson and Buboltz (1998), research on the use of e-mail is mainly focused on its affordance as an instructional tool. As Monk (2001) suggests, perhaps we should explore what e-mail offers as a supportive tool.

2.4.4.1.4 Discussion Boards

A discussion board is a Web-based forum where people interact by holding text-based discussions on specific topics, whereby each posting is an individual contribution to the topic. According to Harman and Koohang (2005), discussion boards are used as they were during the infancy of the Internet. A discussion board is referred to as 'reader centred' or focusing upon the user of information as opposed to the creator of information (Hauben, 1996).

Web-based discussion forums go by many names including discussion boards, bulletin boards, threaded discussions, and Web conferences. Discussion forums are not real-time and do not require that participants are online simultaneously. Discussions allow people to contribute at their own convenience and read through everyone's postings all at once (Kay, 2006). Discussion boards are primarily used as a forum to conveniently communicate with members of a group or an online community and to seek assistance and support from that group or online community, which is archival in nature (Hauben, 1996; Slaton, 2001; King, 2001; Nicholson & Bond, 2003; Harman and Koohang, 2005). Postings tend to be longer and more thoughtful than those in live chats. It is relatively easier to jump into the middle of a discussion and 'pick up the thread' than it is with a live chat.

Discussion boards are different to e-mail in that they use an organising principle called threads, which is a discussion on a single topic, i.e. the original message plus the related replies. Threads make it easier to follow the discussion. This may be

described as a 'one-to-many' type of conference (Berge, 1997). Non-threaded discussions put all the messages in an unstructured presentation, so that students must figure out for themselves which replies go with which messages. Neither threaded nor non-threaded discussions are in real time but students can read and add to them at their own convenience. A group discussion provides a great deal of opportunity for learning and student debate, exchange ideas, compare research, or answer questions (Fein and Logan, 2003). Farmer (2004), states that the discussion board is the ubiquitous communication tool within the e-learning environments and hence significantly shapes the kind of communication that takes place amongst students. Students should quickly realise that it is in their best interest to select important and multidimensional issues to discuss (Pelz, 2004).

Northover (2002), suggests that the lecturer is a key ingredient in the success or failure of online discussion. Lecturers should be part of discussion within an e-learning environment to raise the level of the discussion by enhancing their enthusiasm, providing rewards, promoting encouragement and support of discussions held within a forum. For example, one method to raise the level of discussion may include monitoring the students taking part in the discussion in order to track the development of a discussion. According to Pelz (2004), student led discussions are a major learning activity in most online courses, and explains that these discussions provide a great opportunity for students to present important information that constitutes formal study in the discipline. The online discussions that develops within VLEs, are categorised and displayed on multiple sub-discussion boards, that may be called 'branches', 'topics' or 'rooms' (Berge, 1997).

One of the advantages of using discussion boards, as a medium of asynchronous learning, is to allow the student participating within a wide range of discussions, offer time to reflect on their response, and possibly carry out extra research on the topic to support their argument. Pelz (2004) documents that students learn to ask thought-provoking questions which address the most significant questions presented in textbooks, and that the student discussion may be focused or far-reaching, depending on lecturers' guidance and feedback. According to Harman and Koohand (2005), it is shown that conceptualising discussion boards as learning objects would represent a paradigm shift in learning with many potential benefits for theory and uses in e-learning.

2.4.4.1.4.1 Issues with Discussion Boards

There are several issues regarding the use of discussion boards within e-learning activities. Kay (2006), states that the use of online discussion boards has grown extensively in the past five years although the use of this tool in an effective and meaningful way is minimal at best. Some discussion boards are limited to their current environment and do not provide additional services, for example, provide email, messaging or syndicated updates to users. Many online discussions are unable to be forwarded to users email accounts (Farmer 2004). Students must also frequently log-in to view discussion progress, and regularly monitor discussions.

Pelz (2004) discusses that academic authenticity and integrity of student postings must be both accurate and comprehensive, which places more pressures during online debates. According to Northover (2002), the overall effectiveness of online discussion boards is largely dependent on their planning and implementation, i.e. learning instructions. Discussion boards can vary immensely in the kind of

communication they can successfully facilitate (Farmer, 2004). The actual 'quality' of the message is researched under numerous topics, for example; the tone, grammar, number of words, reasoning, level of controversy, and content. Kay (2006) declares that part of the problem with discussion boards is acquiring more reliable and useful information. Issues may take several exchanges to be resolved, or lecturers may require the responses of multiple students in order to collate opinion. Northover (2002), states that as with any learning theory, the concept of alignment is very important, i.e. does the activity clearly align with the intended learning outcomes, and does the assessment criteria support the learning outcomes as defined in the activity through discussion tool.

While assessment opportunities within discussion boards are infinite and varied, the actual procedure is problematic (Clarke, 2003). Plagiarism is the major obstacle to any assessment strategy, and may question the students' contributions to discussion boards. Departments must design assessment techniques that deter students from copying or from sharing the answers with other students, which may be accomplished by making multiple tests available, testing in real time, setting time limits for beginning and completing tests to determine student contribution (Clarke, 2003).

2.4.4.1.5 Weblogs

Tosh and Werdmuller (2004) define a weblog as *"...any web page with content organised according to date"*. Over the last decade there was a shift in technology due to the demand of easy Web page publishing. Farmer (2004) reports that this is evident as Weblogs adopted a diary-like method which allows users to update Weblogs in accordance to their daily lives and networks which were wholly social.

In the academic and professional domain the personal nature of Weblogs is instrumental in the evolution of Weblogs which reported to use personal online research and facilitated as a knowledge management tools or electronic portfolio (Paquet 2002; Fielder 2003). An electronic portfolio, also known as an e-portfolio or digital portfolio, is defined as (Tosh and Werdmuller, 2004):

> *"...a Web-based information management system that uses electronic media and services. The learner builds and maintains a digital repository of artefacts, which they can use to demonstrate competence and reflect on their learning."*

Blood (2000), states that Weblogs are primarily a tool for 'updating websites' which contained links to websites of interest to the author. The name is seen by some to be reflective of their initial purpose of recording, storing of material of interest to the user (Paquet, 2002). Weblogs provide an easy mechanism for publishing and also caters for adding individual voice to discussion over the Internet. Weblogs became more conversational, like discussion boards with time stamps. Marlow (2004) explains that the Weblog, while fundamentally an innovation in personal publishing, has evolved as a tool for a wider audience which encouraged a new form of social interaction on the Web. This facilitates a massively distributed but completely connected conversation covering every imaginable topic of interest. Weblogs bridge across numerous topics discussed on the Web which lead to activities such as publishing and discussions, but have also moved from a centralised to a distributed publishing model (Wegner et al., 2002). Since Weblogs made publication more effortless, this resulted in a huge increase in published content resulting in such a vast amount of information distributed by many people around the world (Nanno et

al., 2004). This '*information overload*', invited the development of Really Simple Syndication (RSS), which allowed individuals to subscribe to a group of Weblogs (Wegner, et al. 2002) and filter information that is of interest to them.

According to Farmer (2004), Weblogs offer new opportunities in the development of social, cognitive and teacher presence online. This should be considered in the development or alongside established e-learning environments within the IoTs. Farmer (2004) continues by listing the functionality that allows for social, cognitive and lecturer presence and generally allows users to:

1. Frequently add to their Weblog through simple Web publishing technology
2. Publish items uniquely by time and date of publishing
3. Attach to items the facility for comments to be added and for postings elsewhere that have linked to that item to be tracked back
4. Publish a Web feed such as RSS with each new posting.

Weblogs provide many advantages when implemented within an e-learning environment, however there are also a number of issues reported within literature.

2.4.4.1.5.1 Issues with Weblogs

Several issues are identified by Herring et al., (2004), with using Weblogs. One issue is the lack of categorisation within Weblog topics. If content is not categorised into specific topics it can be extremely difficult to sift through the content which may jeopardise the quality of user-generated content. Another issue is the lack of a standardised format to submit posts resulting in inconsistent contributions across Weblogs. A further issue is the lack of bibliography to support online content posted

within Weblogs. After posting on a Weblog, users are unable to edit the original post after a certain timeframe. Another issue raised by Herring et al., (2004) is the lack of an option to view content in reverse-chronological order, to view newest postings first. The next section examines how these tools provide online support within an e-learning environment.

2.4.5 Student Online Support

The availability of flexible learning resources has led to increased use of flexible supportive methods. Monari (2005) explains that nowadays the main issue is not the lack of technology to support certain activities, but the risk of focusing too much on the technology. This may result in not paying enough attention to its impact on the learning process, students' experience, and the usage of learning technologies. The main levels of interaction for support may be categorised as one-to-one, one-to-any, or face-to-face. One-to-one allows for direct interaction between the student and the lecturer, typically via telephone or email to avail of support, for example, on course material, exams or assignments. Carswell et al., (2000) explain that most lectures assign specific hours during the week in which they are available, although students may seek timely support at a crucial moment. This often results in learning delays (which contradicts the 'just-in-time' e-learning philosophy) and student frustrations.

Pelz (2004), states that students' supporting one another to learn is an effective strategy and works well in problem solving or lab activities. In the IoT context, delivery of online student support is changing the form of many interactions, increasing the frequency of student peer communication, and student to lecturer contact, but not necessarily challenging the traditional concept of student support itself. The standard of delivering an e-learning course remains unclear since there is

currently no nationally agreed method, guidelines, or support for IoT (i.e. best in practice). The HEI are beginning to identify that this needs to be addressed and begun to develop communities of practice that explore issues arising from e-learning, for example, the National Digital Learning Repository (NDLR). Regarding online support, it is assumed that lecturers must set aside sufficient time to interact with students and support them by answering questions, and solving student problems within a VLE (Simonson, 1997; Jorgenson, 2003; Clarke et al., 2004). Peak (2004), states that each e-learning system requires instructional designers to spend a significant amount of time to plan and design course content to meet students needs. Lecturers provide Web access to a database of e-learning tutorial material, and in many cases, provide a section on frequently-asked-question to address student queries (Carswell et al., 2000). According to Carswell et al., (2000), educators adopt the use of technology (for example, the Internet) in the hope of solving many of their problems and as an economical solution teaching solution to address increased learning demands. The following sections offer a discussion on the efficiencies and effectiveness of online asynchronous support.

2.4.5.1 Efficiency of Online Asynchronous Support

Efficiency refers to productivity measured by the quality and amount of output against the resources input. Efficiency may be established through an evaluation process of utilised resource within an e-learning environment. Examples of these resources include time, capital, equipment, software and learning material. Within VLE, the actual time spent by a lecturer in providing online support, can be compared with that in a traditional classroom environment (Tattersall et al., 2006). The calculation of time taken to conduct an online course effectively while providing additional online support can reveal the level of efficiency within a course. If the

delivery of the online support requires additional hours of the lecturers' time, there is evidently an efficiency problem. The prime resource that makes lecturers feel uncomfortable with online support is the apparent continual time commitment (Tattersall et al., 2006; Alexander, 2001; Jones, 1999). Time consumption is a major concern in relation to online support. Students may not be able to call their lecturer on the telephone or meet them for a face-to-face discussion with a problem that a student may have. However, they can asynchronously make contact with the lecturer, for example, via email or discussion forums at anytime from anywhere (Kay, 2006). The speed of feedback and support can heavily influence a students learning experience.

A successful online management model must recognise the legitimacy of efficiency, for example, the time resource (Donnelley and O'Rourke, 2007). E-learning systems allow students to overcome time constraints and to assist them in a self-paced and self-directed learning environment. This facilitates reflection, group interaction, and time to build on other subject matters. Information technology allows for a wide-ranging learning experience, thus offering the student support is an extremely important ingredient towards student success within the IoTs.

An efficient course model must aim to achieve the economic utilisation of a reasonable amount of faculty time to offer its students appropriate online support (Rowley, 2000). One problem lecturers may face is to determine how to address students' queries or concerns efficiently. Due to the affordances of e-learning technologies, support should be available to all participating students. Cooze (1991) suggests that there are "obvious difficulties inherent in the measurements of efficiency with regard to the multitude of factors that disrupt student successes". He

adds that there is a lack of knowledge about the production function of education, i.e. an understanding or method to measure college inputs and outputs. Rather than focus on how to produce more effective and efficient lecturing, colleges must also focus on how to produce more effective student learning (Meŝko, 2007).

2.4.5.2 Effectiveness of Online Asynchronous Support

Effectiveness of online asynchronous tools must be adequate to obtain significant support to produce the intended or expected educational result for students. According to Marshall (2006), one of the reasons why uncertainty remains over the effectiveness of e-learning and its impact on student learning outcomes is that the body of research supporting e-learning is weak and subject to methodological flaws. This is largely due to the continuous growth and evolution of e-learning technologies in today's information and communication society. Therefore, it is critical that lecturers keep abreast with learning technologies and tools to devise effective learning strategies. Sims et al., (2002) explains that the level of understanding lecturers, students and developers have of technologies and tools impacts on the ultimate effectiveness of e-learning environments. With the acceleration of innovative learning methods, students may have overcome the time and geographical constraints. However, e-learning developments also challenges effectiveness by placing additional pressure and responsibility on lecturers to support student activities at unscheduled periods of time which ultimately impacts the effectiveness of students learning experience. Assessing the effectiveness of intervention in asynchronous support tools is problematic. Lecturers must provide clear course objectives in terms of student understanding, analytical reasoning, student beliefs and attitudes, and communication skills. Accessing effectiveness also requires creating strategies for assessing the extent to which course goals have or have not been

achieved. Northover (2002) argues that with the increasing use of computer-mediated communication systems, the effectiveness of learning tools must be monitored and maximised. Moore et al., (1989) cites numerous studies from the mid 1960's through the late 1980's. These studies rate the effectiveness of distance correspondence and television-based courses as being as or more effective than traditional classroom courses. Muirhead (1999) and Motamedi (2001) were influenced by Moore's research. Their research indicates that students who participate in VLEs also perform as well or better than students in a traditional classroom. However, several factors determine why learning may not be effective while using asynchronous tools. For example, some students feel isolated by the lack of face-to-face interaction with lecturers and peers (Buckley, 2003; Simonson, 1997). Another ineffective factor which contributes to student failure is the inability to use the technology necessary to complete the course. In some cases, the lack of technological ability is a major contributor towards ineffective learning, and why students drop out of the e-learning experience due to frustration with the method of learning and the slow supportive response from lecturers. The next section explores the students learning environment and discusses some of the most prominent factors which influence the students learning experience.

2.5 The Student E-Learning Environment

E-learning environments have become very complex, especially with the constant (re)introduction of new technologies and tools to facilitate learning which continues to alter the learning environment. It is evident that there is an increase in the uptake of e-learning across HE and as a result it has become less apparent as to the impact of e-learning on the student learning experience. The literature suggests that HE has

continued to embrace e-learning technologies and tools to support students throughout the learning process. The dominant asynchronous tools described above play a pivotal role in providing online asynchronous support for learning tasks. Many studies of learner evaluation, i.e. satisfaction within an e-learning environment, are often limited to single post-class assessments of their perceptions. It would be more meaningful to explore learner satisfaction through a deeper analysis of a wide variety of critical variables to guide improvements in e-learning course design (Johnson et al., 1999) as they engage in learning tasks. E-learning plays a significant factor on several aspects of the students learning experience, including; supporting learning tasks, expectations of e-learning (students and lecturers), learner satisfaction, greater demands on lecturers, intrusive nature of learning technologies and tools, group learning activities, quality of e-learning, e-learning structure and design, student attitudes towards e-learning, and the speed of feedback. The next section presents a discussion on these factors with regard to the effects on the students learning experience.

2.5.1 Supporting Learning Tasks

Thorpe (2002) defines learner support as "…all those elements capable of responding to a known learner or group of learners, before, during, and after the learning process." The delivery of support can facilitate e-learning by making course content available anytime-anywhere (Israel and Aiken, 2007). Asynchronous support plays an important role to support learning tasks, but it is not as yet fully responsive to individual students and their learning actions. Carswell et al., (2000) suggest that e-learning tools rely on encompassing a number of factors, including, a culture of supported learning. Other factors include the integration of technology with administrative infrastructure and teaching practice. In addition, Carswell et al.,

(2000) explains that a successful supportive strategy must transform certain practices to provide needed functions, rather than 'superficial translation of existing practices'. Student support is a dynamic process (Elial et al., 2006), in which the impact of intervention is never completely predictable. In recent years, several researchers have explored the idea of 'personalising' learner support. For example, Dolog et al., (2004) suggest that personalised support is of critical importance considering e-learning takes place in 'open and dynamic learning and information networks'.

Fisher and Scharff (1998), state that supporting self-directed learning presents a major challenge in e-learning environments for both HE and from a technological perspective. For example, Fisher and Scharff (1998) suggest that e-learning developments must explore methods to complement the learning process, such as intelligent tutoring systems, performance support systems, and on-demand learning support systems. In addition, the delivery method of educational content is of critical importance, for example, the chosen medium, speed, multimedia and support. Online delivery of support goes beyond traditional computer learning as it makes full use of the Internet and other digital technologies (Volery 2000). According to Volery (2000), and Israel and Aiken (2007) online delivery provides substantial advantages over traditional technologies, these include:

1. Collaborative tools which offer a rich, shared, virtual workspace in which interactions occur not only between an individual and technology, but also as many-to-many, interpersonal communication, among students.
2. Interactive tools such as simulations or self-administered quizzes which allows students to progress at their own pace through required exercises and self-assessments.

Fisher and Scharff (1998) suggest that a support system must comprise of the following key factors:

1. User-directed and supportive to provide learners with the choice of tasks and goals
2. Sufficiently open-ended and complex to allow students encounter some level frustrations and allow them to learn from these frustration events
3. Allow students to modify, extend e-learning features and progress within an e-learning environment by supporting a wide range of expertise
4. Promote collaboration amongst all e-learning participants

While learning and supportive technologies themselves do not guarantee progressive education, they do provide certain affordances (Laurillard, 1993). Online asynchronous support consists of providing support to students at unscheduled times. A student may request support from a lecturer in relation to course content that has been discussed in the past, within a classroom environment or within an online forum. Online asynchronous tools, such as the use of e-mail or discussion boards, allow both parties to reflect on the problem presented, (i.e. the student may reflect on the 'actual' problem in relation to the content). However, in practical terms, student motivation, attitude towards the course or lecturer, interest in solving a particular query, and the demands on lecturers to address all student queries may present barriers to student seeking and receiving support.

Thorpe et al., (2003) identifies three key factors regarding the responsiveness of learner support; *identity, interaction, and time and duration*. Thorpe et al., (2003) explain that identity is crucial as it allows students to recognise who they interact

with (i.e. peers and lecturers name) within the e-learning environment. Allowing lecturers to determine the student's identity may also influence their responses to provide supportive material and deliver it in a specific style to personalise support. For example, a fourth year student may require more information than a first year student, i.e. student support must be sensitive to students' identity and status within the course. Time and duration of online support is also a vital factor to focus on within an e-learning environment. This factor is essential in the sense that student support is about a '*value added*' process in which a lecturer must respond or act within a particular timeframe. Student support is essentially about supportive roles, structures and environments (Elial et al., 2006). When student support is available on demand at any time, from the student's perspective, such services should be continuous within e-learning environments.

Asynchronous collaborative tools are limited in that they do not guarantee interaction or support with students or lecturers (Volery, 2000), as these technologies act only as a vehicle of communication. The level of understanding that lecturers, learners and developers have of tools being used can impact on the learning outcomes (Donnelley and O' Rourke, 2007; Sims et al., 2002). Curtis and Lawson (2001), identifies the behaviours that characterise positive social interdependence within an e-learning environment. These include giving and receiving support, through the exchange of information, providing feedback, challenging and encouraging each other, and joint reflection on progress and the learning process. Sims et al., (2002) identifies four components of the evaluation process of education behaviours that characterise positive social interdependence. These include *giving and receiving help*, *impact* (did the program make a difference?), *organisational context* (how is the college affected

by the program?) and *unanticipated consequences* (what happened that was not expected?).

Govindasamy (2001) states that student support is one area of e-learning that is noticeably different from the traditional classroom delivery method. He adds that in traditional classroom instruction, student support can be addressed on a supply-and-demand basis. When a student needs performance support they communicate their needs explicitly and consequently receive the needed support. In contrast, within an e-learning environment, students must submit a request for support; for example, email a lecturer to request support. Addressing student queries on an individual basis placed huge demands on lecturers. Laurillard's (2002) introduces the conversational theory which advocates a teaching strategy based on interaction between teacher and student, not on the actions required of the student by the teacher. The conversational theory also emphasises the need for constructive and meaningful feedback. Students should be allowed to reflect as they interact with learning material (Laurillard, 1996) through the guidance of lecturers. A students' rate of access can be tracked and the information used to distinguish between high achievers, average learners, and slow learners. This information can then be used to motivate or positively reinforce weaker learners.

Student evaluation should take into account the way in which support is provided to them in; accessing auxiliary information, becoming communities of learners, availing of instructional support, receiving personalised support, and seeking security support. These are extracted from Sims et al., (2002) and articulated in table 2.3 below.

Student Support	Exploring Online Support
Auxiliary Information	How effective are the communities?
Communities of Learners	Are students encouraged through collaborative activity or discouraged due to independent flexibility?
Institutional Support Features	What expectations do lecturers have for their students?
Personalisation	How do lecturers plan to nurture students into the collaborative world of e-learning?
Security	What support personnel and resources have been identified to ensure that students will feel integral to the learning environment?

Table 2.3 Exploring Online Support (adapted from Sims et al. 2002)

There are many different functions of learning support. Table 2.4 below, outlines the different forms of support and provides a brief explanation for each. According to Romainville and Nöel (1998), providing support is closely linked both to the time of the year and the objectives of providing support.

Level of Support	Function
Preventive Support	• Available at start of academic year • Precautionary measure of skills needed to succeed in the course
Remedial Support	• Addresses shortcomings of student results • Set deadlines for students to solve problems • Sessions throughout the year for immediate feedback on academic performance
Study Skills Support	• Support students to develop skills • Raises the quantity and quality of student success • Match of education and skills for the demands within industry

Table 2.4 Levels of academic support (adapted from Romainville and Nöel, 1998)

The tools used to deliver support must be examined not only from a tangible context, but also from a theoretical view and their ability to enhance the value of e-learning through online support. The learning requirements for delivery of support have shifted in recent years mainly due to technological influence. Students have greater expectations from technology and require a faster pace of problem resolution. The iterative cycle of applying knowledge, interpreting feedback, explaining results, and revising memory provides a model for promoting learning. The students learning experience is affected by sever reasons including, motivational and cognitive issues (understand why they should learn certain topics), and e-learning environments must allow learners to take responsibility and pride in solving problems while being awarded for doing so (Fisher and Scharff, 1998).

2.5.2 The Expectations of E-learning

Hayashi and Chen (2004), explain that expectation is "the personal inherent foundation level in which confirmation is evaluated by users to determine the level of satisfaction". According to Hayashi and Chen (2004), learners may be unsatisfied if the expected benefits of a system are not realised. There are many expectations of students while undertaking an e-learning course. These include greater accessibility, reduced costs, self-pacing environment, and greater interactivity and confidence among students. The advantages outlined here made e-learning appear to be very attractive as a method of learning, thus explaining its explosive growth and interest in recent years. The literature review on e-learning technologies reveals that many of the benefits expected from e-learning are not as sophisticated as one would anticipate (for example, Kock et al. 2002; Valentine 2002; Jenkins 2004). As a result, some expectations were extinguished through numerous drawbacks of e-learning. For example, the literature indicates that there is lack of innovative learning practices (for

example Anderson, 2004b), expected knowledge and proficiency with ICT among students (Hammond, 2005). In addition, other drawbacks include, reduced social and cultural interaction (Asgarkhani, 2004), unsuitable for certain learning styles (Coleman, 1999; Coffield et al., 2004), less interactive support with learning content (Vovides et al., 2007), poor quality measures of information transmitted (Govindasamy, 2002), lack of portability (Son et al., 2004), and technological issues. According to Hayashi and Chen (2004), although the emphasis is often placed upon learning strategy and student control, the design and structure of course material and social presence may not be implemented in an asynchronous learning environment. This may contradict learner's expectations and consequently students are unsatisfied with their learning experience and affect learner's decisions to continue using the e-learning system (Hayashi and Chen, 2004). In addition, Farmer (2004) states that the focus of the literature is on instructional design and facilitation strategies for lecturers engaged in the development and provision of e-learning courses. He adds that there is little focus on the pedagogical impacts of the systems and tools within which the design and facilitation must take place. In order to appreciate the derived expectations from a supportive viewpoint, practitioners should gain a clearer understanding of the effectiveness and efficiency of online support. Fisher and Scharff, (1998), caution that the 'industrial age' learning models that are applied within a traditional learning environment are inadequate for students within an e-learning environment. They insist that technology alone will not provide the answer to address the complex e-learning challenges.

2.5.3 Student E-learning Experience

Eastmond (1995) explains that a students' learning experience and exposure to technologies is important for students to adjust to e-learning. Learner satisfaction is

found to be a critical component in the effectiveness of e-learning systems. Thus, the effectiveness of e-learning is largely a result of the learner's experiences (Chute et al., 1999). Ó Fathaigh (2002), list a number of factors such that impact students satisfaction such as; 'negative experiences of education, under developed aptitudes, non-availability of opportunity; feelings of exclusion; low income and socio-economic status'. Ó Fathaigh (2002), cautions that these factors may be intensify by new technology-based factors. E-learning offers opportunities to both extend and enrich the student learning experience through the exploration and application of information and virtual environments. Students learning abilities and experience are often examined through the use of assessment. Assessment criteria for determining success include exams, papers, tutorials, homework, and authentic assessment. Assessment of student leaning is a key component of the evaluation of both e-learning's success and a student's successful learning experience. According to Jenkins (2004):

> *"Assessment is one of the most powerful drivers of innovation and change in education, as it defines the goals for both learners and teachers."*

Several factors influence student success. These include, student's attitude, course structure and organisation, lecturers' teaching abilities, learning support, instructional design, and whether or not the student have the skills to successfully complete the course (Motamedi, 2001; Rinear, 2003).

Al-Kodmany et al., (1999) reports on a case study using *Asynchronous Learning Networks* (ALNs) to examine students' e-learning experiences on two different

campuses. The research discovered that without prior exposure to the learning tools, the tools used in the course became barriers to learning as students became frustrated with operating them. One of their suggestions is that lecturers should not assume that students have a good knowledge of the learning tools. They suggested that students should be also taught to use the tools and learn the course material at the same time. Al-Kodmany et al., (1999) suggest that lecturers should impose certain prerequisites on technologies that are used in the course or some provide an induction on the learning tools and technologies. The successful implementation of any new technology depends on factors related to users' attitudes and opinions. For example, Webster and Hackley (1997) report on teaching effectiveness in technology mediated learning. They found a positive relationship between students' attitudes toward technology and their learning outcomes. Therefore, being accustomed to e-learning tools and knowing how to use them is a key to enhance the success of online learning outcomes.

Zvacek (2007) raises a significant question about the field of e-learning: '*why should we take on these new roles if we are comfortable with the old ones?*' Students' roles are changing within e-learning environments compared to traditional learning environments. Students adopt a more self-constructionist role rather than a passive role within e-learning. This is largely because students' need to become more 'involved' within their experience in education, rather than just being the recipient of facts and trying to relay these facts within an exam situation (Beaudoin, 1990). Zvacek (2007) states that considering the role change within e-learning, lecturers can only provide the resources, design the activities, and guide students in a way that moves them toward a desirable goal. This allows students to accept responsibility for

their part of the processes. One must question whether technology is bringing about change in learning or whether learning is causing change in technology.

The student's level of satisfaction with the learning media and processes within the learning environment, impacts upon the learners' motivation to participate in future e-learning courses (for example, see Kozma, 1994; Clark, 1994; Hampel, 2006). Moreover, since student satisfaction is a major factor of successful learning, careful analysis of the different aspects of learner satisfaction is an important component of evaluating e-learning courses (Chute et al., 1999). Zvacek (2007) explains that there is a reason after all that this field is known as e-learning, and not e-teaching.

According to Garrison and Anderson (2003), HE is being challenged to find ways to operate more effectively and efficiently. An efficient course model must achieve the economic utilisation of a rational amount of department time to offer its students sufficient support. Within an Irish context, there is little research on the effects of students' efforts, experience, and tool and technology usage within an e-learning environment and its effects on student performance. An online management model must recognise the legitimacy of efficiency, based on realistic input and output measures. The lack of efficiency will eventually risk the maintainability of effectiveness (Han, 1999), and may impact on the evolvement of e-learning within HE. The effectiveness and efficiency in educational technologies comes down to how the tools are used, and how lecturers are facilitated in adapting their learning methods to emerging tools to achieve the learning objectives. Tait (2000), reports that there are two principle factors of 'change' dominating the re-engineering of e-learning. First we are moving from a print based learning environment to a more virtual online learning environment. Tait (2000) adds that the second factor of

change and closely related to the ICT revolution can be termed the *marketisation of education*. Tait (2000) explains that the student within the e-learning environment, as in other educational fields, is being labelled as the customer. Student perception with regard their learning experience may offer us more insight into the effectiveness and efficiency of e-learning.

Similar to a traditional learning environment, assessments are also considered an effective method to evaluate the effectiveness of students' e-learning experience. According to Rowntree (1987), assessment in education can be thought of as occurring whenever:

> *"...one person, in some kind of interaction, direct or indirect, with another, is conscious of obtaining and interpreting information about the knowledge and understanding, or abilities and attitudes of that other person."*

Assessments are an excellent method to evaluate student performance and explore the quality of e-learning to achieve its desired outcome (Sims et al., 2002). Support activities include testing of core knowledge and skills in a particular subject, study skills adapted to course content and revision sessions on specific learning points (Romainville and Nöel, 1998). Educational value may be measured in terms of a student grading system. A grading system is a method to determine how effective a student's learning performance is. This measurement also reflects the effectiveness of the lecturing methods being presented to the participating students. Feedback is a very important part of the learning environment and the online assessment process is an important activity in e-learning. Feedback should always be constructive, supportive and appropriate for the right audience (Alessi and Trollip, 1991).

Knowledge of results is important for students to gauge their performance within an educational environment and is considered the life blood of learning (Rowntree, 1987). Effective feedback allows the student to identify their strengths or weaknesses, and should demonstrate how to improve any weakness or how to build on their strengths.

Sims et al., (2002) presents a discussion on how to best deploy assessments within an e-learning environment, and the form of authentication that should be installed to verify the electronic submission of assignments or completion of remote examinations.

Method of Assessment	Evaluation
Assignments	To what extent do assessment items conform to 'old standards' and what workload impact does this have on the lecturer?
Examinations	Are examinations required, such as for professional accreditation, or are other performance indicators sufficient?
Project Work	What options are available for assessment through projects, and which of the participants is responsible for defining completion?
Work Placement	Can performance in the workplace fulfil the learning objectives?
Authentication	Is there concern about the integrity of assessment submission, or are there other formats that might preclude this operation?

Table 2.5 Methods of online assessments available (Sims et al., 2002)

As outlined in table 2.5 above, the method of assessing students is critical. The 'peer directed' options provides a means for groups to determine and assess the learning output whereas the 'student directed' option provides for individuals to define and pursue specific learning outcomes. However, McNamara et al., (1991) suggest that

students are weak in areas of critical thinking and problem solving within the educational environment. Students tend to recite learning content as facts within exam situations (McNamara et al., 1991) creating a 'just-in-case' learning environment. Rowe (2004) and Baker et al., (2008), raise the issue of security like plagiarism in online assessment. It is difficult to get students to participate in online assessments simultaneously. Some e-learning platforms allow students to re-take assessments on numerous occasions, which is considered to be unfair by some students. Another issue raised by Rowe (2004) is a lecturers' inability to determine whether there is any unauthorised assistance during the assessment. This may take place through the use of e-mail, discussion boards, or by having another person physically present with the student, if the assessment is unsupervised outside the college campus.

Although e-learning presents several advantages towards the extension of the concept of learning, there are many issues identified and expanded below which warrant further exploration. Ó Fathaigh (2002) explains that there are several differences and extensive imbalances in relation to "attitudes, technology use, ICT training, and satisfaction with the Internet may distort access to, participation in, and use of e learning". As a research area, e-learning is both multi-disciplinary and inter-disciplinary (for example, Salmon, 2005). Salmon (2005) discusses how e-learning covers a vast range of research topics and strategies, ranging from those that focus on technologies through to wider socio-technical research questions. E-learning literature also addresses issues concerned with the impact of technologies on learning and lecturing, and more importantly, the quality of students learning experience. Internet-based teaching supports third level institutions ability to accommodate more

system more frequently which will improve performance (i.e. satisfaction and learning outcomes are typically positively correlated). Wang (2003) suggests that it would be useful to adopt traditional methods to evaluate student satisfaction with instruction, the instructor, teaching methods, and e-learning effectiveness. According to Webster and Hackley (1997), learner satisfaction and learning outcomes are the two most commonly used indicators of course effectiveness, especially in e-learning studies. Learner's satisfaction within an e-learning environment is influenced by prior experience and which explain 'key post-learning behaviours', such as complaining, word of mouth, and reuse intention (Wang, 2003). Student learning satisfaction relates to perceptions of being able to succeed and their perceived levels of satisfaction in achieving the learning outcomes (Keller, 1983). Ó Fathaigh (2002), discusses how ease of access to e-learning has often been cited as a critical factor which influences learner satisfaction, although there are concerns over how it compares in terms of access "to the broader range of elements and experiences that constitute a 'complete' educational experience". In addition, Wang (2003) reports that learners with high levels of satisfaction are "expected to have higher levels of reuse intention and make less complaints" (p. 77). Student satisfaction is also a critical factor regarding the success of an e-learning programme. Wang (2003), suggests that e-learner satisfaction is defined as "a summary affective response of varying intensity that follows asynchronous e-learning activities, and is stimulated by several focal aspects, such as content, user interface, learning community, customisation, and learning performance" (p. 77). Chang (2004), states that there are three expectations concerning student's satisfaction within an e-learning environment. These are; firstly a timely response time with prompt feedback (a main expectation of students). The second factor is sufficient supportiveness, i.e. a

lecturers' availability to satisfactorily answer student queries. The third factor is to develop a comfortable relationship between the student and the lecturers. Ó Fathaigh (2002), cautions that the access issue often focus on e-learning opportunities to meet the educational needs while overlooking leaner's informational needs. However, within an Irish context, there appears to be few studies carried out, to evaluate student satisfaction rates within e-learning environments.

2.5.3.1.2 Greater Demands on Lecturers

The use of ICTs in the delivery of education has major implications for lecturers, students and the IoTs at large. Whilst there is potential for major benefits for all concerned, ICTs also challenges providers to develop new strategies for delivering learning content. This is mainly because e-learning is evolving and in a state of constant change (Phipps, 1999; Conole et al., 2000; Mitchel, 2000; Taylor, 2001; Conole et al., 2004). As e-learning tools evolve, there is expectancy that students are knowledgeable and proficient with the tools within the VLE.

From a lecturer's perspective, the expectancy of on-demand support presents many problems, and directly impacts on the students learning experience. Within a traditional learning environment, students can question lecturers to reduce uncertainty on certain topics, within a specific timeframe. Within an e-learning environment student can request support at unscheduled times, placing greater demands on lecturers. Chang (2004), identifies that students have expressed the feeling of 'psychological distance' (space and time distance between lecturers and peers) and experienced technological problems (unfamiliar with learning technologies) as some of the major barriers within e-learning. Chang (2004) explains that this reduces student's motivation to participate in online learning activities, for

example to discuss ideas and seek additional assistance. Students often lack the necessary skills to overcome technical difficulties although lecturers often take this for granted (Chang, 2004). There is little research to report students experience with these greater demands within an e-learning environment.

2.5.3.1.3 Intrusive Nature of E-learning Technologies and Tools

Carswell et al., (2000) suggest that although lecturers explore the promises of e-learning tools, we must ask "whether technology's effect on the learning it is meant to support is constructive, rather than obstructive". E-learning tools and technologies allow students of diverse backgrounds to participate within the same learning course. Students have increased interaction with other peers, experts, or sources of information, regardless of their physical location. An e-learning platform has increasingly more tools at its disposal to encourage students' participation, motivation, and interaction through various approaches. The lecturer plays a central role in the value chain of producing effective online support through these Web tools. The medium of communication does influence the students' interaction (Curtis et al., 2001). Gilbert et al., (2007) examine students learning experience and identify several key factors which have little research attention. These include:

1. Students engage with the learning material in different sequences and the best designed e-learning environments should meet these needs.

2. Students typically download and/or print learning material which means that students can avoid participating in collaborative tasks.

3. Students welcome discussion forums as a method of online support but they are reluctant to be the first contributor and in some cases are unconfident to interact with other students.

4. Students often report to be unsure as to the lecturers role within the e-learning environment and often expect that lectures adopt a similar role to that of a traditional learning environment.

The availability of learning tools and content, assumes that students are available to participate in learning tasks anytime and anywhere. However, Monari (2005), states that since there is a great abundance of different e-learning platforms and systems, it proves to be more difficult to find or use the right learning tool. Curtis et al., (2001) and Israel and Aiken (2007) explains that a student's familiarity with the medium and the ease of use of the interface are very important factors. If IoTs are to exploit the use of e-learning tools, it is essential to identify and understand the critical success factors affecting the online delivery of support.

According to Garrison and Anderson (2003), it is difficult to discuss or analyse a tool outside the way in which it is applied and appreciate that instructional technology. When students communicate asynchronously in computer-supported collaborative learning environments, divergences from face-to-face social interaction may also influence the learning process of increased collaboration (Ellis, 2001). However, asynchronous communication may obscure the completion of some collaborative tasks which require input of all group members and/or from the lecturer. Students expect faster methods of communication and feedback which places additional pressures on lecturers and peers.

2.5.3.1.4 Group Learning Activities

Interaction and discussion are encouraged within an e-learning environment as lecturers see implicit benefits in student-student interaction and peer group assessment (Carswell et al., 2000). Interaction with the course content not only

requires that students complete assignments, but that they have also the technological skills required to successfully complete the assignment (Fein and Logan, 2003). During specific learning tasks, the process of choosing group members for specific learning activities may be problematic (Curtis and Lawson, 2001). For example, groups may have difficulties making decisions online and taking responsibility for adding value to certain learning activities. This also impacts on factors such as students' time and quality of student contribution. Groups also take longer to reach agreements within e-learning platforms rather than in a face-to-face discussion. Groups communicating online tend to take more unconventional and riskier decisions than they in face-to-face discussion. According to Peak (2004), in order to gain the greatest benefit from group discussion, students should ensure that their contribution is a valid and researched. Failing to do so compromises the quality of e-learning. However, there is still huge debate regarding what might constitute as a quality learning experience. Students may have difficulties negotiating online which may lead to frustration by heightened emotional expression.

2.5.3.1.5 Quality of Information in e-Learning

Learning quality can be defined in terms of process quality and structural quality. According to Teare (1998), if students adopt a proactive (rather than reactive) approach to e-learning it is possible to have an outcome of 'added value' information while enriching the learning process by exploiting the Web. He adds that at best, this approach enables learners to travel from the 'questioning' to the 'programmed knowledge' and back again via a cycle that involves capturing and disseminating real time knowledge using ICT. In essence, e-learning is about improving and extending the quality of learning through the use of interactive technologies (communication, conferencing and collaborative tools). It is an attempt to extend educational sources

in ways that other traditional teaching methods cannot equal (Clarke, 2003). Group discussion facilitates and improves the quality of e-learning (Peak, 2004; Lorenzetti, 2002).

2.5.3.1.6 E-learning Structure and Design

Instructional structure and design for e-learning should enhance learning and the students learning experience by foreseeing and addressing the obstacles that students may face. Melton (2003), reports that these issues may be categorised as follows: learning, social and technical issues within e-learning. Students must be made aware of the obstacles they will face upon entering a VLE. Another obstacle within VLEs is time, i.e. lecturers must provide quick and satisfactory response to student questions. It is very important that lecturers address students problems, calm students fears, and clarify instructions for them when required. This is important as lecturers cannot see how students react to assignments or instruction within VLEs. In addition to lecturer support, students are encouraged to work together to solve problems, answer questions, or comment on each other's work within the VLE (Clarke et al., 2004). Carswell et al., (2000) reports that it is most common to discover that lecturers are simply converting their notes into Hypertext Mark-up Language (HTML) for the Web although there is little support provided. In doing so, lecturer begin to treat e-learning as a data repository.

It is therefore crucial that new pedagogies for e-learning are designed, developed, implemented and tested within our IoTs in order to direct quality e-learning environments. E-learning developers and indeed lecturers must be resourceful with these new digital environments, designing and researching with learning and lecturing ideas. Research reveals that although e-learning is elevated on a pedestal of

technological promise to enhance education, the majority of educational software often under-exploits the opportunities offered by the technology (Clarke, 2003). Many facilitators are beginning to 'experiment' with its possibilities. Research indicates that there are large technological potential to enhance educational support. However, enforcing certain learning practices can prove to be a challenge. It is difficult to measure the effectiveness of e-learning design and structure methods practiced within HE.

2.5.3.1.7 Student Attitudes

Students experience and attitudes are mainly influenced through the introductory phase of e-learning. Students differ in skills and attitudes within the process of learning and implementing sufficient support is critical at this stage. Exploring student attitudes towards e-learning can provide us with more insight in the students learning experience. Pelz (2004), states that a common finding in learning activities is that students do most of the work. He continues by explaining that the role of the lecturer is limited in providing the necessary structure and directions, supportive and corrective feedback, and to provide a final evaluation of the final product, i.e. the learning outcome or grade. Ally (2004), reports that it is the instructional strategy and not the technology which influences the quality of learning and support which impacts on learners' attitudes. Kozma (1994) argues that attributes of a computer are required to bring 'real-life models and simulation' to the learner. Therefore the medium does have an influence on learning and the learner is supported through the e-learning technology. E-learning technologies allow students to interact with each other in synchronous and asynchronous ways, and can therefore constitute a good support for collaborative learning activities (Monari, 2005). Student acceptance of e-learning relies on several factors. Many students value the peer presence discussion

(Simonson, 1997). The learning tools also impact on the students' e-learning attitudes. However, although there is an increase in the demand for e-learning modules, there is little known about students learning attitudes towards online support.

2.5.3.1.8 Speed of Feedback

Asynchronous tools offer many affordances, for example, the development of higher order learning, critical thought, and more importantly, feedback of student contribution. This is achieved through reflective and collaborative activities and through assessments using online tools such as email, discussion boards and online assessments. Feedback in e-learning is crucial to learning. However, feedback is not a constant occurrence (Clarke et al., 2004). This poses the question of whether asynchronous tools are exploited to support students, or rejected as a tool of interference on lectures time, within an e-learning environment. Nowadays, students expect faster interaction with lecturers and peers. Considering the method of communication is at users own preference and at their desired pace, this also raises concern of the speed in which feedback and support is received. Guess (2007) explains that as new methods of interaction with information are becoming more ubiquitous, students will have different expectations and perceptions for acquiring knowledge and skills. Learning is not one single method and may require students to interact with numerous technologies. Some students may feel uncomfortable or incapable with operating some learning technologies and methods. Therefore, some methods available for students to receive feedback may also be an issue. When faced with a more complex learning environment (e.g. subjects with varying cultural and educational backgrounds, IT skills, cognitive ability, and learning platforms), control, interaction, and other factors may have more influential impacts than social

presence factors on the learning outcomes (Hayashi and Chen, 2004). This study also explores issues experienced by students with regard the level of feedback within the learning process.

2.6 Summary and Conclusion

> *"The biggest growth in the Internet, and the area that will prove to be one of the biggest agents of change, will be in e-Learning... Education over the internet is so big it's going to make e-mail look like a rounding error"*
>
> (John T. Chambers, CEO, Cisco Systems, 1999)

In this chapter the researcher has presented a discussion on learning theories and e-learning technologies and tools. This chapter also discusses the phenomenal uptake of e-learning and presents the dominant issues which surround e-learning. Certainly lecturing in an e-learning environment is influenced by the absence of the non-verbal communication that occurs in the face-to-face settings of conventional education, and the reduction in the amount of paralinguistic information transmitted. The literature suggests that e-learning is not pedagogically supported or theoretically led within HE, and there is a lack of research to report on the effects of this. Consequently, this has a significant bearing on the students learning experience. Greater importance is placed on e-learning technologies and tools to connect e-learning participants and lecturers to facilitate the delivery of e-learning content. Castell's (1998 - p. 379) quote on theory and research sums up this chapter by a fitting quotation, as follows:

> *"Theory and research...should be considered as a means for understanding our world, and should be judged exclusively on their accuracy, rigour, and relevance. How these tools are used, and for what purpose, should be the exclusive prerogative of social actors themselves, in specific social contexts, and on behalf of their values*

and interests".

The fundamental challenge presented within this literature review is the need to evaluate the current use of online asynchronous support, available to students within the IoTs and report on the students' perceived learning experience.

CHAPTER 3

RESEARCH METHODOLOGY

"The important thing is not to stop questioning"
-Albert Einstein

3.1 Introduction

This section of the thesis is aimed at developing a research plan, methodology and design appropriate to the research community and to achieve the research objectives. Following a presentation of the research objectives, a research design will be discussed based on a review of the literature. It will also position the research within the most appropriate research idioms. In addition, ethical issues will be considered in light of the research objectives and the implementation of the research plan.

3.2 The Objectives of the Research

The primary objective of this research is as follows:

- To explore students' profile, usage, and perception of their learning experience while requesting online asynchronous support throughout an e-learning course.

The literature review identifies (section 2.4 and section 2.5) a number of areas which focus the objectives as follows:

- To explore what are the main learning tasks for which students use asynchronous tools.

- To examine whether student feel e-learning can replace face-to-face meetings with lecturers.
- To explore whether student perceive online asynchronous tools are intrusive and whether this impacts their perceived level of satisfaction.
- To explore students perception on individual and group learning tasks.
- To examine how students access and gather learning material online.
- To gain an understanding of how student perceive e-learning courses are managed and supported.
- To examine how student plan learning activities online using asynchronous tools.
- To explore online support and students satisfaction with various forms of asynchronous support.

As stated in chapter 1, to realise these objective, the secondary objectives are used to support this quest:

1. To develop a profile (average age, discipline of study, etc.) of students undertaking e-learning in the IoTs.
2. To explore the usage of asynchronous tools to gain online support.
3. To develop a profile of the asynchronous tools used by students undertaking e-learning in IoTs, i.e. to determine the range of asynchronous tools used.
4. To report the perceived effectiveness of online asynchronous support tools.

5. To report on the levels of satisfaction of students when using each asynchronous tool to avail of online support.

The broad objective therefore being to improve student support by developing a better understanding of what asynchronous tools students use, what they use these tools for, and their levels of satisfaction while using them for supportive learning purposes.

The research evaluates students' perception of their learning experience, and the availability of e-learning tools, while engaging using online asynchronous tool in an e-learning course. The research questions presented in this thesis are given the following formulation:

- ***RQ1: What asynchronous tools do student currently use within an e-learning environment?***

  RQ1a: What is the e-learning student profile within the IoTs?

  RQ1b: How are the tools used to provide online support?

  RQ1c: What are students perceptions of the tools used?

  RQ1d: Are students introducing new tools for online support?

  RQ1e: What tasks are student using online asynchronous tools for?

- ***RQ2: What level of satisfaction do students experience when using asynchronous online tools?***

  RQ2a: What are students' perceptions on the effectiveness of online asynchronous support tools?

RQ2b: What are students' perceptions on the efficiency of online asynchronous support tools?

RQ2c: What are the main issues which cause dissatisfaction with the level of online asynchronous support?

- ***RQ3: How satisfied are students with the levels of online support provided by lecturers when using online asynchronous tools?***

Following is a discussion on the philosophical assumptions and associated strategy of enquiry to meet these research objectives.

3.3 Research Methodology

The main objective of this section is to examine the theoretical and conceptual considerations influencing this research design implemented by the researcher. Cáliz (2004) states that all research is based on underlying assumptions about what constitutes valid research and what research methods are most appropriate. Several authors (Miles and Huberman, 1984; Easterby-Smith et al., 1991; Walsham, 1995) claim that to allow the reader to understand the research issue, the researcher must explain their philosophical preferences. Myers and Avison, (2002) define a research methodology as:

> *"...a strategy of enquiry which moves from the underlying philosophical assumptions to research design and data collection."*

A research methodology must align with the ontological and epistemological positioning of the researcher, and suitable to the community being studied (Galliers

and Land, 1987). In this study the community consists of students engaging with e-learning technology. Ontology is the image we have of social reality upon which a theory is based. Guba (1990) refers to this worldview as "*a basic set of beliefs that guide action*" (p. 17). Ontology refers to beliefs concerning the state and nature of the world as we see it – is 'reality' objective and what can be observed as an entity external to the individual (realism) or is it subjective and dependent on individual cognition. Ontological research can be described as evolutionary because it represents shifting ontological assumptions, concerned with what we believe constitutes as social reality and this may change over time.

Epistemology is one of the core branches of philosophy which is concerned with the theory of knowledge. It is especially concerned with regard to its methods, validation and the possible method of gaining knowledge of social reality, whatever it is understood to be. Epistemological assumptions suggest an appropriate approach to the construction and evaluation of valid information about a certain phenomenon (Orlikowski and Baroudi, 1991). Two distinct epistemological categories have been identified in the literature: knowledge can be acquired by measuring hard facts (positivism), or knowledge needs to be experienced and interpreted (nominalism) (Mingers, 2001; Bryman, 2004).

Following is a brief discussion on the general philosophical assumptions or epistemologies underlying research enquiry. The most appropriate philosophical assumptions is identified and subsequently used to guide the choice of a research methodology for this study.

3.4 *Underlying Philosophical Assumptions*

Before undertaking this research study, it is crucial that the researcher is clear about their philosophical assumptions and approach to the phenomena under investigation (Falconer and Mackay, 1999). The underlying philosophical assumptions determine which research methodologies and techniques are applicable for gathering information concerning particular phenomena (Orlikowski and Baroudi, 1991). Several authors have proposed different classifications of the paradigms underlying qualitative research. The literature suggests five distinct epistemological categories have been identified in the literature: positivist, interpretive, phenomenology, critical, and naturalism (Mingers, 2001; Bryman, 2004; Patton, 2002; Guba and Lincoln, 1994; Orlikowski and Baroudi, 1991).

3.4.1 *Positivist*

Positivistically-based quantitative researchers employ the language of objectivity, distance and control because they believe these are the keys to the conduct of social research (Denzin and Lincoln, 2000). Positivist research approaches are generally premise on the idea that the social world exists externally. The properties of the social world being observed may be measured through objective methods rather than being inferred subjectively through sensation, reflection and intuition (Cáliz, 2004). It is assumed that the observer is independent of what is being observed and that the choice of what to study and how to study it can be determined objectively (Chen and Hirschheim, 2004). Positivists generally attempt to test theory in order to enhance our predictive understanding of phenomena (Fitzgerald and Howcroft, 1998). Postpositivism challenges the notion of '*absolute truth*' (Phillips and Burbules,

2000), and holds a deterministic viewpoint to identify outcomes (Creswell, 2003). While positivism is a 'natural science' epistemology, it can be argued that it underpins an approach which is not suitable for the social sciences. In this environment, an interpretative approach may be appropriate (Bryman, 2004).

3.4.2 Interpretive

From an interpretivist point of view, what distinguishes human (social) action from the movement of physical objects is that the former is inherently meaningful (Denzin and Lincoln, 2000). Therefore, to understand a particular social action, the researcher must grasp the meanings that constitute the action. Interpretative studies start from the assumptions that our only access to reality (whether given or socially constructed) is through social constructs such as language, consciousness, shared meanings, documents, and tools. Williams (2000), applies interpretivism to indicate:

> *'...those strategies in sociology which interpret the meanings and actions of actors according to their own frame of reference.'*

This frame of reference suggests a different research procedure to positivism, one that recognises human distinctions between humans and the natural world. The researcher is considered part of what is being observed, and science as being driven by human interest (Cáliz, 2004). The focus or central theme of research is on the meaning that students assign to phenomena rather than on facts and understanding processes and evolution. Interpretive research does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges (Kaplan and Maxwell, 1994). According to Voigt (1985),

interpretative research seeks "*...to find how teachers and pupils make sense and establish order of what happens in the classroom. The focus of interest in not primarily on individual, private interpretations, but rather on the natural and mutually controlled patterns of interaction and action*" (p.7). Crotty (1998) identifies three main assumptions within this approach:

1 People construct and interpret meaning of the world they engage in allowing researchers to extract and report the meanings.

2 Human engagement is mainly based on historical and social viewpoints, i.e. impact of certain cultures, and researchers must understand this cultural background

3 The researcher's position is largely inductive, i.e. generate meaning for human social interaction.

A researcher's objective is to interpret the meanings and experiences of people about the world.

3.4.3 Phenomenology

According to Patton (2002), the discipline of phenomenology may be defined initially as the study of structures of experience, or consciousness and social life of a phenomenon for a person or group of people. As an approach within sociology, Orleans (2002) cites Natanson, (1970) explaining that phenomenology seeks to reveal how human awareness is implicated in the production of social action, social situations and social worlds. Phenomenological research deals with how the social world is made meaningful, and attempts to understand behaviour patterns within certain groups – from their perspective. Groenewald (2004), states that a researcher applying phenomenology is concerned with the lived experiences of the people

involved, or who were involved, with the issue that is being researched. Phenomenology seeks to secure absolute insights into what, or essence, of whatever is given instinctively in experience.

According to McShane (2007), most universities in Australia, and in the UK, evaluate teaching and according to the results of student course evaluation questionnaires, that seek students' perceptions of the teaching and learning. These have been developed out of the phenomenographic research base and have improved students learning in universities in the UK, Scandinavia, Hong Kong and Australia for the past 25 years. Phenomenographic research requires that human beings make sense of experience, and transform experience into consciousness, both individually and as a shared meaning. Thus, this requires methodologically, carefully, and thoroughly capturing and describing how people experience some phenomena – 'how they perceive it, describe it, feel about it, judge it, remember it, make sense of it, and talk about it to others' (Patton, 2002).

3.4.4 Critical

Critical research assumes that social reality is historically represented and is produced and reproduced by people (Myers, 1997). Critical researchers focus on the identification of mechanisms that can produce an effect, and change the *status quo* (Warren and Karner, 2004). The focus of critical research is on conflicts and contradictions in modern society. It attempts to eliminate the causes of isolation and control within the research population (Myers, 1997). The purpose of critical research is to evaluate conflicts that exist in social practice in order to prescribe a method to 'replace or transform' the current social structure. It also sets out to reduce the restrictive social conditions resulting from research findings. It therefore focuses

on oppositions, conflicts and contradictions in modern society (Guba and Lincoln 1994). Perceived reality is shaped over time by a series of social, political, cultural and economic factors that have preserved in structures that we now perceive as real (Cáliz, 2004). Researchers attempt to evaluate the imbalances within their findings and recommend some transformations to promote social harmony within the researched target population.

3.4.5 Naturalism

According to Lincoln and Guba (1985), qualitative research approach consists of the naturalistic inquiry paradigm. Naturalism is concerned with understanding how knowledge is attained. Mertens and McLaughlin (2004) combine the concept of interpretivism with social constructivism as an approach to qualitative research. Guba (1990) promotes the social constructivist worldview within the work of *naturalistic inquiry* which evaluates methods to seek understanding of the world. The researcher constructs facts on the social environments that are under research and attempts to discover meanings and identities through which individuals or groups in a hope to make sense of their lives and social interactions. Naturalistic inquiry focuses on human behaviour and experiences within natural settings. Adopting a naturalistic approach, a researcher believes that a specific phenomenon should be explored in a given environment. It also incorporates phenomenology and interpretative research approaches.

3.5 Philosophical Assumption Selection

The selection of philosophical assumptions to underpin the validity of research must be appropriate to the nature and complexity of the research questions. In addition, the philosophical viewpoint must reflect the following factors:

The primary objective of this research is as follows:

- To explore students perception of their learning experience while requesting online asynchronous support throughout an e-learning course.

The research realises this objective by achieving each of the secondary objectives as outlined below:

1. To develop a profile (average age, discipline of study, etc.) of students undertaking e-learning in the IoTs.
2. To explore the usage of asynchronous tools to gain online support.
3. To develop a profile of the asynchronous tools used by students undertaking e-learning in IoTs, i.e. to determine the range of asynchronous tools used.
4. To report the perceived effectiveness of online asynchronous support tools.
5. To report on the levels of satisfaction of students when using each asynchronous tool to avail of online support.

According to Lincoln and Guba, (1985), prior to carrying out qualitative research, a research must adopt the characteristics of the naturalist paradigm, and prepare a research design to meet naturalistic inquiry strategies. Therefore, as this research

collects meanings constructed by students as the engage with the world (e-learning) they are interpreting to allow the research make sense of their perceptions. The researcher attempts to understand the phenomena, through assessing these meanings provided by students and report on typical interaction amongst students and lecturers; this suggests the appropriateness of a ***naturalistic*** and ***interpretive*** view of ontology and epistemology.

3.6 Sample Size and Sample Selection

The selection of valid and efficient samples is crucial to the quality and success of this research. The greater the sample size, the more accurate will be the estimate of the true population mean (Kumar, 2005). Therefore, the accuracy of this research depends on the quality of the sampling itself. The procedures must therefore be explicit and practical to document all the steps in the task of sampling the student population in the IoTs (see appendix A). The sample of this research is determined to obtain a broad spectrum of perceptions across all IoTs in Ireland and therefore an IoT student population survey is necessary. The target population consisted of students, both undergraduate and postgraduate students currently undertaking an e-learning course. As explained through the 'Central Limit Theorem', research study populations are typically made up of 30 to have an approximate normal distribution for the sample mean. Therfore, the minimum student population sample required were 120 students for four population groups; 60 undergraduates (comprising of 30 male students, 30 female students) and 60 postgraduates (comprising of 30 male students, 30 female students) undertaking an e-learning course within the IoTs. Additional responses added greater refinement to the overall validity of this research.

3.7 Selection of Research Method

Data collection using the interpretive and naturalistic view of ontology and epistemology seek to obtain people's perception of the world in which they live in to develop subjective meanings of their experience. According to Creswell (2003), the goal of this research method is to rely on the participants views of the situation being studied. The process is largely inductive, as the researcher generates meaning from the data collected. The research method adopted in this research is both largely qualitative, with quantitative elements, for example, to determine student profiles and tool usage patterns. According to Hoepfl (1997), quantitative researchers draw "causal determination, prediction, and generalisation of findings", whereas qualitative researchers seek "illumination, understanding, and extrapolation to similar situations". Qualitative research studies (exploratory or interpretive) require *naturalistic* environments in order to make sense of a specific situation. Denzin and Lincoln (2000) define qualitative research as (p.3):

> *"...multi-methods in focus, involving an interpretative, naturalistic approach to its subject matter..."*

This research sets out to study students learning experience in their natural learning environment, to make sense of, or interpret e-learning phenomena in terms of the meanings which student bring to them (Denzin and Lincoln, 2000). Therefore a survey is deemed the most suitable research method to capture students' experiences. A survey presents us with the opportunity to undertake a cross-sectional study of all the IoTs in Ireland and provide a platform study of students' experiences with online asynchronous support. This allows the research to capture a sample population of e-

learning students (i.e. geographical dispersion) within IoTs and encourages a large response rate in a timely fashion which is a pragmatic reason to employ an online survey as the research method. The students are also given the opportunity to respond within their timeframe and they are also given the opportunity to share their experiences and/or opinions. This is appropriate for a naturalistic and interpretative research approach. This method provides a numeric description of students' attitudes, description of trends, use of learning tools and opinions of the research population. It allows the researcher to identify the essence of student learning experience. Lincoln and Guba, (1985), explain that "*if you want people to understand better than they otherwise might, provide them information in the form in which they usually experience it*" (p. 120). Understanding students' learning experiences and tool usage allows the researcher to report the students' views while undertaking e-learning courses.

3.8 Selection of Research Tool

The method adopted by the researcher is field research through the use of an online questionnaire. According to Bryman (2004), the main advantages of an online questionnaire include, low cost, faster response, attractive formats, unrestricted distribution, fewer unanswered questions, and a better response to open questions. This study requires the collection of data through the use of an online questionnaire (SurveyMonkey.com). This is used to determine the perception of students learning experience and the range of online asynchronous support tools used by students while engaging in learning tasks. It also allows students to provide additional comments on any issues, factors, or considerations they deem to be important to the successful completion of the students learning objectives. Quantitative surveys aim

to uncover data on respondent's perceptions, attitudes, opinions, and experience using structured questionnaire items (Sue and Ritter, 2007). Information is collected from a population sample which is a fraction of the predefined population. This approach facilitates replication of the study and generalisation of the answers from the sample to the overall student population in the IoTs. The online survey is used to gain a wider understanding of learners' experiences in seeking online support.

3.9 Structure of the Questionnaire

In structuring the questionnaire (see appendix B), many elements were taken into consideration, such as the time and effort it would require to be completed, and the possibility of neutral answers. The researcher opted for the use of closed questions (majority), to limit the burden of completing the questionnaire. The structure also incorporates open questions to allow students to express any additional information on their experiences. This method would allow the student to quickly complete the survey and allow the researcher to analyse the results, in order to extract as much information as possible. This structure allows to determine whether certain correlations exists, for example, the students' proficiency of using online technologies against the students satisfaction with the level of online support made available to them from their lecturer. The questionnaire content is summarised in table 3.1 as follows:

Question Number	Purpose of Question
SECTION 1	**BACKGROUND INFORMATION**
Q1 – Q8	Identify background information and develop a student profile
SECTION 2	**ONLINE ACTIVITY INFORMATION**
Q9	Determine students perceived proficiency with general computing activities
Q10	Establish average number of hours students spend on the Internet
Q11	Determine importance of various asynchronous tools to students
Q12	Determine the perceived level of use of asynchronous support tools by students
Q13	Determine the students preference of asynchronous tool to avail of support
Q14	Determine average online support response time of preferred tool
SECTION 3	**SATISFACTION WITH ONLINE SUPPORT**
Q15-Q18	Identify areas of perceived satisfaction and dissatisfaction regarding student learning activities and online support
SECTION 4	**SUPPORT FOR COURSE CONTENT**
Q19	Identify formats that students use to access online course content
Q20	Identify asynchronous tools used by students to access online content
Q21	Determine the percentage of individual and group activity within an online course
Q22	Determine student perceived level of satisfaction in individual and group activity within an online course
SECTION 5	**USAGE OF ONLINE ASYNCHRONOUS SUPPORT TOOLS**
Q23	Determine level of usage of online asynchronous support tools in various learning activities
Q24	Determine perceived level of satisfaction of online asynchronous support tools in various learning activities
Q25	Determine level of support available using online asynchronous support tools in various learning activities
SECTION 6	**ADDITIONAL INFORMATION**
Q26	Allow students to comment on additional information

Table 3.1 Structure of Online Survey for Student Population

3.10 Pretesting the Questionnaire

The questionnaire was pretested on six third level students participating within an e-learning course. They were also asked to offer an evaluation of the questionnaire with particular emphasis on the following:

1. The scope and content of the questionnaire i.e. are any important issues or factors neglected.
2. The relevance of the questions, are they meaningful to students.
3. Whether issues arose in completing the questions.
4. Clarity of questions
5. Completion time of the survey, i.e. whether it was too prolonged.
6. The terminology of the questions, i.e. did questions create any confusion.
7. Overall design of the questionnaire.

The feedback from the students was very valuable and has resulted in minor changes to the questionnaire content. The students felt that the structure of the questionnaire was *"good and very clear"* as it was *"easy to navigate"*, i.e. a lot of white space. This is a design strategy in order to make the respondent feel at ease and to avoid clutter while completing the survey. Other comments when taken into consideration in determining the administration strategy, and lead to slight modifications of the questionnaire, for example, "*I didn't understand what this term meant"*, and "*I don't think this applies to me, how do I answer this"*.

3.11 Strategy for Research Bias

According to Kumar (2005), bias is a deliberate attempt either to hide what a researcher has found in their study, or to highlight something disproportionately to its true existence. According to Mertens and McLaughlin (2004), the assumption is made that the best way for the researcher to obtain this knowledge is to remain objective, which is achieved by 'maintaining a distance from the people under evaluation'. Within this research, bias and non-response bias is overcome by following a strict deployment of population sampling. The non-response occurs whenever some members of the sample refuse to cooperate, cannot be contacted, or for some reason cannot supply the required data (Bryman, 2004). Email and online survey tools allows the researcher to monitor the rate of responses received from the student population. This enabled the researcher to directly contact 30 non-respondents from across all the IoTs who originally refused to participate within the survey. These results were accounted for within the data analysis. The researcher applied several strategies to eliminate non-response bias. These include:

1. ***Call back 30 non-respondents*:** Finding out why students did not respond helped determine the extent of response bias. These students were identified independently by the level (or lack) of response from online courses which did not respond to the first call for responses. The survey allowed the researcher to identify the IoT, department, and module which facilitated the request of 30 non-respondents.
2. ***Compare data in hand on respondents and the 30 non-respondents:*** Data from the researcher instrument allowed the researcher to compare data from non-respondents to determine whether there are any significant differences.

3. ***Assured there is no response bias and generalise the student population*:** The data from both the respondents and non-respondents allowed the researcher to profile the student population and on examination of the data, it revealed no obvious abnormalities.
4. ***Result:*** There were no variances within the data received from the respondents and non-respondents, therefore a generalisation to the student population can be justified while eliminating any form of bias.

This sample is obtained by carrying out a population sample of the student population within the IoTs, which adheres to the ethical code of research that this methodology achieves.

3.12 Limitations of Research Design

This is a platform study providing insight of students' experiences while engaging in e-learning. It also provides an overall snap-shot of the current use or lack of use of asynchronous tools to support students for the function of learning. Subjective ratings were expected in the use of Likert scales throughout the questionnaire, to allow the respondents to indicate their proficiency and satisfaction level using e-learning tools to avail of support from lecturers.

Operating within an academic calendar proved to be an obstacle as students are constantly under stress and time pressures, through exams or other ongoing group activities. Getting lecturers to allocate students' time within a lecture is a limitation to provide data. Therefore, as part of the questionnaire administration strategy, the heads of the e-learning centres within the IoTs, were contacted to get assurance of their co-operation by approving of the questionnaire. The researcher reassured the

heads of the e-learning centres, lecturers and students that this research adheres to the ethical code of research, omitting personal information and aggregate data is used throughout this research methodology (see appendix C). The heads of e-learning centres distributed the survey to all students listed on their records as student participating in e-learning courses and the researcher was also copied in on the email to provide reassurance that they sent this email to e-learning students.

CHAPTER 4

RESEARCH FINDINGS

The opposite of a correct statement is a false statement.

But the opposite of a profound truth may well be another profound truth.

-Niels Bohr

4.1 Introduction

The purpose of this chapter is to report the research findings. This chapter presents the quantitative and qualitative research findings based on the analysis of data. The interpretative results will address the primary and secondary objectives set out in chapter three and further discussion on the findings will be provided. The data is obtained using an online questionnaire (see Appendix B).

4.2 Background Information

This research received valid responses from 448 students across the Irish IoTs. This section addresses the research sub-question:

RQ1a: What is the e-learning student profile within the IoTs?

This section provides a general profile of the surveyed student population (for example, academic departments' surveyed, average time students spend online, and student demographics).

4.2.1 Academic Departments

The respondents were asked to specify which academic department they study within. Figure 4.1 depicts the percentage of surveyed respondents studying in various departments.

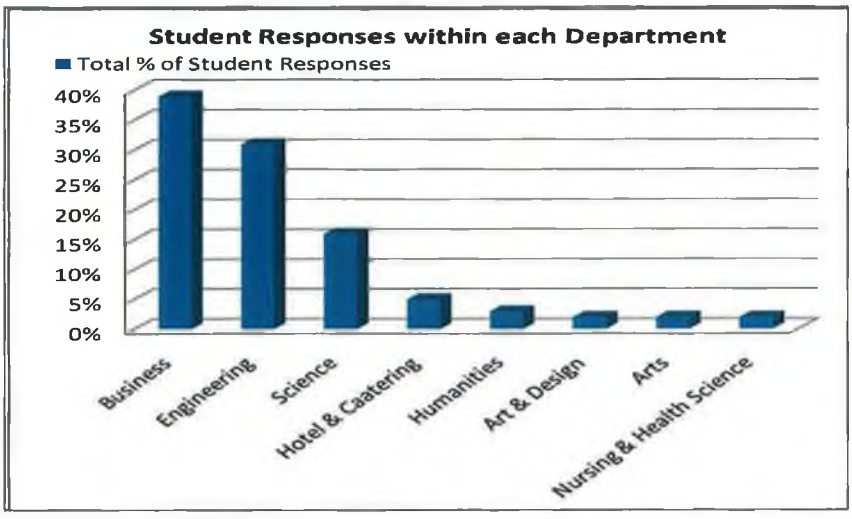


Figure 4.1 Departments of Respondents

Figure 4.1 illustrates that the level of response varied across the departments. The responses suggest that e-learning is more widely used throughout business, engineering, and science departments. Table 4.1 below, provides a summary of the student population and the percentage of response from each department. The responses are reasonably proportional to the number of students in each department across the IoTs. This can be summarised in table 4.1 as follows:

		HETAC Population Figures		Research Respondents	
Dept. No	**Department**	**Total Number of Students**	**% of Target Population**	**Number of Respondents**	**% of Valid Response**
1	Business	22, 833	31%	176	39%
2	Engineering	17, 618	24%	142	31%
3	Science	8, 956	14%	72	16%
4	Humanities	8, 437	11%	14	3%
5	Art & Design	6, 242	8%	7	2%
6	Arts	1, 389	4%	9	2%
7	Hotel & Catering	2, 987	4%	21	5%
8	Education	1, 389	2%	5	1%
9	Nursing & Health Science	1, 840	2%	2	2%
	Total	**74, 693**	**100%**	**448**	**100%**

Table 4.1 Student population within the IoTs

Table 4.1 above, summarises the student population within the different departments and the percentage of response within each discipline. The correlation coefficient indicates that the percentage of responses is representative and proportional to the student sample population across all depertments within the IoTs. The student population sample is also illustrated in figure 4.2 below.

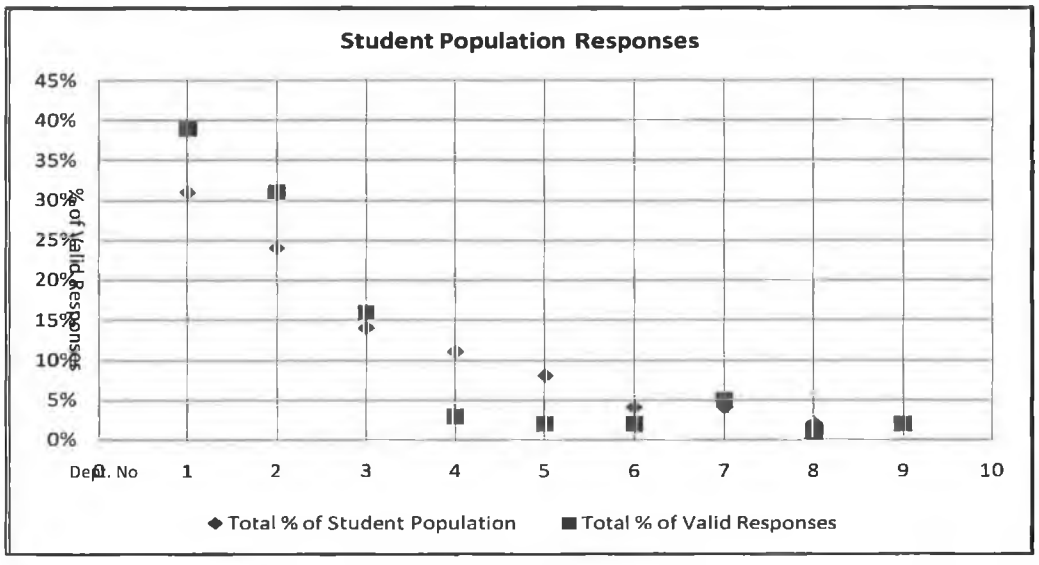


Figure 4.2 Correlation between student population and the responses

The coorelation cofficeint is a measure to evaluate whether points of two data arrays share a common pattern. In general, values closer to plus or minus one are closer to a straight line. Values which are closer to zero indicate that the points are more scattered. The correlation coefficient value of this data set is 0.95. This indicates that a representative sample of the student population and the research respondents is successfully achieved across each department as illustrated in figure 4.2 above.

4.2.2 Average Time spent Online

Students were asked to indicate how long they spent online per day. There are 362 valid responses to this question. The average time a student spends online per day, using or exploring the Internet is 2.6 hours. The statistical results are summarised in table 4.2 below. On average, students consume approximately 2.6 hours online daily.

Students Average Time Online	
Mean	2.6
Median	2.0
Mode	2.0
Range	9.0
Minimum	1.0
Maximum	10.0

Table 4.2 Number of hours consumed online per day

4.2.3 Student Demographics

The student profile was based on six criteria: age, gender, nature of application (i.e. standard applicants or mature applicants), computer proficiency level (very inefficient, average proficiency, or very proficient), NQAI level (level 6-10) at which they are studying, and their average time online per day (hours). These results are summarised table 4.3 as follows:

Student Demographics	*Valid Responses*	*Findings*
Average Student Age	471	23.7 years
Gender	471	49% Male; 51% Female
Perceived Computing Proficiency	358	92% of students average or above
Perceived Internet browsing Proficiency	358	91% of students average or above
Average time consumed online per day	362	2.6 hours
Students Application Status	467	80% Standard; 20% Mature
NQAI Level	455	• 5% Higher Cert; • 46% Ordinary Degree; • 41% Honours Degree; • 3% Higher Diploma; • 4% Masters Degree; • 1% Other

Table 4.3 Summary of Students Demographics within the IoTs

While this section describes the general student profile, the following section addresses the research questions by providing an overview of the use of asynchronous support tools and students' perception of their learning experiences as they engage in e-learning activities.

4.3 Main Findings

This section reports the main findings of this research. A general overview is provided followed by a deeper discussion to meet the research objectives. This section addresses the research question:

- ***RQ1: What asynchronous tools do student currently use within an e-learning environment?***

Respondents' comments are also provided where applicable since the personal voice is often considered irreducible which reflects a student's personal level of experience in learning. A summary of findings and conclusion is also provided.

4.3.1 Overview of Use of Asynchronous Tools

This section presents the findings on student use of asynchronous tools and the perceived importance they place on them for the successful completion of an e-learning module. This section addresses the research sub-question:

RQ1b: How are the tools used to provide online support?

Respondents were asked to specify their usage of asynchronous support tools while undertaking learning tasks. There are 351 valid responses to this question. Figure 4.3 illustrates these results as follows:

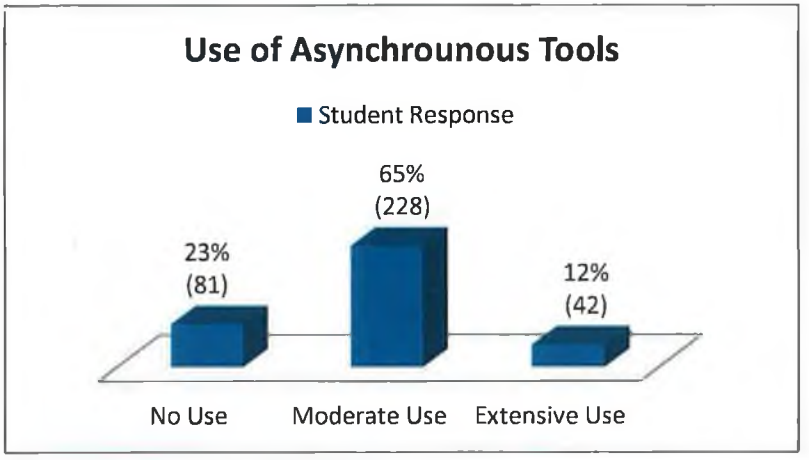


Figure 4.3 Use of Asynchronous Tools

As figure 4.3 above depicts, 77% (270) of respondents make moderate to extensive use of asynchronous support tools. Of the asynchronous tools students use, the respondents were asked to specify the level of importance they place on each of the following tools to successfully complete their module. This addresses the research sub-question:

RQ1c: What are students perceptions of the tools used?

These findings are summarised in table 4.4 below.

Asynchronous Tools	% of Importance
Email	97%
Mobile Phones	62%
Discussion Boards	54%
Wikis	49%
Weblogs	39%

Table 4.4 Students Perceived Use of Asynchronous Tools

The students report that e-mail is the most important tool, followed by mobile phones, and discussion boards to successfully complete their module. This is not surprising considering the increase in email usage a means of communication (see, Mock, 2001; Martin et al., 2005). Respondents were asked to specify other asynchronous tools which (not presented in table 4.4 above) they use to avail of online asynchronous support. This addresses the research sub-question:

RQ1d: Are students introducing new tools for online support?

A total of 11 responses added social networks, online journals, e-resources in their college's libraries, IP phone, and MSN Messenger as additional support tools. This finding suggest that students use asynchronous tools to support important learning tasks, for example, directed study tasks, resource discovery, and communication or collaboration while undertaking e-learning.

The respondents were requested to specify the level of importance they place on the more prominent asynchronous tools to successfully complete an e-learning module. There are 352 valid responses to this question. The results are illustrated in figure 4.4 as follows:

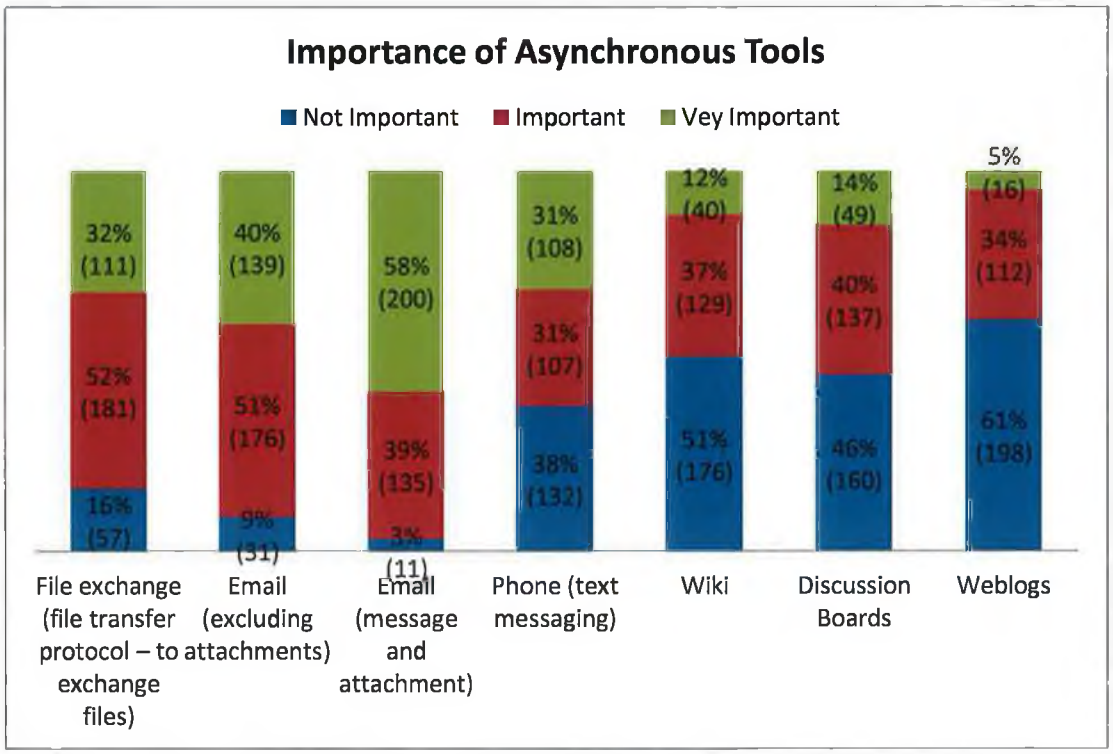


Figure 4.4 Importance of Asynchronous Tools

Over 90% of students feel that the use of email is important to successfully complete their e-learning module. Ninety seven percent of students feel that the use of email attachments to send files is also important to complete the module. Sixty two percent of students indicated that mobile phones are an important tool to assist in completing course work (for example, planning and working on collaborative learning tasks).

4.3.2 Learning Tasks

The respondents were asked to specify, in order of preference, online asynchronous tools they use to request online support from their lecturer. This addresses the research sub-question:

RQ1e: What tasks are student using online asynchronous tools for?

The students were also asked to estimate the average response time it takes to receive a response from their lecturer. There are 259 valid responses to these questions. The results are summarised in table 4.5 as follows:

Statistic	Email	Discussion Boards	Weblogs	Wikis	Mobile Phones
Preference Rank	1st	2nd	3rd	4th	5th
Average response time (hrs)	12	14	13	5	1
Median (hrs)	5	3	12	4	1
Mode (hrs)	24	2	24	1	-
Minimum response time (hrs)	1	1	1	1	1
Maximum response time (hrs)	48	48	24	24	1

Table 4.5 Student preferences of asynchronous tool and response times

Table 4.5 above presents five asynchronous tools, ranked in order of student preference (1st to 5th). In addition, it presents students perception of the average, minimum and maximum lecturer response times based on their experiences of using these tools. Students' first and second choices of asynchronous tools are email and discussion boards, with a perceived support response time of 12 and 14 hours respectively. Weblogs are the third preference for students with an expected response time of 13 hours.

4.4 Student Use of Asynchronous Tools

This section reports on students learning experience while seeking asynchronous support tools for the function of learning. This section addresses the research question:

- ***RQ2: What level of satisfaction do students experience when using asynchronous online tools?***

The respondents were asked to indicate their level of use (%) of email, discussion boards, and weblogs to receive support from their lecturer and peers. Table 4.6 below, summarises the students response as follows:

	High Use for Online Support		Moderate Use for Online Support		No Use for Online Support	
Asynchronous Tool	**PEER**	**LECTURER**	**PEER**	**LECTURER**	**PEER**	**LECTURER**
EMAIL	17%	23%	48%	60%	35%	17%
DISCUSSION BOARD	6%	7%	22%	26%	72%	67%
WEBLOG	3%	5%	24%	27%	72%	70%

Table 4.6 Students % use of Tool to Avail of Online Support

It is evident from table 4.6 above that the majority of students make moderate to extensive use of email to avail of online support. Students make less use of discussion boards and Weblogs to avail of online support. The respondents report that they make relatively similar use discussion boards and Weblogs to seek support form lecturers and peers. Table 4.6 also indicates that peers play a significant role in the provision of online support within an e-learning environment. Figure 4.5 below, provides a snapshot of the usage of email, discussion boards and Weblogs for specific learning activities.

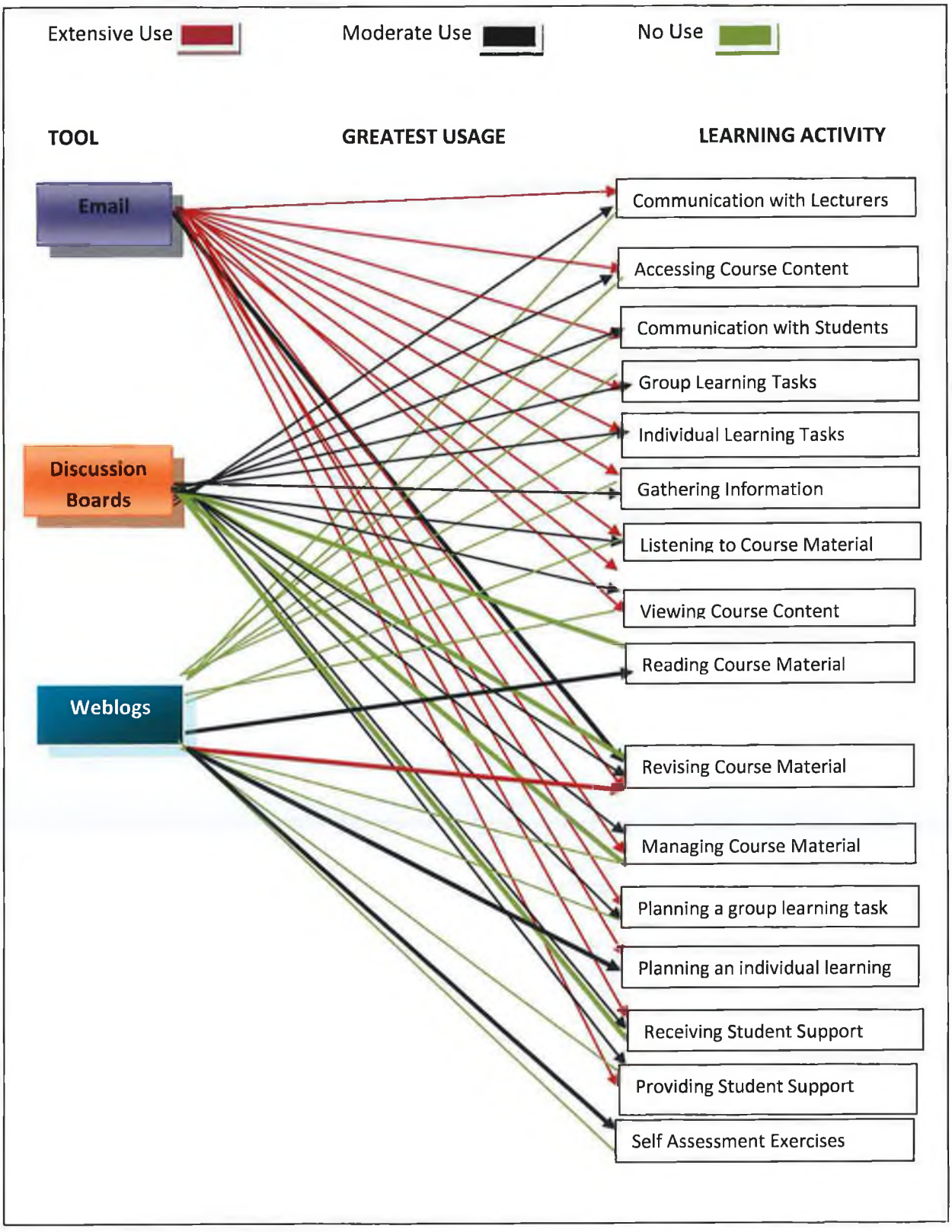


Figure 4.5 Perceived Usage of Asynchronous Tools for Learning Activities

It is clear from figure 4.5 above that email plays is a critical tool to facilitates the majority of students learning activities. The respondents were asked to specify their perceived intensity (%) of use of email, discussion boards, and weblogs for specific learning activities. The major findings, based on 280 valid responses, are presented below in table 4.7 as follows:

Learning Activities	Email Usage	Discussion Board Usage	Weblogs Usage
Communicating with other students	**75% (102)**	29% (42)	22% (29)
Communicating with your lecturer	**80% (113)**	36% (49)	26% (33)
Carrying out a group learning task	**61% (77)**	22% (28)	16% (20)
Carrying out a learning task individually	**54% (64)**	32% (39)	26% (31)
Gathering information	**67% (76)**	44% (53)	43% (52)
Listening to course material	**24% (28)**	22% (26)	20% (24)
Managing course material	**46% (52)**	30% (34)	27% (31)
Planning a group learning task	**54% (59)**	24% (27)	17% (19)
Planning an individual learning task	**41% (41)**	26% (29)	27% (30)
Reading course material	**44% (44)**	32% (36)	40% (45)
Revising course material	34% (34)	34% (37)	**36% (40)**
Self assessment exercises	**30% (29)**	25% (27)	25% (27)
Receiving Student Support	**61% (68)**	37% (41)	30% (32)
Providing Student Support	**54% (62)**	34% (37)	27% (29)
Viewing course material	**53% (55)**	37% (40)	36% (39)

Table 4.7 Usages of Asynchronous Tools for Learning Activities

The respondents were asked to indicate from 15 statements what they believe to be true, false or whether they have no opinion on the learning activity statement (see Appendix B, question 15). The findings were grouped into specific learning support

activities: communication with lecturers and peers, face-to-face contact with lecturers, individual and group learning tasks, accessing and gathering online course material, course content management activities, task planning activities, and online support activities.

4.4.1 Communicative Learning Activities

Students were asked to specify whether or not they agree with the statement "*communication with other students taking this module is easily achieved through the use of asynchronous tools*". Respondents could also indicate whether or not they had an opinion to offer. There are 283 valid responses to this question. These are summarised in table 4.8 below:

Statement	True	False	No Opinion	Response Count
Communication with other STUDENTS taking this module is easily achieved through the use of asynchronous tools, e.g. e-mail	**62% (176)**	23 % (66)	15% (41)	283

Table 4.8 Peer communication through asynchronous tools

Of the 283 responses, 176 students (62%) suggest that they did not experience any difficulty while communicating with their peers though asynchronous tools. In addition, students were asked to specify whether or not they agree with the statement "*communication with my lecturer teaching this module is easily achieved through the use of asynchronous tools*". Respondents could also indicate whether or not they had an opinion to offer. There are 284 valid responses to this question. These are summarised in table 4.9 below:

Statement	True	False	No Opinion	Response Count
Communication with my LECTURER teaching this module is easily achieved through the use of asynchronous tools, e.g. e-mail	**74 % (211)**	16% (46)	10% (27)	284

Table 4.9 Student communication with lecturers through asynchronous tools

The majority of students (74%) report that they can easily communicate with lecturers through asynchronous tools. The respondents were asked to rate the intensity of use for each of the asynchronous tools (email, discussion boards, and weblogs) to communicate with lecturers and peers. Respondents could also indicate whether this statement was non-applicable to them. These are summarised in table 4.10 below (categorised into email, discussion boards, and weblogs):

Email	No Use	Moderate Use	Extensive Use	N/A	Response Count
Communicating with other students	20% (28)	**57% (78)**	18% (25)	5% (8)	138
Communicating with your lecturer	17% (23)	**60% (81)**	20% (27)	3% (4)	134
Discussion Board	**No Use**	**Moderate Use**	**Extensive Use**	**N/A**	**Response Count**
Communicating with other students	**57% (81)**	25% (36)	4% (6)	14% (20)	143
Communicating with your lecturer	**56% (76)**	27% (37)	9% (12)	7% (10)	135
Weblog	**No Use**	**Moderate Use**	**Extensive Use**	**N/A**	**Response Count**
Communicating with other students	**61% (81)**	20% (27)	2% (2)	17% (22)	132
Communicating with your lecturer	**63% (81)**	22% (28)	4% (5)	11% (14)	128

Table 4.10 Use of asynchronous tools for communication tasks

The findings indicate that email is moderately used to communicate with lecturers and their peers. On average, the majority (60%) of students make little to no use of discussion boards or weblogs to communicate with their lecturer or peers.

4.4.2 Face-to-face contact with lecturers

Students were asked to specify whether or not they agree with the statement "*I feel that face-to-face contact with my lecturer is necessary to learn within this module*". Respondents could also indicate whether or not they had an opinion to offer. There are 281 valid responses to this question. These are summarised in table 4.11 below:

Statement	True	False	No Opinion	Response Count
I feel that face-to-face contact with my lecturer is necessary to learn within this module.	**68% (192)**	22% (61)	10% (28)	281

Table 4.11 Necessity of face-to-face contact with lecturers

The majority of students (68%) feel that face-to-face contact is necessary with their lecturer. Only 16% of these respondents who feel that face-to-face contact is necessary have reported that communication with their lecturer is not easily achieved through the use of asynchronous tools. This is a significant finding as it suggests that online learning needs to be augmented by face-to-face communication. This will be discussed further in greater depth.

4.4.3 Individual and Group Learning Tasks

Students were asked to specify whether or not they agree with the statement "*group activities are a critical part to successfully completing this module*". Respondents could also indicate whether or not they had an opinion to offer. There are 281 valid responses to this question. These are summarised in table 4.12 below:

Statement	True	False	No Opinion	Response Count
Group activities is a critical part to successfully completing this module	**46% (130)**	32% (91)	22% (60)	281

Table 4.12 Group learning activities

Less than half of the respondents (46%) state that group activities are a critical part to their module. Thirty two percent of students do not consider group activities as a critical success factor. In addition, students were asked to specify whether or not they agree with the statement "*I work productively on my own in achieving module objectives*". Respondents could also indicate whether or not they had an opinion to offer. There are 281 valid responses to this question. These are summarised in table 4.13 below:

Statement	True	False	No Opinion	Response Count
I work productively on my own in achieving module objectives	**82% (230)**	8% (22)	10% (29)	281

Table 4.13 Productivity working on an individual basis

The findings suggest that 82% of students' work productively on their own and as one student puts it, "*avoids the hassle*" of arranging group activities, with the exception of seeking online (peer) support ad arranging group activities or meetings.

Email is the predominant tool used to carry out individual and group learning activities. Only 8% of respondents do not work as productively on their own to meet the course objectives. This confirms Curtis and Lawson (2001), assertion that process of choosing group members for specific learning activities may be problematic which may impact on students' time and quality of learning contribution

According to Peak (2004), in order to gain the greatest benefit from group work, students should ensure that their contribution is a valid, reflected upon, and well-researched opinion. For example, groups may have difficulties making decisions online, taking responsibility for adding to certain learning activities, and groups take longer to reach consensus through e-learning platforms than in a face-to-face discussion.

4.4.4 Accessing and Gathering Online Course Material

Students were asked to specify whether or not they agree with the statement "*I have easy access to the Internet while undertaking this module*". Respondents could also indicate whether or not they had an opinion to offer. There are 280 valid responses to this question. These are summarised in table 4.14 below:

Statement	True	False	No Opinion	Response Count
I have easy access to the Internet while undertaking this module	**88% (246)**	9% (24)	3% (10)	280

Table 4.14 Access to Internet

The majority of students (88%) state that they have easy access to the Internet. Students were also asked to specify whether or not they agree with the statement

"*The course content is easily accessible*". Respondents could also indicate whether or not they had an opinion to offer. There are 283 valid responses to this question. These are summarised in table 4.15 below:

Statement	True	False	No Opinion	Response Count
The course content is easily accessible	**76% (214)**	17% (47)	7% (22)	283

Table 4.15 Access to course content

A majority of 76% of students stated that the course content is easily accessible, while 17% of the respondents reported that the content is inaccessible. Interaction with the course content not only requires that students complete assignments, but that students have also the technological skills required to successfully complete the assignment (Fein and Logan, 2003). Internet access while undertaking an e-learning module impacts on the accessibility of online course content. However, what students report in the next paragraph is that they are not solely reliant on online content.

The respondents were asked to "*estimate the percentage of core course content you are expected to access in each of the formats, to successfully complete an online course*". The questionnaire listed four mediums (based on literature) of accessing course content. There are 199 valid responses to this question. These are summarised in table 4.16 below:

Accessing Course Content	Averages % of Course Content
Text Books and hard copy articles (hard copy, offline materials)	53%
Online textual core course content – Web Pages containing text	41%
Online core course content in the form of Video/Animation	2%
Online core course content in the form of audio	2%
Other	2%

Table 4.16 Accessing Online Course Content

A survey carried out by Zao and Yang (2004) concludes that over half of all online students prefer the Internet as their primary source for information, because of its ease of information retrieval, convenience, and the quality of information. However, it is interesting to find within this research that the primary source for over half (53%) of the course content is accessed through text books and hard copy articles. Students access 41% of course material through web course content. The technology within a VLE affords lecturers the possibility to exploit web technologies and deliver course material and web resources. However it is evident that students are very dependent upon traditional learning approached, i.e. through text books. The findings also suggest that there is a lack of innovative multimedia practices (animation, video, or audio) within e-learning environments. This will be further discussed later in this chapter.

Students were also asked to "*estimate the percentage of core course content you are expected to access using the following asynchronous tools, to successfully complete*

an online course". There are 189 valid responses to this question. The average results are summarised in table 4.17 below:

Asynchronous Tool	% of Content
Web Browser (To view content, browse relevant web sites etc.)	32%
Email (message and attachment)	18%
File exchange (file transfer protocol – to exchange files)	19%
Online Assessments	17%
Discussion Forum	9%
Weblogs	5%

Table 4.17 Asynchronous Tools used to Access Course Content

Considering the reliance e-learning students have on the Web browser, the respondents indicate that the Web browser is used to access 32% of online course content. The use of web browsers also suggests that students seek external sources of information, rather that the information available within the e-learning module. This is affirmed through the students' dependency on textbooks within e-learning environments. Students use email, FTP and online assessments to access 19% and 17% respectively of the e-learning content. Discussion boards (9%) and Weblogs (5%) serve a minimal role in making course content more assessable.

Access to results and feedback in a timely manner is an important factor which influences a student's learning experience (Clarke et al., 2004). Students were asked to specify whether or not they agree with the statement "*I am satisfied with the speed of feedback from my online assignments*". Respondents could also indicate whether or not they had an opinion to offer. There are 279 valid responses to this question. These are summarised table 4.18 below:

Statement	True	False	No Opinion	Response Count
I am satisfied with the speed of feedback from my online assignments	**42% (118)**	31.9% (89)	25.8% (72)	279

Table 4.18 Student satisfaction with assignment feedback

Less than half of the respondents (42%) report to be satisfied with the speed of feedback from their assignments. Thirty two percent of the respondents stated that they were dissatisfied with the level of feedback. One student (number 26) expresses their frustrations with an exam situation and the insufficient speed of feedback, which prompts for a faster grading system to access exam results:

> *"The assignments I submit sometimes take weeks to be marked..."*
>
> ***Student Response No. 26***

This comment appears to reflect the dissatisfaction amongst 32% of the respondents with the speed of assignment feedback.

4.4.5 Course Content Management Activities

The respondents were asked to rate the intensity of use for each of the asynchronous tools (email, discussion boards, and weblogs) to perform certain learning tasks. These tasks may be categorised into course management activities. Respondents could also indicate whether this statement was non-applicable to them. These are summarised in table 4.19 below:

Statement	No Use	Moderate Use	Extensive Use	N/A	Response Count
Managing course material using Email	**46% (46)**	38% (43)	8% (9)	8% (9)	113
Managing course material using Discussion Boards	**59% (67)**	24% (27)	6% (7)	11% (13)	114
Managing course material using Weblogs	**61% (71)**	21% (24)	6% (7)	12% (14)	116

Table 4.19 Asynchronous Tools used to Manage Course Content

The results indicate that students make relatively similar use of email, discussion boards and weblogs to manage course content. The majority of students report to make little to no use of the tools listed in table 4.19 to manage course content.

4.4.6 Task Planning Activities

The respondents were asked to rate the intensity of use of each of the asynchronous tools (email, discussion boards, and weblogs) to plan learning tasks. The respondents could also indicate whether this statement was non-applicable to them. These are summarised in table 4.20 below:

Statement	No Use	Moderate Use	Extensive Use	N/A	Response Count
Carrying out a learning task individually using Email	41% (50)	**46% (56)**	8% (10)	5% (6)	121
Carrying out a learning task individually using Discussion Boards	**61% (74)**	27% (33)	5% (6)	7% (8)	121
Carrying out a learning task individually using Weblogs	**64% (76)**	21% (25)	5% (6)	10% (12)	119

Table 4.20 Asynchronous Tools used to carry out individual learning tasks

Email is more moderately used to carry out individual learning tasks, while discussion boards and weblogs share relatively similar usage patterns for individual learning activities. Over half of the respondents (on average 55%) make no use of email, discussion boards or weblogs to facilitate individual learning tasks.

The respondents were also asked to rate the intensity of use for each of the asynchronous tools (email, discussion boards, and weblogs) to plan learning tasks. Respondents could also indicate whether this statement was non-applicable to them. These are summarised in table 4.21 below:

Statement	No Use	Moderate Use	Extensive Use	N/A	Response Count
Carrying out a group learning task using Email	30% (38)	**47% (58)**	14% (18)	9% (11)	125
Carrying out a group learning task using Discussion Boards	**67% (85)**	15% (19)	7% (9)	10% (13)	126
Carrying out a group learning task using Weblogs	**69% (85)**	13% (16)	3% (4)	15% (18)	123

Table 4.21 Asynchronous Tools used to carry group learning tasks

Email is more moderately used to carry out group learning tasks, while discussion boards and weblogs also share a relatively similar usage patterns for both individual and group learning activities. Over half of the respondents (on average 60%) make no use of email, discussion boards or weblogs to facilitate individual learning tasks.

In addition to the various methods students use to interact with lecturers and peers, and the various mediums used to access online course content, students were presented with a question to estimate the percentage of learning they were expected to achieve through individual and group tasks. This question received a response of 191 valid responses. These findings are summarises in table 4.22 as follows:

Learning Activity	Average % of Learning Task
Individual Work	72%
Group Work	28%

Table 4.22 Student Individual and Group Learning Tasks

The students state that, on average, 72% of their learning tasks are expected to be carried out individually, while group work accounts for an average of 28% of the online module. The majority of students (82%) reported that they successfully meet the course's objectives working individually. The research also presents findings on the students' perception on the importance of group activities. Results indicate that student responses are generally equally divided on the importance placed upon individual and group learning tasks. Forty six percent of students perceive that group learning activities is a critical part of their learning activities, while 48% of students reported that group activities are not an important part of their course activities. This question may offer some insight as to why student perceive to work more productively individually as there is no expectation of lecturers that they should work in groups. It is expected (from lecturers) that group work accounts for about 28% of the overall module on average.

Students were also asked to determine their level of satisfaction working through an individual task, and with a group task. There were 188 valid responses to this question. The results are summarised in table 4.23 as follows:

Learning Activity	Average % Satisfaction
Individual Work	66%
Group Work	34%

Table 4.23 Students Perceived Satisfaction with Individual and Group Learning Tasks

Table 4.23 above, summarises students levels of satisfaction with individual and group learning activities. Their levels of satisfaction is on average 66% while carrying out individual learning tasks, and 34% while carrying out group learning tasks. This indicates that students are less satisfied participating in group learning tasks within their e-learning module. Therefore, it is evident that student are expected to carry out the majority of course work (72%) individually, and they are very satisfied to do so.

Students were asked to specify whether or not they agree with the statement "*I am motivated to achieve high results within this module*". Respondents could also indicate whether or not they had an opinion to offer. There are 280 valid responses to this question. These are summarised in table 4.24 below:

Statement	True	False	No Opinion	Response Count
I am motivated to achieve high results within this module	**77% (215)**	10% (27)	13% (38)	280

Table 4.24 Student motivation to achieve high results

The majority of students (77%) report that they are motivated to achieve high results. However, 10% of the respondents perceive that they are not motivated to achieve high grades within their course. Thirty one percent of these students (eight students)

report that this was due to a number of cross referencing factors including: dissatisfaction with the inability to communicate with their lecturer, lack of technical support when required, slow response of feedback from assignments, and the lack of training to use the VLE. These factors are expressed by all eight students.

4.4.7 Online Supportive Learning Activities

Students were asked to specify whether or not they agree with the statement "*In this module, I moderately request additional online support from my lecturer*". Respondents could also indicate whether or not they had an opinion to offer. There are 278 valid responses to this question. These are summarised in table 4.25 below:

Statement	True	False	No Opinion	Response Count
In this module, I moderately request additional online support from my lecturer.	39% (107)	43% (120)	18% (51)	278

Table 4.25 Requesting additional support from lecturers

Thirty nine percent of respondents stated that they moderately request additional support from their lecturer. However, 43% of students report that they do not request additional support. Seven percent of these respondents shared a sense of not being motivated to achieve high results and are dissatisfied with the speed of feedback on assignments.

Students were asked to specify whether or not they agree with the statement "*a FAQ section relating to this module content is provided online*". Respondents could also

indicate whether or not they had an opinion to offer. There are 280 valid responses to this question. These are summarised in table 4.26 below:

Statement	True	False	No Opinion	Response Count
A FAQ section relating to this module content is provided online	29% (80)	**39% (108)**	32% (92)	280

Table 4.26 Availability of a FAQ support

Twenty nine percent of students state that an FAQ section is made available to them while undertaking their module. However, 39% reported that an FAQ section was not made available to them. It appears that the use of an FAQ section as a supportive medium is not implemented in many of the e-learning environments.

In addition, students were also asked to specify whether or not they agree with the statement "*technical support, when required, is readily available to me*". Respondents could also indicate whether or not they had an opinion to offer. There are 279 valid responses to this question. These are summarised in table 4.27 below:

Statement	True	False	No Opinion	Response Count
Technical support, when required, is readily available to me	**51% (143)**	26% (71)	23% (65)	279

Table 4.27 Availability of technical support

The majority of respondents (51%) stated that technical support is available to them. Students were asked to specify whether or not they agree with the statement "*training regarding the use of a Virtual Learning Environment features is available to me when required*". The respondents were provided with a clear definition for a Virtual Learning Environment to avoid any ambiguity. Respondents could also

indicate whether they had no opinion to offer. There are 280 valid responses to this question. These are summarised in table 4.28 below:

Statement	True	False	No Opinion	Response Count
Training regarding the use of Virtual Learning Environment* features is available to me when required	**38% (106)**	34% (95)	28% (79)	280

Table 1.28 Availability of VLE training

Results are generally equally divided. Thirty eight percent of respondents report that training is available, while 34% of students stated that training was unavailable. Twenty nine percent of the respondents who stated that training was not available were mature students. In relation to technical support, two mature students felt that their learning needs were neglected when they required technical assistance:

> *"Not enough support for the older students in the college even an hour a week would be sufficient for the older mature student with little experience with IT Skills."*
>
> ***Student Response No. 6***

> *"As a mature student, who never had real exposure to the computers and the world wide web, before restarting college, the automatic assumption by lecturers that you have had the opposite experience, the nurture concept doesn't exist...you are expected to know...the computer course aspect needs to allow for people as I."*
>
> ***Student Response No. 17***

Another student clearly has similar concerns and states:

> *"I don't like the way the lecturer just presents their stuff by using the PowerPoint all the time. It can be pretty distracting and the lack of one to one interaction with the students. Provide them with Technical Support from time to time so that some of the students won't have the feeling of falling behind if compared to their classmates."*
>
> ***Student Response No. 46***

The 28 mature students previously stated that they were unskilled to successfully operate a computer and browse the Internet. This is an important finding as it highlights that there is an assumption that students who seek e-learning as a medium for education are proficient users of ICT technology. It also highlights the need for lecturers to provide training programmes on the functionality of VLEs especially for the mature student population. Additional tutorials were also requested to allow a less proficient computer user, avail of some basic computing skills. Another mature student provides a lengthy comment on their frustrations as a less proficient computer user:

> *"As mature students we may not be as IT aware as the younger students. No one ever asks if or advises us what IT supports are available and not given any opportunity to up-skill through extra tuition.*

*I am here in **IoT X** for 4 years and only advised this year about other information that is stored elsewhere on tutors example folders etc. No one wants to share information and just assumes we know.*

The Tutor is always too busy or on a time limit if you want to meet with them. No feedback on assessment only a result. You never know where you went wrong or how you can improve your writing skills. It is like they just want your fees and then left to get on with it. There is more value put on full time younger students. I think mature students are very brave, dedicated and have to work a lot harder to juggle work, family, course work and have a life as well. This should be acknowledged and supported. We are never advised about careers/jobs or offered the careers service we don't even know if we can use the service!"

Student Response No. 35

This students' statement raises concerns in relation to the lack of IT support available to students, and projects a sense of student isolation within an e-learning environment. Other issues reported above include the inability to up-skill, insufficient student assistance, insufficient feedback, and the lack of acknowledgement for their busy lifestyles outside of the educational environment. These factors will be further discussed in the following chapter.

Students were asked to specify whether or not they agree with the statement "*support by way of online tutorial is available to 24/7*". Respondents could also indicate

whether they had no opinion to offer. There are 280 valid responses to this question. These are summarised in table 4.29 below:

Statement	True	False	No Opinion	Response Count
Support by way of online tutorials is available 24/7	23% (65)	**55% (153)**	22% (62)	280

Table 4.29 Availability of 24/7 online tutorials

Twenty three percent of students state that online tutorials are available to them 24/7. A majority of 55% of respondents state that online tutorials are not available to them. This may have a significant negative effect on students' experiences often leading to frustration or even dropping out of the module (Terrell, 2005; Terrell, 2006; Terrell, 2007). To provide some insight as to the types of technical problems students face, two respondents state that they need support when there was a technical problem with downloading online material and poor audio quality of course material:

> *"Having problems due to the inability of the system (or the college) to allow downloadable lectures for study or future reference. There are some technical issues with recorded lectures such as sound out of synch with video, sometimes no sound or no video."*
>
> ***Student Response No. 22***

> *"Sometimes the sound quality during a lecture is poor"*
>
> ***Student Response No. 26***

The comments provide above highlight the need for continuous maintenance of online multimedia course material (video and audio) to reduce technical problems occurrences.

4.4.7.1 Receiving Student Support

The respondents were asked to rate their intensity of use for each of the asynchronous tools (email, discussion boards, and weblogs) to receive online support. Respondents could also indicate whether this statement was non-applicable to them. These are summarised in table 4.30 below:

Statement	No Use	Moderate Use	Extensive Use	N/A	Response Count
Receive online support using Email	34% (37)	**50% (55)**	11% (18)	5% (6)	110
Receive online support using Discussion Boards	**54% (60)**	31% (35)	5% (6)	10% (11)	112
Receive online support using Weblogs	**56% (60)**	26% (28)	4% (4)	14% (15)	107

Table 4.30 Use of Asynchronous Tool to Receive Online Support

The respondents state that email is again the most used tool to avail of online support, while discussion boards and weblogs are used to a lesser extent to receive online support. It is also worth noting that over half of the respondents state that they do not use either discussion boards or weblogs to receive online support. These respondents also state that they do not use these tools to carry out individual or group learning task, gather information, plan learning tasks, or to read course material.

4.4.7.2 Providing Peer Support

The respondents were also asked to rate the intensity of use for each of the asynchronous tools (email, discussion boards, and weblogs) to provide peer support.

Respondents could also indicate whether this statement was non-applicable to them. These are summarised in table 4.31 below:

Statement	No Use	Moderate Use	Extensive Use	N/A	Response Count
Provide online support using Email	35% (39)	**45% (50)**	9% (10)	10% (11)	110
Provide online support using Discussion Boards	**62% (56)**	29% (26)	8% (7)	11% (10)	110
Provide online support using Weblogs	**58% (61)**	24% (25)	4% (4)	15% (16)	106

Table 4.31 Use of Asynchronous Tool to Provide Online Support

Again, the results indicate that students make greater use of email to provide online support when compared to discussion boards and weblogs. The majority of respondents (on average 60%) report that they make no use of discussion boards or weblogs to provide online support. As identified earlier in these findings, the students are adopting a more supportive role (peer support) within an e-learning environment. It is clear that student make similar usage of asynchronous tools to receive and provide online support.

4.4.7.3 Self assessment exercises

The respondents were asked to rate the intensity of use of each of the asynchronous tools (discussion boards and weblogs) to carryout self assessment exercises. Respondents could also indicate whether this statement was non-applicable to them. These are summarised in table 4.32 below:

Statement	No Use	Moderate Use	Extensive Use	N/A	Response Count
Carrying out self assessment exercises using Discussion Boards	**61% (67)**	22% (24)	3% (3)	14% (15)	109
Carrying out self assessment exercises using Weblogs	**58% (63)**	14% (15)	11% (12)	17% (18)	108

Table 4.32 Use of Asynchronous Tool to Carry Out Self Assessments

The majority of students do not make use of discussion boards (61%), or weblogs (58%) to perform self assessment learning activities. Approximately one quarter of the total respondents make use of these tools to carryout self assessment tasks. Assessments are a very effective method to evaluate the level of understanding or knowledge a student has on a particular topic. It is an excellent method of feedback to allow students to gauge their progression within the e-learning course. One student requested more frequent examination sessions as the respondent feels it is a very effective method of learning:

> *"...it helps to do assignment to learn. I have two lecturers who give us assignments every week and they seem to be my best subjects where as the other two I seem to be struggling a little bit."*
>
> ***Student Response No. 28***

Effective and efficient online support has a major impact on the students learning experience. This section provided a summary of students' use of asynchronous tools and their learning activities. The following section reports on the students' perceived level of satisfaction with the use of asynchronous support throughout the academic year.

4.5 Students Level of Satisfaction using Asynchronous Tools

This section of the findings addresses the primary objective to report the perceived level of satisfaction students experience from the use of asynchronous tools for the function of learning. This section addresses the research sub-questions:

RQ2a: What are students' perceptions on the effectiveness of online asynchronous support tools?

RQ2b: What are students' perceptions on the efficiency of online asynchronous support tools?

RQ2c: What are the main issues which cause dissatisfaction with the level of online asynchronous support?

There are 114 valid responses to this question. Table 4.33 below provides a summary of the students satisfaction experienced under a number of support factors (for example, Volery, 2000; Sims et al., 2002; Tattersall et al., 2006; Marshall, 2006; Kay, 2006; Donnelley and O' Rourke, 2007; Israel and Aiken, 2007).

Factors	Level of Satisfaction from Email	Level of Satisfaction from Discussion Boards	Level of Satisfaction from Weblogs
Speed of Support	83%	48%	40%
Usability of tool	86%	54%	44%
Facilitate Feedback	78%	41%	36%
Support Communication	80%	45%	41%
Delivery of Support	82%	45%	43%
Accessibility of Content	78%	49%	42%
Effectiveness of Support	79%	43%	44%
Efficiency of Support	80%	46%	41%

Table 4.33 Student perception of satisfaction with Asynchronous Tools

Monari (2005) warns that nowadays the main issue is not the lack of technology available to support certain learning activities, but the risk of focusing too much on

the technology without paying enough attention to its impact on the learning process and to its uses that students and lecturers make of it. The asynchronous tools were evaluated on a number of factors: speed of feedback, usability of the tool, mechanism of feedback, communication tool, mechanism of delivering support, content being delivered, the perceived effectiveness of the tool and the efficiency of specific tools (summarised in table 4.33 above). These factors emerged from the literature review as being the key factors which influence students satisfaction within an e-learning course. It is evident that students' perceive that email satisfies the majority of their support needs on a number of factors. Discussion boards and weblogs share a similar role in fulfilling student supportive learning needs. These findings are further explored within the following subsections under separate tools (email, discussion boards, and Weblogs).

4.5.1 Level of Satisfaction using Email

- ***Speed of Support using Email:***

The majority (96%) of students are very satisfied with the speed of email support. Four percent of respondents stated that they are not satisfied with the speed of feedback from email. They previously stated that they do not have easy access to the Internet which offers an explanation for the dissatisfaction in the speed of asynchronous support.

- ***Usability of Email:***

The majority of students (94) report to be very satisfied with email usability. The unsatisfied respondents (10) also state that training regarding the use of Virtual Learning Environment features is unavailable to them when required.

- ***Feedback using Email:***

The majority of students (101) are very satisfied with receiving feedback through email. This restates that email is an important tool in e-learning support activities. Eleven percent of students state that they are dissatisfied with the level of feedback through the use of email.

- ***Communication through Email:***

Students are very satisfied with the level of communication using email. Twenty six percent (30 students) of the respondents state that the level of communication through email is dissatisfactory. Of the dissatisfied respondents, 57% (17) state that communication with other students taking this module is not easily achieved through the use of asynchronous tools. Although communication with their lecturer is easily achieved, they perceived that face-to-face contact is necessary to achieve meaningful learning. This reinforces previous findings on the necessity of face-to-face interactions.

- ***Delivery of Support using Email:***

The majority of students (98%) are very satisfied with the delivery of support through email. Only two percent of the respondents report to be dissatisfied with the delivery of support through email. They previously report that they have also poor access to the Internet, and are dissatisfied with the speed of feedback from online assignments, although they state that email is an important support tool. The majority

of students perceive that the use of email attachments is a very valuable feature in sending and receiving files to and from lecturers and their peers to avail of support.

- ***Supportive Content through Email:***

The students are very satisfied, with supportive content through the use of email. Four percent of the respondents (5) have reported to be dissatisfied with supportive content from email. Sixty percent of these respondents' (3) report not to use email, discussion boards or weblogs to provide online peer support, or to revise course content. They do not make use of discussion boards or weblogs to communicate with lecturers, or their peers. They do not request additional online support from their lecturer, and state that online tutorials and FAQ's are not available online. These students also access on average 72% of course content through text books, although 60% of these respondents stated that they have easy access to the Internet.

- ***Effectiveness of Email:***

Ninety four percent (107) students reported that they are very satisfied with the effectiveness of email as a supportive learning tool. Six percent (7) of the respondents state that they were dissatisfied with the effectiveness of email, especially for viewing course content, and to provide or receive student support. Seventy one percent of these respondents (5) state that email was also ineffective in planning individual or group learning task. However, all of the respondents' perceive email as being an important asynchronous tool to successfully complete an e-learning module.

- ***Efficiency of Email:***

The majority of students (94%) are very satisfied with the efficiency of email as a supportive learning tool. Six percent of students are dissatisfied with the efficiency of

email as a supportive tool, for a number of reasons including: the level of supportive content, the level of communication, and the level of feedback in their learning activities. They also state to access 29% of course content through the use of email.

4.5.2 Level of Satisfaction using Discussion Boards

- ***Speed of Support using Discussion Boards:***

Of the students who report to use discussion boards, 50% of the respondents (57) are satisfied with the speed of support. Of the dissatisfied respondents, nine percent (5) of the respondents state that they have easy access to the Internet while undertaking this module.

- ***Usability of Discussion Board:***

Forty eight percent of the respondent (55) report to be satisfied with the usability of discussion boards. Ten percent of the respondents (14) state that they are dissatisfied with the usability of discussion boards. These respondents' also state that they are proficient users of their PC and the Internet, and perceive discussion boards to be an important tool to successfully complete an online course.

- ***Feedback using Discussion Boards:***

Forty one percent of the respondents report to be satisfied with feedback through the use of discussion boards. Sixteen percent of the respondents (20) are dissatisfied with the level of feedback through discussion boards. Of this 16%, half of the respondents do not use discussion boards to receive support from their lecturer, while participating in an e-learning module. They also report that they work more productively on their own in achieving module objectives.

- ***Communication through Discussion Board:***

Forty five percent of students (51) are satisfied with the level of communication through discussion boards. Forty two percent of the respondents (48) are dissatisfied with the level of communication through discussion boards. Thirty nine percent of the dissatisfied respondents (19) state that they do not use discussion boards to provide peer support. They also state that face-to-face contact with their lecturer is necessary within an e-learning environment. One respondent clearly stated that the e-learning environment should be more interactive to open up more effective communication channels between students and lecturers:

> *"I would like if the discussion boards were up and running on the system so that us students could interact with each other in solving problems with a module. Only one module in my course is available online. I think all modules should be on the system. The system should be more interactive between students and lecturers so that students are able to contact lecturers from outside college if they have any queries on an assignment."*
>
> ***Student Response No. 2***

This student reports the need to increase the level of interaction between lecturers and students through discussion boards.

- ***Delivery of Support using Discussion Boards:***

The majority of students are, on average, 45% satisfied with the delivery of online support through the use of discussion boards. Eighty two percent of these respondents state that discussion boards are important tools within an e-learning environment.

- ***Supportive Content through Discussion Boards:***

Sixty three percent of students (72) are satisfied with the level of supportive content obtained via discussion boards. Eleven percent of the respondents (13) are dissatisfied with the level of supportive content available from discussion boards. Sixty two percent of these respondents (8) are also dissatisfied with the level of feedback, and the gathering of information available through discussion boards. These students also access on average 54% of course content through text books, although 92% of these respondents stated that they have easy access to the Internet, and spend on average, 3.5 hours per day online.

- ***Effectiveness of Discussion Boards:***

The majority (65%) of students (74) are satisfied with discussion boards' effectiveness as a supportive learning tool. However, 13% of the respondents (15) are dissatisfied with the effectiveness of the discussion board. Thirty three percent of these respondents state that they were dissatisfied with a number of learning experiences, including: the delivery of course content, the level of communication, the level of feedback, the speed of support, usability, and providing or receiving support.

- ***Efficiency of Discussion Boards:***

The majority (69%) of students (79) are satisfied with the efficiency of discussion boards as a learning support tool. Nine percent of the respondents (10) are dissatisfied with the use of discussion board efficiency for a number of reasons. These include effectiveness and the level of feedback and communication, the delivery of support, and speed of support through discussion boards. Eighty percent

of these respondents (8) perceived that they neither provide or receive support, or plan group learning tasks through discussion boards.

4.5.3 Level of Satisfaction using Weblogs

- ***Speed of Support using Weblogs:***

The majority of respondents (70%) report to be less satisfied with the speed of Weblogs to provide online support than that of email and discussion boards, although only 50% of the respondents make moderate use of weblogs to receive support from lecturers and peers, while participating in their online course.

- ***Usability of Weblogs:***

Of the 50% of respondents who use weblogs, 44% of students (25) report to be satisfied with the usability of weblogs. Two explanations for this include the lack of importance students place upon weblogs, and generally the lack of use of Weblogs across the IoTs e-learning environments.

- ***Feedback using Weblog:***

Only 36% of the respondents (41) are satisfied with the level of feedback from lecturer through weblogs. Fourteen percent of the respondents (16) state that they are dissatisfied with the level of feedback from lecturer through Weblogs. Of the dissatisfied students, seven students report not use weblogs to communicate with lecturers and also stated that support by way of online tutorials is not available 24/7. The seven students do not consider weblogs to be an important tool to successfully complete an online course.

- ***Communication through Weblog:***

Of the 50% of respondents who use weblogs, 41% of students (24) are satisfied with the level of communication through weblogs. Eleven percent of the respondents (6) are not satisfied with communication through weblogs. These respondents also feel that face-to-face contact with their lecturer is necessary to learn within their module. They also report that they do not consider weblogs as an important learning tool.

- ***Delivery of Support using Weblogs:***

Forty five percent of respondent who use weblogs (26) report are satisfied with the delivery of online support through weblogs. Seven percent of the respondents (4) stated that they were dissatisfied with delivery of support from weblogs. These respondents make no use of weblogs to receive online support, although they have easy access to the Internet. Flexibility is a very significant concept within e-learning support mechanisms and in the delivery of online support. For example, one respondent stated that flexibility is very important in the successful completion of the course:

> *"I feel that the online learning is very good as you can work full time with no need to work back time, i.e. no need to take time off work on a weekly basis to attend lectures.*
>
> ***Student Response No. 29***

Another student emphasise the importance in the flexibility of e-learning by comparing e-learning to the traditional learning method:

> *"Having completed college the old way (attending lectures) and the new way (online), I definitely prefer the new system. This is mainly because I am working, have family commitments and other things that I need to do (fix my car springs to mind!). I am very happy that I can listen to a lecture live, or if things are just mad busy I can hop online at anytime and catch up..."*
>
> ***Student Response No. 36***

Therefore, students require that supportive methods are flexible to meet their individual learning needs.

- ***Supportive Content through Weblogs:***

Forty two percent of respondents (24) are satisfied with weblog content within their e-learning environment. Ten percent of the respondents (6) are dissatisfied with the level of supportive content available from weblogs and are also dissatisfied with the level of feedback. These respondents are also dissatisfied with the level of information gathering available through weblogs. They access on average 56% of course content through textbooks, although they have easy access to the Internet, and spend on average 2.4 hours per day online.

- ***Effectiveness of Weblog:***

Forty percent of students (29) are satisfied with weblogs as an effective supportive learning tool. Eight percent of the respondents (5) are dissatisfied with the effectiveness of the weblogs. These students are also dissatisfied with weblogs for a number of reasons, including: the delivery of course content, the level of communication, and the level of feedback via weblogs. Other issues include the

speed of which online support is delivered and weblog's usability. For example, one student suggested that lecturer involvement creates greater effectiveness within the e-learning environment.

> *"More lecturers need to get involved in Moodle for it to be effective. When it is used it is very effective."*
>
> ***Student Response No. 19***

Another student promotes the concept of feedback and reflection on student activities under the interactive guidance of the lecturer, and suggests that the lecturer should navigate students through a discussion on exam and study techniques.

> *"You need to ask questions after the exams to gauge the effectiveness of this type of study"*
>
> ***Student Response No. 22***

Northover (2002) states that with the increasing use of computer-mediated communication systems, the effectiveness of these tools must be monitored and maximised. Sims et al., (2002) explains the effectiveness of online teaching and learning environments hinges on the level of understanding lecturers, students and developers have of e-learning environments.

- ***Efficiency of Weblogs:***

Forty two percent of respondents (24) are satisfied with the level of efficiency from using weblogs as a learning support tool. Nine percent of the respondents (6) state that they are dissatisfied with weblog efficiency, for a number of reasons. These include their effectiveness in delivering support, the level of feedback, and the level

of communication through weblogs. Other issues include their dissatisfaction with the speed of online support. They also state that weblogs are inefficient to plan group learning tasks. Efficiency may be established through the evaluation of standard resource utilisation within an e-learning environment. Examples of these resources include lecturer and student time consumption, equipment, software and learning material. The prime resource that makes lecturers feel uncomfortable with online support is the apparent continual time commitment. Three students provided additional comments to highlight their concerns with the lack of communication within their e-learning course as follows:

> *"Communication from the lecturers if a lecture was cancelled. They don't appreciate that some people stay on at work to take a lecture."*
>
> ***Student Response No. 22***

> *"Comments and questions to tutors often go unanswered for days if at all. Without some form of acknowledgement there is no feel for whether or not any one is even considering your request/comment."*
>
> ***Student Response No. 27***

"There is really no outside contact with lectures here, no use of email. Course work very hard to find. Very badly organised. In fact I am thinking of changing college due to the lack of organisation. I'm fed up with the lack of passion and lack of effort with teachers. All I ask is my emails to be answered!"

Student Response No. 38

In some cases, the lack of technological ability is a major contributor as to why students become frustrated and drop out of the e-learning course. Studies indicate that students drop out of e-learning courses at a higher rate than traditional courses (Terrell 2005; Terrell 2006; Terrell 2007). According to Picciano (2002), online discussions tend to be lengthier than in face-to-face situations, and with more information from many sources, students need to be more attentive to both '*the who*' and '*the what*' of a discussion. Sproull and Kiesler (1991) cautions about discussions that continue based on misinformation because a lecturer cannot immediately correct or clarify a comment. Online material is widely acknowledged to contain a questionable level of quality material, and as the Internet is used for more communication needs, there is every reason to assume that the overall average quality of public information is decreasing (Murray, 2003). This can challenge multidisciplinary tasks by providing realistic complex environments for student inquiry, providing information and tools to support investigation and presenting data to support problem solving.

Having explored students' levels of satisfaction with the use of asynchronous tools, for specific learning activities, the next section evaluates students' level of

satisfaction from the various levels of online asynchronous support provided by lecturers.

4.6 Student Satisfaction with Online Support provided by Lecturer

This section presents the findings on the students' level of satisfaction with lecturer support through the use of asynchronous tools. ¬This section addresses the research question:

- ***RQ3: How satisfied are students with the levels of online support provided by lecturers when using online asynchronous tools?***

Respondents were asked to specify their level of satisfaction with the different forms of support: (1) preventive support, (2) remedial support, and (3) study skills support, while undertaking learning tasks. There are 107 valid responses to this question. Students were provided with a brief explanation of the three forms of lecturer support which was adapted from Romainville and Nöel (1998) to avoid any ambiguity, as summarised in table 4.34 as follows:

Form of Support	Explanation
Preventative Support	• Available at start of academic year • Precautionary measure of skills needed to succeed in the course
Remedial Support	• Addresses shortcomings of student results • Set deadlines for students to solve problems • Sessions throughout the year for immediate feedback on academic performance
Study Skills Support	• Support students to develop skills • Raises the quantity and quality of student success • Match of education and skills for the demands within industry

Table 4.34 Lecturer Learning Support with Asynchronous Tools (Romainville and Nöel, 1998)

Figure 4.6 below illustrates the students' perception on the availability of online lecturer support through email, discussion boards, and weblogs.

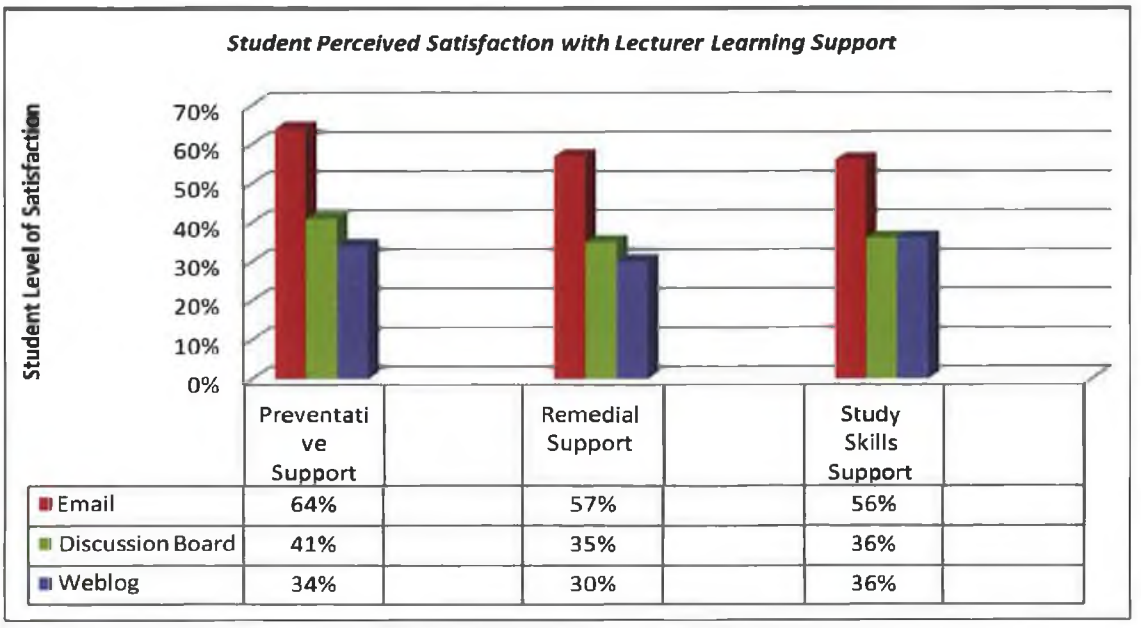


Figure 4.6 Students Perceived Satisfaction with Lecturer Support

Bauerová (2007) explains that technologies start the process of e-learning, but people expand on the possibilities of the technologies. It is evident from figure 4.6 above, that students are more satisfied with the use of email to deliver the various forms of online support throughout the academic year, followed by discussion boards and weblogs respectively.

4.6.1 Preventative Support

Within an e-learning environment if asynchronous support and services malfunction for any reason, it obviously impacts negatively on the students learning experience.

This is mainly due to the lack of precautionary measures to secure online resources, management, and a failure to implement supportive techniques. E-learning tools may become under-exploited or possibly abandoned by students as a result of their frustrations. Once the precautionary measures have been correctly implemented, the lecturer should continuously monitor the effectiveness of them to ensure risks have been eliminated. Preventative support should be made available at the beginning of, and throughout the academic year. The respondents are satisfied (64%) with the level of preventative support provided by lecturers through email. Students are less satisfied with the level of preventative support from discussion boards (41%) and weblogs (34%) respectively.

4.6.2 Remedial Support

Students may request remedial academic support when learning difficulties are experienced. The variability of the academic support services documented in the results of this survey suggests that support is inconsistent or slow in meeting students learning needs. Remedial support provides students with support to assist them to progress within the module with minimal hindrances. Often, remedial support is infrequently available or is available only for students failing to meet the desired learning outcome. The students are satisfied (57%) with the level of remedial support provided by lecturers through email. Students are less satisfied with the level of remedial from discussion boards (35%) and weblogs (30%) respectively.

4.6.3 Study Skills Support

E-learning methods and tools allow students to develop or extend their learning skills into many areas. For example, in traditional classroom environments a student can listen to presentations, attend lectures and discussions and develop learning skills to identify the key issues throughout the module. E-learning, on the other hand, involves very little listening since the written word has replaced the spoken one. E-learning students develop skills to read and analyse from a wide range of sources including many small informal e-mail messages to the vast network of Internet resources. The respondents are satisfied (56%) with the level of study skills support provided by lecturers through email. Students are less satisfied (36%) with the level of study skill support from discussion boards and weblogs.

Considering the dependency placed upon email, it is not surprising that email is the more dominant support tool for the various forms of support outlined above. It appears the students' satisfaction of various forms of support is relatively consistent throughout the academic year through the use of each asynchronous tool. Three students added additional comments with their dissatisfaction in the online support. They felt that lecturers did not exploit asynchronous tools to deliver online support. The following three respondents articulated this view:

> *"Not much in the way of tutor support. Little feedback on assignments or personal progress."*
>
> ***Student Response No. 22***

"The student support on the course is poor. It's very difficult to get a reply from staff either through personal email or the discussion board.

Student Response No. 23

"I find online learning very good and flexible, but can be difficult to get help when it is needed"

Student Response No. 24

It is critical that e-learning providers within the IoTs carefully respond to students need for continuous support throughout the duration of the module. As e-learning courses become increasingly more available due to the increased demand placed upon the IoTs, so too does the demands for online support. IoTs must be proactive in planning for the large demands that lay ahead form the increasing student e-learning population.

4.7 Summary of Findings

This section presents the summary of the main findings in this research. To summarise, the students were asked to report on their experiences and usage of tools while seeking online asynchronous support.

The students seem relatively satisfied participating within an e-learning environment. However, they seem dissatisfied with a number of online support factors which

influence they experience. As demonstrated in section 4.3.1, email is the more dominant tool for all student asynchronous support requirements. Discussion boards and Weblogs provide little support to students within an e-learning environment and appear to be under-exploited by lecturers within e-learning environments. Students view email, discussion boards, and weblogs as individualistic tools, with little interaction, lacking in innovation, imagination, and functionality (section 4.5). The concept of increased mobility for online support emerges as an important factor (i.e. the use of mobile phones for text messaging peer support). It is apparent that students are adopting a new role within education to provide online peer support. However, the quality of peer support is questionable, and may require further research (section 4.4.7).

The results indicate that there is a lack of a social learning environment (social constructivism learning) within e-learning. This is evident in section 4.4 as results indicate that there is a lack of peer communication and group engagement. Although e-learning platforms promote the notion of interactivity and the majority of students could easily communicate with their peers, many of the respondents felt that this is more of a burden on them, as it consumes large amounts of a students study time. The majority of students prefer to work alone on their course as they work more productively. Students generally feel that there is no sense of online community, which projects the concept of '*online silence*'. Students want to work alone and are very satisfied in doing so, but they want the option of availing of online peer support when required. However, as indicated in section 4.4.2, students report that face-to-face contact with lecturers is necessary in order to successfully complete the module. This is a significant finding as it suggests that online learning needs to be augmented

by face-to-face communication. Some explanations for this may be due to the overall lack of communication and interaction within a VLE. Another explanation may lie within the course content design and students may need lecturers' assistance to understand what is expected of them on a regular basis.

The majority of students reported that training for the use of VLEs is not available. This frustration is exasperated within the mature student population. They feel that they are inefficient users of a computer and browsing the Internet. Additional tutorials were requested by students to allow a less proficient computer user to avail of some computing skills. The mature student population suggest the need to implement an induction programme to allow students to make the most effective and efficient use of VLE (section 4.2). There is a sense that lectures take it for granted that students are adequately skilled to operate a VLE proficiently which is not the case as was discovered in these findings.

Another critical issue which emerges from the findings in section 4.4.4 is the need to ensure that all students have access to learning software that is required within the curriculum (e.g. AutoCAD) to complete the module. Students have to accept the additional costs of software packages necessary to complete a course. Lecturers should make this software available, or an alternative software available to students to successfully complete their e-learning module. Within an e-learning environment if technological support and services malfunction for any reason, it impacts negatively on the students learning experience. This is mainly due to the lack of precautionary measures to secure online resources, through proper management, leadership and support (section 4.4.7).

The majority of students' primary source for e-learning course content is from the text books and hard copy articles. This suggests that lecturers are relying on traditional methods of teaching students within the course, although e-learning platforms afford lecturers a wide variety of tools at their disposal to use innovative methods of delivering course content. Multimedia is underutilised within e-learning courses (section 4.4.5). This is a significant as it informs us that e-learning tools and technologies are not as exploited as one would expect. The dependency on text books might suggest that e-learning platforms may be utilised as data repositories which instruct students towards online and text book learning material (4.4.4).

The effectiveness of the asynchronous tools must be monitored and maximised. Students raised concerns in relation to the lack of IT support available to students (for example, 24/7 supportive mechanisms), which instils a sense of student isolation within a course (section 4.6). In some cases, the lack of technological ability and frustration is a major contributor as to why students drop out of the e-learning modules. Studies indicate that students drop out of e-learning courses at a higher rate than traditional courses (Terrell 2005; Terrell 2006; Terrell 2007). The findings suggest that lecturers and developers should implement a feedback form that allows students to raise lecturers' awareness of technical difficulties, with the assurance that the problem will be corrected immediately. Another issue includes students' lack of knowledge on the accessibility of students services 'external' to a VLE, offered by the IoTs on-campus (for example, career advice) available to students' on-campus. Students need to be included in the whole educational experience, including the accessibility of services made available to on-campus students.

Students were largely dissatisfied with the level of support they receive from their lecturer although they are satisfied with the level of communication. Students allude that they need a personalised form of support, i.e. acknowledgement, feedback that address their specific issues, and feedback on areas of the course where students may display some misunderstandings (section 4.5). Although communication with lecturers is easily achieved, students insist that face-to-face contact with their lecturer was also necessary to learn within the module. Students perceived that lecturers 'lack passion and effort' while providing an e-learning course. Face-to-face contact may be perceived as a better method to compensate for the lack of communication and direct feedback from lecturers.

It is critical that e-learning providers within the IoTs carefully adhere to students needs for continuous support throughout the duration of the course. In fact, it may be necessary to involve students in the development of e-learning systems to understand their requirements to avoid negative learning experiences in the future. This is necessary as the demand for e-learning courses continue to increase within the IoTs, it is inevitable that the demands for online support will continue to increase and place greater pressures on lecturers. The following section will provide a conclusion to these findings.

4.8 Conclusion

The findings of this research indicate that asynchronous support tools are under exploited in fulfilling students supportive needs within the IoTs. The findings do not suggest that innovative uses or best practices of asynchronous technologies are in

place within the IoTs (section 4.4.5). The findings indicate that although e-learning is considered the most prominent method to extend the reach of education, it under-exploits the opportunities afforded by the asynchronous technologies. At present, the IoTs appear to be 'experimenting' with asynchronous tools possibilities as indicated in section 4.7. The findings report that communication and interactivity are minimal, with little effort from students to participate in group learning tasks.

E-learning platforms within the IoTs appear to act as data repositories which allow students to log-on and view course content. This is supported by the significant finding in section 4.4 which suggests that online learning needs to be augmented by face-to-face communication. This has a major impact on students learning experience, giving them a feeling of isolation, or '*online silence*' if they cannot meet the lecturer face-to-face. The students responses indicate that many of the promised learning functionalities and features documented throughout the literature are not as sophisticated as one would anticipate within the IoTs.

Technically, email could replace the VLE, considering it is used for the majority of students learning activities and to distribute material Lecturers appear to make very little use of discussion boards and weblogs. Email could replace VLEs to deliver learning content and to facilitate communication activities through attachments and group email lists. E-learning content may be delivered to students on a prescheduled basis, which could allow students to focus on one asynchronous tool and thoroughly exploit its functionalities.

The marketing campaigns within the IoTs to attract e-learning students, incorporates terms such as good accessibility of the course content, innovative usage of multimedia, and its capability of meeting the increasing demands for education in a

more flexible manner, were initially very much rehashed across all IoTs. This made e-learning appear to be very attractive as a method of learning, thus explaining its explosive growth and interest in recent years and in a state of constant change.

Lecturers need to gain experience in exploiting VLEs, i.e. course content management, multimedia, interaction online, and project a stronger sense of leadership to enhance student motivation and student engagement (see section 4.4). Mature students appear to be the most vulnerable group as they feel that their additional needs are neglected in relation to additional technical support. One of the problems recurring throughout the findings is possibly the emphasis on the technologies themselves, and not on learning styles. As identified earlier in section 4.4.7, students are adopting a more supportive role within an e-learning environment and the use of mobile phones emerged as an effective tool to provide students with support. This suggests that students are seeking alternative tools to communicate with peers and possibly lecturers.

The IoTs must begin to incorporate students into the VLE development life cycle, determine what their needs are, and attempt to exploit asynchronous support tools to enhance their learning experience. The IoTs should temporarily divert some of their attention from discovering what technologies exist, and towards evaluating methods to meet students' needs. Lecturers need to determine students' learning needs and discover what technologies exist to meet those needs more effectively and efficiently.

The final chapter will discuss the significance of these findings. It will also provide a number of recommendations and suggest a number of areas that may require further research.

CHAPTER 5

CONCLUSION

"The open mind never acts: when we have done our utmost to arrive at a reasonable conclusion, we still – must close our minds for the moment with a snap, and act dogmatically on our conclusions."

George Bernard Shaw

5.1 Introduction

This chapter discusses the significance of the findings and offers a concluding discussion on students learning experiences with online asynchronous support tools. The themes emerging from the findings of this research may be summarised as follows:

1. The rising expectations of students and lecturers
2. The need to introduce increased social support factors for student engagement
3. Lack of encouragement for students to publish learner content
4. Variance in students IT skills
5. 24/7 demand of online support
6. Mobility of online support
7. Accessibility of online content

The primary objective of this research is achieved as the findings explore students perceptions of their learning experience while requesting online asynchronous support within an e-learning course. The secondary objectives are also achieved. The research presents a profile of the students and the usage of asynchronous tools while engaging in specific learning tasks. The findings also meet the secondary objectives as they report on the effectiveness and level of satisfaction from the usage of online

asynchronous support tools. In addition the research findings determine whether there is a need for further investment to enhance online support.

5.2 Significance of Findings

The background research on the population provides a profile of the students who are undertaking e-learning modules within the IoTs (section 4.2). This research presents an evaluation of their experiences while engaging with online asynchronous support. The findings support that currently students do 'assume greater control' of monitoring and managing the cognitive and contextual aspects of their learning (section 4.3). However, the findings also suggest in section 4.4 that email is the dominant support tool and there is a lack of innovation to incorporate other asynchronous tools to deliver online support. The significance of this research emphasises the need for e-learning developers and lecturers to take more responsibility in providing structure and guidance which encourages and supports students on a three main areas: educational, social, and technological. This supports Sims et al., (2002) argument that uses understandings of the technologies determines the effectiveness of e-learning. Online asynchronous support appears to be underexploited and insufficient in supporting students in their quest to assume greater control in their learning (section 4.5). Although it is desirable and often encouraged that students take greater control of their learning, support should be provided to reduce student learning frustrations in a new learning environment. The results also indicate that there is a significant lack of a social environment within e-learning (for example, sections, 4.4.1, 4.4.3, and 4.4.7). The research findings suggest that lecturers should introduce more innovative methods to introduce student

to the concept of e-learning and explore interactive methods to deliver e-learning modules (see sections 4.4.5 and 4.4.7). This is necessary for the following general reasons which emerge from the overall findings:

1. To compensate for the scarce resources of lecturers time.
2. To provide online asynchronous support and meet students learning requirements.
3. To promote a 'just-in-time', rather than a 'just-in-case' learning environment which overburdens students with learning content.
4. To promote group learning and social learning activities.
5. To encourage students to exploit asynchronous tools within an e-learning environment and enhance their learning experience.

If the IoTs are to exploit e-learning technologies, it is essential to identify and understand the factors which affect the quality of delivery of asynchronous support. Many of the learning theories, styles, and practices reported throughout the literature are not as apparent as one would expect within an e-learning environment (for example, section 4.7). Clarke, (2003) reports e-learning attempts to extend educational sources in ways that other traditional teaching methods cannot equal. However, the findings suggest that lecturers are reliant on traditional methods to extend educational resources via electronic sources (for example, sections 4.4.2 and 4.4.4). This suggests that lecturers need to change their mindsets and adapt methods towards a more socially interactive community of learners. E-learning platforms appear to act as data repositories (see section 4.4.4) which do not cater for individual learning styles, nor does it effectively meet students' supportive demands (section 4.4.7). For example, students state that face-to-face contact with a lecturer is

necessary to succeed in the e-learning course. This is a significant finding as it suggests that online learning needs to be augmented by face-to-face communication (section 4.4.2). It also highlights the inability of e-learning technologies to sustain interaction between student and lecturer. Another significant finding includes the method in which students' access learning content (section 4.4.4). The findings suggest that lecturers remain heavily dependent on textbooks (53% of course content) which indicate the under-exploitation of innovative technologies and methods to deliver content. Other issues are identified within the main findings.

5.3 Main Findings

The themes which emerge from the findings on students experiences within an e-learning environment are discussed in the following subsections.

5.3.1 Rising Expectations of Students and Lecturers

The findings suggest that students and lecturers have high expectations in the level of communication (section 4.4.1) and learning which occurs in e-learning environments. Students report that e-learning tools and technologies must meet their individual learning needs although they are heavily dependent on the use of email (section 4.3.1). Students become frustrated when they experience difficulties in operating various learning tools or with the lack of feedback (section 4.4.7). This is exasperated within the mature student population. Students prefer to undertake learning tasks alone and report that they work more productively, especially when they can avoid the need to negotiate with other students (section 4.4.3). The findings

also suggest that there is an expectation from lecturers that students will engage in group learning activities although student report that group activities are an insignificant factor within their learning experience. Students expect rapid feedback from assignments and when they request support. Peer support plays a significant role in the provision of asynchronous support (section 4.4.7).

Although communication with lecturers is easily achieved, students report that face-to-face contact with their lecturer is necessary to successfully complete the module (section 4.4.2). This confirms what Lee et al., (2005) describes e-learning as "*...combining face-to-face and web-based approaches in teaching and learning*." It is evident that face-to-face communication between students and lectures is of significant importance within an e-learning environment. Students report that lecturers lack passion and effort in the deliverance of an e-learning module which reaffirms that e-learning platforms are at a relatively early stage of development which supports the distribution of e-learning material rather than a pedagogical sound method to extend learning (section 4.5). Students can benefit from an individually tailored remedial programme. However, the provision of live online lecturing is labour-intensive and requires some investigation of the possible implementation. This finding of expectations versus reality, challenges Jegede et al., (1995) eight components of effective learning environments: (1) interactivity, (2) instructional support, (3) task orientation, (4) teacher support, (5) negotiation, (6) flexibility, (7) technological support, and (8) ergonomics. There is no evidence to suggest that e-learning environments support these components which questions its effectiveness as a learning method. It is clear that there is more importance on the

technology and a lack of emphasis on the student learning as suggested by Marshall (2006) and Meško (2007).

5.3.2 The Need for Social Learner Support

Students are accustomed to having fast and easy access to information in this digital age, and therefore have an expectation of the same for their online modules. Kelly (2005) suggests that students should be presented with greater opportunities in the digital age. Students engaging with e-learning are part of a wider, networked, learning community of peers (Volery, 2005; Guess, 2007). They may be viewed as members of a '*community of practice*', sharing resources, requesting peer support, and introducing new methods of online support (e.g. text messaging). Social tools such as mobile phone text messaging can introduce greater flexibility of access for asynchronous support (section 4.3.1). This can assist to reduce the levels of frustrations which Rohall (2002) describes due to the slow response from lecturers. The findings indicate that peer support activities are significant because they reduce demands on lecturers. Students report that communication tasks present some burden on them, as they consume large amounts of study time. Students report that there is no sense of online community, which projects the concept of 'online silence' (i.e. isolation). Students want to work alone and are very satisfied in doing so, but they want the option of availing of online peer support and lecturer guidance when required (section 4.4.7). The literature indicates that this corresponds with the first generation of e-learning where learning material was printed and studied individually and focused on behaviourism (Monari, 2005). This confirms Curtis and Lawson (2001), observation that group activities are problematic. Students are not satisfied

with group learning tasks, which suggest the need for more 'effective' group learning activities. This raises the question as to why students are encouraged to participate in groups although they work more productively on their own (section 4.4.3). Group learning activities must be led and monitored by lecturers. This would motivate students to participate and assist lecturers in monitoring and rewarding student contributions (Northover, 2002).

Students enjoy interaction through social network tools outside of a college environment (section 4.3.1). Although group activities are often encouraged within an e-learning group (an artificial group) students prefer to interact within a social group (for fun and friendship). One explanation for this is that students select social network group members based on their own interests and activities. Within an e-learning environment, students are placed within groups to achieve a specific learning goal and this often places a greater burden on them to achieve a predefined outcome without a social presence (section 4.4). This finding indicates that there is an absence of a social presence as illustrated in Garrison and Anderson's (2003) '*community of enquiry*' model (figure 2.3). This ultimately has a negative impact on the students learning experience. Another explanation for the lack of social interaction includes the fear factor in publishing or submitting learning content to a group. Within an e-learning environment students' face the consequence of critical evaluation on content. This fear is not experienced within a social network setting since the objective is to share knowledge and create a fun environment amongst groups. E-learning tools and technologies should cater for social interaction to promote group activity and knowledge sharing.

5.3.3 Publishing Learner Content

Outside the e-learning environment, i.e. a social environment, students enjoy publishing content online, for example, the explosive growth in social networks (Facebook, Bebo, Twitter, and blogs). These tools allow them to add, update, share or delete information within a community of user-generated content at regular time periods. However, the findings suggest that within an e-learning the lack of weblog and discussion board activity limits students' exposure to publishing academic content and interacting with peers. The dominant tool for support is email. Within an academic environment, email, discussion boards, and weblogs are perceived to be 'boring' tools, lacking in innovation, imagination, and functionality. The findings suggest that there is a need to promote a greater social factor to encourage students to publish content and share knowledge within a fun learning environment (section 4.4).

5.3.4 Variance in IT Skills

Students are demonstrating new skills in terms of using new technologies for communication and learning. This includes using skills and strategies to evaluate content (searching, restructuring, validating), which enables them to critique and make critical learning decisions on the relevancy or quality of content (section 4.3.2). However, it appears to be taken for granted that students possess sufficient IT skills to undertake an e-learning module as indicated in the findings. Similar results were also reported by Motamedi, (2001), Curtis et al., (2001), Rinear, (2003) and Israel and Aiken (2007). It is evident from the findings that mature students have many difficulties in successfully operating ICTs which needs to be addressed by the IoTs e-learning providers (section 4.2). This is an important finding as students raise

concerns in relation to the lack of IT support available to them. This concern instils a sense of isolation when students are faced with IT difficulties while undertaking modules. Another issue within the findings is the lack of student's knowledge on the availability of student support services 'external' to the VLE, but offered by the IoTs on-campus, for example, the availability of ECDL programmes or IT skill workshops available to students' on-campus. The findings strongly suggest that all students should undergo an introductory module as a form of preventative support to learn how to proficiently operate tools within a VLE.

5.3.5 24/7 Demand of Online Support

The removal of the time and place dependency associated with traditional learning environments has many effects on students' expectations (section 2.5.1). Based on the student profile (table 4.3), the majority of students are accustomed to interaction on demand through web-based tools and technologies. This raises their expectations within an e-learning environment of what learning activities technology can support (section 4.5). The availability of e-learning methods to suit students' lifestyles and learning styles (e.g. social constructivist learning) may have been misguided by students perception, expectations and college marketing. This may lead to a sense of frustration because due to a lack of leadership from lecturers and subsequently lack of student motivation to participate. There is an expectation amongst the respondents (section 4.4.7) to expect that online support is available 24/7when requested by students. As the demand for e-learning increases so too will the demand and expectation of online support. This is a major concern which must be addresses within IoTs and a significant finding within this research.

The respondents report that they use mobile phones and social networks as part of their learning activities. The tools made available (i.e. email, discussion board, and weblogs) for students to request support within a VLE provide a slow response which suggest the need to avail of tools external to a VLE, e.g. text messaging tool (section 4.3).

5.3.6 Mobility of Online Support

Mobile communication tools and 24 hour access to support is reported as a very useful resource for students (section 2.5.8.10). Students are accustomed with Web 2.0 (Guess, 2007), handheld communication and computing devices and suggest that mobility is a very important characteristic of online support. Increased mobility may allow the IoTs to deliver more flexible methods of support, for example, mobile phone text alerts, social networking applications (e.g. Twitter) or handheld gaming devices to deliver online course content. 24/7 support must incorporate synchronous supportive methods through mobile social media if practitioners wish to extend the reach of online support and adopt Farmers (2004) view that there needs to be a focus on what these tools facilitate rather than focus on the gadgetry of the tools (sections 4.3 and 4.4).

5.3.7 Accessibility of Online Learning Content

Another critical theme which emerges from the findings (section 4.4.4) is the need to ensure that all students have access to learning content and software when required. It is interesting to find that the primary source for course content within an e-learning

environment is the text book and hard copy articles (section 4.4.4.). This suggests that lecturers are relying on traditional methods of teaching students, although VLE's make a wide variety of tools available to lecturers to use innovative methods of delivering course content. Peer-published content is often encouraged, but the level of quality is questionable as suggested by Teare (1998). Peak (2004) and Lorenzetti (2002) report that group discussions improves the quality of e-learning discussions but there is little evidence to suggest that this is the case within the IoTs. This suggests the need to monitor student interaction on public forums (discussion boards and weblogs) to enhance the standard of quality.

5.4 Reflection on Research

The use of VLEs facilitates students to achieve their learning objectives reasonably well by accessing learning content. However, there is little evidence in this study to suggest that e-learning provide similar learning experiences although IoTs use similar learning methods if compared to the traditional classroom environment. This research indicates that e-learning systems require academic staff, students and instructional designers to be increasingly more involved in the development life cycle of the e-learning platform. This will improve lecturers' ability to understand and meet students' supportive requirements. The results also suggest that developers and lecturers must explore the design of pedagogical sound instruction and preparing course resources to meet students' learning needs. Students tend to be more independent, prefer working individually, and are reasonably motivated to succeed in their module. Lecturers must become more innovative with the methods to deliver online asynchronous support. A preference for specific e-learning asynchronous

support tools does not appear to be a determinant for success. It is evident from the findings that there is a requirement for increased social interaction (i.e. social constructivism) within students learning experience.

This research is considered valuable as students have indicated through their responses that there is a sense of inadequate online support within the IoTs. The IoTs are not fully exploiting e-learning technology to enhance students learning experiences. Instead, the e-learning platform appears to act as a data repository allowing students to access content or instructions on textbook content. In this regard the developers (programmers, academics, graphic designers, and multimedia experts), should embrace a multidisciplinary and collaborative model of development to create a knowledge-base that is appropriate for the evolving e-learning and social networking environment.

5.5 Exploiting Asynchronous Support Tools

This section summarises some areas which email, discussion boards and weblogs could become exploited to extend student support. Lecturers may overcome some time constraints through the development of course 'e-newsletters'. This may be sent to all students undertaking specific modules to address specific questions. Students may repeatedly ask questions throughout the academic year or in the years to follow. Lecturers can exploit e-newsletters to address a number of issues and to distribute solutions amongst their students via email groups.

Lecturers may also assign students to monitor a discussion group and use a rotation system whereby every student within a group will be required to monitor and manage

the discussion forum for specific periods, e.g. weekly. This may relieve time constraints that a lecturer may have, and also project a sense of ownership, belongingness and responsibility amongst students. In addition, it allows students to critically evaluate quality of contributions within a social learning environment.

Lecturers and students can exploit weblogs to publish links to papers, post photographs, provide audio and video content and include hyperlinks to other interesting resources on the Web. In short, weblogs are probably the most promsing tool to avail of online support from both the lecturer and student. Weblogs can also be exploited to promote and monitor literacy and enhance student's confidence in publishing educational material which may be viewed by peers. Publishing material is now becoming a critical learning activity in HE, considering the number of students continuing into the so-called 'fourth level' education at post-graduate level. Students can also adopt a social constructionist approach within education by constructing new knowledge through self-expression, past experience and interaction with their peers (i.e. user generated content).

5.6 Further Recommendations

E-learning platforms should be armed with a knowledge-base which allows online support to be powered by a subject-specific ontology, and automated crawlers that can mine through e-learning platforms and content. This will assist to identify relevant learning content for online asynchronous support retrieval processes. In short, the researcher proposes that e-learning discipline integration should be implemented across all IoTs. IoTs should explore methods to automate online

support to achieve the students learning objectives. Students on a national level, participate in similar courses (e.g. business studies), learning similar theory from educational content and participating in similar group exercises. The rational here is to remove all physical educational boundaries and allow students to participate in a wider national and social learning community.

E-learning course content can be semantically examined for subject or topic relevancy. Content classification and semantic metadata enhancement may also ensure that relevant content can be made available to the e-learning platform for its students with minimal search and retrieval effort. This search process will solely focus on the e-learning environment, with the option to search the Web if the student is not satisfied with the search results. Classification of results and semantic metadata can be exported directly into an e-learning system, where the metadata can then be used as the basis for indexing and searching. This would allow students to sift through the vast amounts of information available to them, and only associate themselves with quality pre-academic approved material (both nationally and internationally). In addition, this would relieve the demand on lecturers to provide 24/7 support. Another method would include allowing students to rate or post comments of e-learning support results. This supportive material may be ranked and based on quality and relevance to students' queries. The National Digital Learning Repository (NDLR) could implement and exploit learning technologies to enhance third level academic support across all the IoTs.

Students must become more involved in the system development life cycle to identify their requirements and implement new and innovative online support techniques. From a student supportive prespective, collaborative peer learning

activities should be encouraged or enforced. A system may be implemented where students are awarded with additional marks for contributing to other students queries.

E-learning tools (email, discussion boards, weblogs, etc.) have extended the traditional means of keeping students informed via the traditional classroom and libraries. They are a valuable source of information and quite often, when a student needs rapid online support, they will simply start searching the Web for some solution, as suggested in the findings. Many students operate numerous asynchronous tools to avail of support, thus making solutions difficult to centralise, retrieve, or unavailable to other students with the same problems. Semantic web technologies can merge some of these tools together to enhance the accessibility of online support. New technologies such as Twitter may have an interesting role in e-learning. Twitter is an online application that acts similar to weblog, and social net-work, with the option of using a mobile phone interaction. This may offer an alternative tool for students whom reported that text messaging is an important activity to avail of online support through innovative and mobile methods of online asynchronous support.

The research yielded both expected and unexpected findings in terms of students' use of e-learning asynchronous technologies. The expected findings are useful in terms of providing valuable up-to-date empirical evidence of students' current learning experiences. The unexpected findings of the student learning environment raises a host of important implications for policy and practice in meeting students learning demands, more specifically, the growing demand for support as the growth in e-learning continues to accelerate. Across all departments, students made extensive use of personally owned tools and technologies, including mobile phones. It is evident

that although e-learning tools are available to students, they are neither effective nor efficient in meeting students' needs in a self paced e-learning environment. This requires increased involvement of students in the redevelopment of e-learning environments. If the demand for e-learning courses increases as expected, so too will the demand for greater online asynchronous support.

The research proposes ten additional improvements which would improve online asynchronous support available to students:

The Problem	Recommendation for Improvement
Social factor in e-learning.	A college academic-wide social network: this will enhance the level of student interaction across all IoTs and instil a social factor in learning.
Mobile support and improve communication within group tasks.	Text message or Twitter application on the e-learning platforms: this will allow students to send free texts to a lecturer or to peers.
Lack of transparency whether lecture received students request for support.	Email receipt technologies: this will provide some acknowledge to the deliverance of student emails and remove any uncertainty that a lecturer has received it.
Online support – quality content retrieval.	E-learning search engine technologies on learning content: this will allow students to search e-leaning content within the VLE and across the learning community for additional support.
Communication with peers regardless of location or learning institution and access to learning content.	National collaboration forums: these forums can be categorised by course, year, or subject and improve learning networking. This will allow students access to learning content nationwide.
Technical difficulties with e-learning multimedia.	Minimise video graphics and audio: this will reduce the time required to download material or the bandwidth required to view video.
Personalisation of e-learning delivery.	Personalisation of e-learning: students may be profiled by subjects, learning styles, and topics where they are weak in the module. This will support them through the benefit of personally tailored e-learning content.
Student requirements and ability to reconfigure e-learning interface design.	Introduce mash-ups and dashboards applications to e-learning interfaces: this will support them through the benefit of personally tailored interfaced and meet their requirements.
Communication and support to add greater unity amongst e-learning peers.	Develop e-newsletters: this will address student queries and provide weekly information on module updates. The newsletter can be distributed to all participants.
Quality of e-learning content and support and access to software to complete a module.	Access to reputable e-journals and software: this will enhance the quality of student publications and proper software facilities. The software could be made available to students under new licensing agreements. This licence may be leased on a short-term basis with a predefined expiry date once the module is complete.

Table 5.1 Recommendations for Improvements

The next section will propose areas for further research.

5.7 *Further Research*

The findings from this study conclusively indicates that the current state of online asynchronous support within the IoTs is unsatisfactory, and in need of significant attention, redevelopment, or reinvention. It has also identifies the need to introduce methods to enhance the availability of innovative and mobile online support. One of the most significant findings which warrant further research is on social interaction in e-learning environments. In addition, further research needs to be undertaken on the IoTs community of shared practices and learning policies, to determine whether there is a need to reshape the current IoT strategies to cater for e-learning methods of teaching.

This research provides an excellent stepping stone for determining these approaches to enhancing the students learning experiences within e-learning environments. Research should be carried out on whether students' e-learning lifestyles and selection of learning courses may have been misguided by their perception, expectations and college marketing. Additional research should be focused on student mobility, and mobile technologies.

5.8 *Closing Remarks*

This research provides valuable insights into the current level of online asynchronous support available to students, and the students learning experience within the IoTs. It appears that e-learning is a great educational marketing tool, which attracts a wide student audience, opting for a more flexible learning mechanism tailored around their lifestyles. Support is an integral part to the learning life cycle. The IoTs do not

provide sufficient online support to meet students' diverse needs. In some cases, lecturers fail to acknowledge students seeking support. If the IoTs are to increase student numbers, an increase for student support and the development of social media is inevitable. IoTs and e-learning developers must be proactive and invest in advanced IT to explore methods to automate or enhance learning support.

The research findings highlight the need to implement a knowledge-base and the introduction of a semantically enhanced VLE and social constructivism learning tools and technologies. E-learning's success relies on the students' successful experience within the platform. The IoTs need to be equipped with the skill to ensure that each student has a successful and positive learning outcome within each module, thus promoting a positive learning experience for the students.

Bibliography

Åkerlind, G. S., (2007). Constraints on academics' potential for developing as a teacher. Studies in Higher Education, Volume 32, Number 1, pp. 21-37.

Al-Kodmany, K., George, R. V., Marks, A., and Skach, J. (1999). 'A case study of teaching an urban design course on two campuses simultaneously', Asynchronous Learning Networks Magazine, Volume 3, Issue 1.

Ally, M., (2004). 'Theory and Practice of Online Learning', Chapter 1 - Foundations of Educational Theory for Online Learning. Retrieved from website [12th January 2010]: http://cde.athabascau.ca/online_book/pdf/TPOL_book.pdf

Alessi, S. M. and Trollip, S. R., (1991). 'Computer-Based Instruction – Methods and Development', 2nd Edition, Prentice-Hall Publishers

Alonso, F., López, G., Manrique, D., and Viñes, J. M., (2005). An instructional model for web-based e-learning education with a blended learning process approach, British Journal of Educational Technology, Volume 36, Number 2, pp. 217–235

Anderson, T., Rourke, L, Garrison, D.R., and Archer W. (2001). 'Assessing Teaching Presence in a Computer Conferencing Context', Journal of Asynchronous Learning Networks (JALN), Volume 5, Issue 2, September.

Anderson, T. (2004). 'Toward a Theory of Online Learning', Part 1: Role and Function of Theory in Online Education Development and Delivery, Chapter 2, Theory and Practice of Online Learning. Retrieved from Website [12th January 2010]: http://cde.athabascau.ca/online_book/ch2.html

Ashley, J. (2003). ASAE & the Center for Association Leadership, December. Retrieved from website [12th January 2010]: http://www.asaecenter.org/PublicationsResources/articledetail.cfm?ItemNumber=13572

Baker, R. K., Berry, P., and Thornton, B., (2008). Attitudes on academic integrity violations. Journal of College Teaching & Learning, Volume 5, pp. 5-13.

Bauerová, B. (2007). 'Learning 2.0 and Paradigm of Education', ICETA, 5th International Conference on Emerging e-Learning Technologies and Applications, Slovakia, 6-8 September

Beaudoin, M. (1990). 'The instructor's changing role in distance education', The American Journal of Distance Education, Volume 4, Number 2.

Bellotti, V., Ducheneaut, N., Howard, and M., Smith, I., (2003). 'Taking Email to Task: The Design and Evaluation of a Task Management Centered Email Tool', Volume 5, Issue No. 1, Pages: 345 -352, Conference on Human Factors in Computing Systems, Proceedings of the SIGCHI conference on Human factors in computing systems, SESSION: Integrating tools and tasks, April 5th-10th

Berge, Z. L. (1997). 'Computer Conferencing and the On-line Classroom', International Journal of Educational Telecommunications, Volume 3, Number 1, pp 3-21.

Berge, Z.L. (2003). 'Barriers to eLearning', Keynote presentation at the Fourth Annual Irish Educational Technology Conference Waterford, Ireland. May 22-24.

Bernard, H. W., (1956). Psychology of Learning and teaching – third edition, McGraw-Hill Book Company.

Berners-Lee, T. (1999). 'Weaving the Web: The original design and ultimate destiny of the World Wide Web by its inventor', San Francisco: Harper

Blood, R. (2000). 'Weblogs: A history and perspective'. Retrieved from website [12th January 2010]: http://www.rebeccablood.net/essays/weblog_history.html

Bourke, T. (2005). 'i2010: Fostering European eLearning Content to Make Lisbon a Reality', The European eLearning Industry Group, October. Retrieved from Website [12th January 2010]: http://www.elig.org/files/repository/web_content/elig_contents/5-Resources/1-Elig%20Policy%20Papers/i2010%20Fostering%20Europ_B0018.PDF

Brestenská, B., (2007). From Homo Sapiens to Homo Mobilis – or How the Schools and Teachers Change. ICETA, 5th International Conference on Emerging e-Learning Technologies and Applications, Slovakia, 6-8 September.

Buckley, K. (2003). Evaluation of classroom-based, Web-enhanced, and Web-based distance learning nutrition courses for undergraduate nursing. Journal of Nursing Education, Volume 42, Number 8, pp. 367-370.

Bryman, A., (2004). Social Research Methods, Second Edition, Oxford University Press.

Cáliz, C. (2004). 'E-learning: Designing New Business Education', Working Paper, The PwC&IESE e-business Centre and IESE Business School, January. Retrieved from website [12th January 2010]: http://www.iese.edu/research/pdfs/DI-0533-E.pdf

Cannings, T., (2003). Online Professional Development for Teachers, Media & Methods, Volume 39, Number 4, pp. 14-16.

Capshaw, N. C., (2007). The Quality of Higher Education Internet and Computer Technologies: Exacerbating or Lessening Differences across Countries? An Analysis at Three Levels: National, Institutional, and Classroom. PhD Thesis. Graduate School of Vanderbilt University, Nashville, Tennessee. May.

Cartwright, G. P. (1994). Distance learning: A different time, a different place. Change: The Magazine of Higher Learning, Volume 26, Number 4, pp. 30-32.

Castells, M. (1998). End of millennium. Blackwell: Oxford.

Chen W. and Hirschheim, R., (2004). "A paradigmatic and methodological examination of information systems research from 1991 to 2001", Information Systems Journal, Volume 14, pp. 197-235.

Chute, A. G., Thompson, M. M., and Hancock, B. W, (1999). The McGraw-Hill handbook of distance learning. New York: McGraw-Hill.

Cisco Systems, Inc. (1999). "What is E-Learning?" Retrieved from: www.cisco.com

Clark, R.E. (1994). Media will never influence learning. Educational Technology Research and Development, Volume 42, Number 2, pp. 21-29.

Clarke, C. (2003). 'Towards a Unified e-Learning Strategy', Consultation Document. Retrieved from website [12th January 2010]: http://www.dfes.gov.uk/consultations/downloadableDocs/towards%20a%20unified%20e-learning%20strategy.pdf

Clarke, M., Butler, C., Schmidt-Hansen, P., and Somerville, M., (2004). Quality assurance for distance learning: a case study at Brunel University British Journal of Educational Technology, Volume 35, Number 1, pp. 5-11

Clayton, K., Blumberg, F., & Auld, D. P. (2010). The relationship between motivation, learning strategies and choice of environment whether traditional or including an online component. British Journal of Educational Technology, 3 (41), 349–364.

Cohen, *L., and* Manion, *L., (*1989*).* Research Methods in Education. (Third Ed.). London, England: Routledge.

Conole, G., Oliver, M. and Harvey, J. (2000). 'Toolkits as an Approach to Evaluating and Using Learning Material. Proceedings of the Learning to Choose, Choosing to Learn', 17th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, Coffs Harbour Australia, Southern Cross University.

Conole, C., Oliver, M., Isroff, K., Ravenscroft, A., (2004). Addressing methodological issues in elearning research. In S. Banks, P. Goodyear, V. Hodgson, C. Jones, V. Lally, D. McConnell & C. Steeples (Eds.), Proceedings of

the Fourth International Conference on Networked Learning, 92-97. Lancaster: Lancaster University & University of Sheffield.

Connolly T., and Stansfield, M. (2006). 'Game-Based Technologies in Overcoming Difficulties in Teaching Information Systems', Journal of Information Technology Education, Volume 5.

Cooze, J. (1991). 'The Elusive Concept of Efficiency in Education', The Morning Watch over the eight-year period, 1991-1999, Volume 1. Retrieved from website [12th January 2010]: http://www.mun.ca/educ/faculty/mwatch/vol1/cooze.html

Creswell, J. (2003). Research Design – Qualitative, Quantitative, and Mixed Methods Approaches, Sage publications, London.

Crotty, M. (1998). The foundations of social research: Meaning and perspective in the research process. Thousand Oaks, CA: Sage.

Curtis, D. D. and Lawson, M. J., (2001). 'Exploring Collaborative Online Learning', JALN, Volume 5, Issue 1, pp 21-34, February

Deal, W. F., (2002). Distance Learning: Teaching Technology Online. Technology Teacher, Volume 61, Number 8 (May-June), pp. 21-26.

De Souza, F. V. and Gomes, A. S. (2005). 'Analysis of Activity Structure in the Asynchronous Education Process via Mailing List', ACM International Conference Proceeding Series; Volume 127, Proceedings of the 4th international workshop on Task models and diagrams table of contents, Gdansk, Poland

Denzin, N. K., and Lincoln, Y., (2000). Handbook of qualitative research (2nd Ed). London: Sage.

Devedzic, V. (2004). 'Education and the Semantic Web', International Journal of Artificial Intelligence in Education', (IJAIED), Volume14, pp165-191.

DiPaolo, A., (2004). 'A Symposium eLearning as a Strategic Imperative for universities in Ireland' conference, DCU, 4 November. Available at website [12th January 2010]: http://www.universitiesireland.ie/news/elearning.php

Donnelly R, and O'Rourke, K. (2007). 'What now? Evaluating eLearning CPD practice in Irish third-level education ', Journal of Further and Higher Education, Volume 31, Number 1, pp. 31-40, February.

E-Learning Research & Development Roadmap for Ireland (2004). E-Learning Research Agenda Forum 2004. National College of Ireland. Retrieved from website [12th January 2010]: http://www.ncirl.ie/downloads/research_and_innovation/SFI_reportFINAL.pdf

Easterby-Smith, M., Thorpe, R. and Lowe, A. (1991). Management Research: An Introduction, London, UK: Sage Publications.

Eastmond, D. V., (1995). Alone but together: Adult distance study through computer conferencing. New York: Basic Books.

E-Learning Research & Development Roadmap for Ireland, National College of Ireland e-Learning Research Agenda Forum – 2004. Retrieved from Website: http://www.ncirl.ie/downloads/research_and_innovation/SFI_reportFINAL.pdf

Ellis, A., (2001). 'Student-Centered Collaborative Learning via Face-to-Face and Asynchronous Online Communication: What's the difference?' Retrieved from website [12th January 2010]: http://www.ascilite.org.au/conferences/melbourne01/pdf/papers/ellisa.pdf

Elial, G., Secundo, G., and Taurino, C., (2006). 'Towards unstructured and just-in-time learning: the "Virtual eBMS" e-Learning system'. Retrieved from website [12th January 2010]: http://www.formatex.org/micte2006/CoverTOC2.pdf

Ernest, H. J., and Federico, E. G. (2000). 'Measuring Learning Effectiveness: A New Look at No-Significant-Difference Findings', JALN, Volume 4, Issue 1, pp. 33-38, June

Ertmer, P. A., and Newby, T. J., (1993). 'Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective', Performance Improvement Quarterly, Volume 6, Number 4, pp. 50-72.

Falch, M. (2004). A Study on Practical Experiences with using E-learning Methodologies and Cooperative Transnational Development Methodology. CTI Working Paper, no. 97, 2004, Center for Tele-Information, Technical University of Denmark. Retrieved from website [12th January 2010]: http://www.cict.dtu.dk/upload/centre/cict/publications/working%20papers/ctiwp97.pdf

Falconer, D. J. and Mackay, D. R. (1999). "Ontological problems of pluralist research methodologies" in Proceedings of the Fifth Americas Conference on Information systems, W. D. Haseman and D.L. Nazareth (eds.), Milwakee, Wisconsin, pp. 624-626.

Farmer, J. (2004). 'Communication dynamics: Discussion boards, weblogs and the development of communities of inquiry in online learning environments', In R. Atkinson, C. McBeath, D. Jonas-Dwyer & R. Phillips (Eds), Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference (pp. 274-283). Perth, 5-8 December. Retrieved from website [12th January 2010]: http://www.ascilite.org.au/conferences/perth04/procs/farmer.html

Fein, A., and Logan, M., (2003). Preparing instructors for online instruction. New Directions for Adult and Continuing Education, Number 100, Winter, pp. 45-55.

Felix, U. (2003a). Pedagogy on the line: identifying and closing the missing links. In: Felix, U. (ed.), *Language Learning Online: Towards best practice*. Lisse: Swets & Zeitlinger, 147-171.

Felix, U (2003b). 'Humanising Automated Online Learning through Intelligent Feedback', Proceedings of the 20th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE).Retrieved from website [12th January 2010]: http://www.ascilite.org.au/conferences/adelaide03/docs/pdf/178.pdf

Fiedler, S. (2003). Personal web publishing as a reflective conversational tool for self-organized learning. BlogTalk--- A European conference on weblogs, Vienna, Austria, May 23-24, 2003. Retrieved from Website [12th January 2010]: http://www.educause.edu/Resources/PersonalWebpublishingasareflec/153931

Fitzgerald, B. and Howcroft, D. (1998). Towards Dissolution of the IS Research Debate: From Polarization to Polarity. Journal of Information Technology, Special Issue on Interpretive Research in Information Systems, Volume 13, Number 4, pp. 313-326.

Funk, P. (2002). 'Case-Based Reasoning and Knowledge Management to Improved Adaptability of Intelligent tutoring Systems', Workshop on Case-Based Reasoning for Education and Training at 6th European Conference on Case Based Reasoning, ECCBR2002, ed. Pedro A. González-Calero, pp 15-23, September.

Gagne, R. (1985). The Conditions of Learning, New York: Holt, Rinehart & Winston, 4th edition.

Gagne, R. M., Briggs, L. J., and Wager, W. W. (1992). Principles of Instructional Design, 4th edition, Orlando, Harcourt Brace Jovanovich.

Galliers, R. D. and Land, F. F., (1987). 'Choosing an appropriate information systems research methodology', Communications of the ACM, Volume 30, Number 11, pp. 900-902

Garrison, D. R., Anderson, T., and Archer, W. (2000). Critical Thinking, Cognitive Presence, and Computer Conferencing in Distance Education. The American Journal of Distance Education, Volume 15, Number 1, pp 7-23.

Garrison, D. R. (2003). 'Cognitive presence for effective asynchronous online learning: The role of reflective inquiry, self-direction and metacognition', In J. Bourne & J. C. Moore (Eds.), Elements of quality online education: Practice and direction. Volume 4, Sloan C Series, Needham, MA: The Sloan Consortium.

Garrison, R. and Anderson, T., (2003). E-learning in the 21st Century: A Framework for Research and Practice, Routledge Publishers

Govindasamy, T. (2001). Successful implementation of e-Learning Pedagogical considerations, The Internet and Higher Education, Volume 4, Issues 3-4, pp. 287-299

Groenewald, T. (2004). 'A phenomenological research design illustrated', International Journal of Qualitative Methods, Volume 3, Number 1, Article 4. Retrieved from website [12th January 2010]: http://www.ualberta.ca/~iiqm/backissues/3_1/pdf/groenewald.pdf

Guba, E. G., (1990). The alternative paradigm dialog. In E. G. Guba (Ed.), The paradigm dialog. Newbury Park, CA: Sage.

Guba, E. G. and Lincoln, Y. S. (1994). 'Competing paradigms in qualitative research, Handbook of Qualitative Research', NK Denzin and YS Lincoln (editions), SAGE, Thousand Oaks, pp. 105-117.

Guess, A., (2007). 'Students 'Evolving' Use of Technology', Inside Higher Ed, Educause Center of Applied Research, September 17th. Retrieved from website [12th January 2010]: http://www.insidehighered.com/news/2007/09/17/it

Hampel, R., (2006). Rethinking task design for the digital age: A framework for language teaching and learning in a synchronous online environment. ReCALL, Volume 18, Number 1, pp. 105-121. UK: Cambridge University Press.

Han, Xiaoxing, P., (1999). Exploring an Effective and Efficient Online Course Management Model, Newsletter: Volume 5, Number 2, November.

Harman, K., and Koohand, A., (2005). 'Discussion Board: A Learning Object', Interdisciplinary Journal of Knowledge and Learning Objects, Volume 1, pp. 67-77, Retrieved from Website [12th January 2010]: http://ijklo.org/Volume1/v1p067-077Harman.pdf

Hauben, R., (1996). Chapter 2 – The evolution of USENET: The poor man's ARPANET. In Netizens, On the history and impact of the Internet. Retrieved from website [12th January 2010]: http://www.columbia.edu/~rh120/ch106.x02

Herring, S., Scheidt, L., Bonus, S. and Wright, E., (2004). Bridging the gap: A genre analysis of weblogs. Proceedings 37th Annual HICSS Conference, 2004. Big Island, Hawaii.

Hoepfl, M. C., (1997). Choosing qualitative research: A primer for technology education researchers. Journal of Technology Education, Volume 9, Number 1, pp. 47-63. Retrieved from website [12th January 2010]: http://scholar.lib.vt.edu/ejournals/JTE/v9n1/pdf/hoepfl.pdf

Hummel, H., Manderveld, J., Tattersall, C., Koper, R., (2004). Educational modelling language and learning design: new opportunities for instructional reusability and personalised learning. International Journal of Learning Technology, 2004, Volume 1, Number 1, pp. 111-126

Israel, J. and Aiken, R., (2007). 'Supporting Collaborative Learning with an Intelligent Web-Based System', International Journal of Artificial Intelligence in Education, Volume 17, pp. 3-40.

Jansen, W., Hooven, H. M. V. D., Jägers, H. P. M., and Steenbakkers, G. C. A. (2002). The added value of elearning. Proceedings of the Informing Science and IT Education Conference: InSITE 2002, June 19- 21, 2002, Cork, Ireland. Retrieved from website [12th January 2010]: http://proceedings.informingscience.org/IS2002Proceedings/papers/Janse124Added.pdf

Jarvis, P. (2000). 'The Changing University: Meeting a Need and Needing to Change', Higher Education Quarterly, Volume 54, Number 1, pp. 43–67, January

Jarvis, P., Holford, J., and Griffin, C., (2003). The Theory and Practice of Learning, 2nd Edition, Routledge Falmer Publishers.

Jegede, O. J., Fraser, B., and Curtin, D. F., (1995). 'The development and validation of a distance and open learning environment scale', Educational Technology Research & Development, Volume 43, Number 1, pp. 90-94.

Jenkins, M. (2004). Unfulfilled Promise: formative: assessment using computer-Aided Assessment, Learning and Teaching in Higher Education', Volume 1, Issue 1, pp. 67-80.

Johnson, S. D., Aragon, S. R., Shaik, N., and Palma-Rivas, N. (1999). 'Comparative analysis of online vs. face-to-face instruction'. ERIC Document No. ED 448722. Retrieved from website [12th January 2010]: http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/16/c2/f6.pdf

Jorgenson, H. (2003). 'Evaluate & Improve Distance Programs with Sloan-C's Five Pillars of Quality', Distance Education, Report 7, Number 24

Kahiigi, E. K., Ekenberg, L., Hansson, H., Tusubira F.F, and Danielson, M. (2008). "Exploring the e-Learning State of Art." The Electronic Journal of e-Learning, Volume 6 Issue 2, pp. 77 - 88. Retrieved from website [12th January 2010]: http://www.ejel.org/Volume-6/v6-i2/Kahiigi_et_al.pdf

Kaplan, B. and Maxwell, J.A., (1994). Qualitative research methods for evaluating computer information systems, in Evaluating Health Care Information Systems: Methods and Applications, J.G. Anderson, C.E. Aydin, and S.J.Jay (Eds), CA: Sage, p.45-68.

Kay, R. H., (2006). 'Developing a comprehensive metric for assessing discussion board effectiveness', British Journal of Educational Technology, Volume 37, Issue 5, Page 761-783.

Kear, K., (2004). 'Peer learning using asynchronous discussion systems in distance education', Open Learning, Volume 19, Number 2, June.

Kellar, M., Watters, C., and Shepherd, M., (2006). A Goal-based Classification of Web Information Tasks. In Proceedings of the Annual Meeting of the American Society for Information Science and Technology (ASIS&T 2006), Austin, TX.

Keller, J., (1983). 'Motivational design of instruction, In C. Reigeluth (Ed.), Instructional design theories and models: An overview of their current status', pp. 386-434, Hillsdale, NJ: Erlbaum.

Kelly, M. (2005). Chairman of HEA, Public address on international networking event for Minerva, EU's open and distance-learning programme, Dublin Castle, on Friday, 2nd September 2005. Available on Website [12th January 2010]: http://www.siliconrepublic.com/news/news.nv?storyid=single5346

King, K. (2001). 'Educators revitalize the classroom "bulletin board": A case study of the influence of online dialog on face-to-face classes from an adult learning perspectives', Journal of Research on Computing in Education, Volume 33, Number 4, pp. 337-354.

Kock, N., Gray, P., Hoving, R., Klein, H., Myers, M., and Rockart, J., (2002). 'Is research relevance revisited: Subtle Accomplishment Unfulfilled Promise, or Serial Hypocrisy? Communications of the Association for Information Systems, Volume 8, pp. 330-346

Kolodner, J. L., Cox M. T., and Gonzalez P. A., (2005). 'Case-Based Reasoning-inspired approached to education', The Knowledge Engineering Review, Volume 20, pp. 299-303, Cambridge University Press.

Koper, E. J. R., Giesbers, B., Van Rosmalen, P., Sloep, P., Van Bruggen, J., Tattersall, C., Vogten, H. and Brouns, F. (2005). A design model for lifelong learning networks. Interactive Learning Environments. 1-2, pp. 71-92.

Kozma, R.B. (1994). Will media influence learning? Reframing the debate. Educational Technology Research and Development, Volume 42, Number 2, pp. 7-19.

Kraver, T., Goldstein M., Friesen, O., and Andrews, D., (2005). 'E-Learning Research Portal Study, Business Case, Feasibility, and Research Community Impact, Institute for Defense Analyses (IDA), Strategic Planning Consultants, (V03A Draft), August 15, Retrieved from website: http://trainingplace.org/home/mod/resource/view.php?id=55

Kumar, R. (2005). Research Methodology – A Step-By-Step Guide for Beginners, Second Edition, SAGE Publishers.

Kurt D. S., (2004). 'Changing The Game: What Happens When Video Games Enter the Classroom?' Innovate: Journal of Online Education. Retrieved from website

[12th January 2010]: http://www.academiccolab.org/resources/documents/Changing%20The%20Game-final_2.pdf

Laabs, J., C., (1997). Distance Learning Is Here! Lutheran Education, Volume 132 (January/February), pp. 141-150

Laurillard, D. (1993). Rethinking University Teaching, London: Routledge.

Laurillard, D. (1996). 'The educational challenges for teachers and learners', Paper presented at Virtual University Conference, 24 May, University of London, England.

Laurillard, D. (2002). Rethinking University Teaching. A conversational framework for the effective use of learning technologies. London: Routledge.

Lee, M., Thurab-Nkhosi, D. and Giannini-Gachago, D. (2005). Using informal collaboration to develop quality assurance processes for eLearning in developing countries: The case of the University of Botswana and The University of the West Indies Distance Education Centre, International Journal of Education and Development using ICT, Volume 1, Number 1.

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. Beverly Hills, CA: Sage.

Liyan Song, E., Janette, S., Singleton, R. and Hill, M. H. K., (2004). Improving online learning: student perceptions of useful and challenging characteristics, internet and Higher Education, Volume 7, pp. 59-70.

Lorenzetti, J., (2002). No Significant Difference – With the Right Instructor, Distance Education Report, Volume 6, Number 15.

Lyytinen, K. and Hirschheim, R., (1987). 'Information systems failures - a survey and classification of the empirical literature', In P.I. Zorkoczy (ed.), Oxford Surveys in Information Technology - Oxford University Press, Volume 4, Number 1987, pp. 257-309.

McCormick, R., and Paechter, C., (1998). Learning and Knowledge', Paul Chapman Educational Publishing.

McKenna, P. and Laycock, B., (2004). Constructivist or instructivist: pedagogical concepts practically applied to a computer learning environment. Proceedings of the 9th annual SIGCSE conference on Innovation and technology in computer science education, June 28th-30th 2004, Leeds, United Kingdom.

McLoughlin, S. (2001). Multimedia: Concepts and Practice, Prentice Hall.

McNamara, T. P, Miller, D. L., and Bransford, J. D. (1991). Mental models and reading comprehension. In Brown, R., Kamil, M. L., Mosenthal, P., and Pearson,

D. P. (eds.), Handbook of Reading Research, Vol. II, Longman, White Plains, NY, pp. 490–511.

McNamee, L., Roberts, T., Williams, S. and McInnerney, J. (2007). 'An Introduction – Online Collaborative Learning in Higher Education, May 31. Retrieved from website [12th January 2010]: http://clp.cqu.edu.au/software_tools.htm

McShane, K. (2007). 'Technologies Transforming Academics: Academic Identity and Online Teaching', PhD Thesis, retrieved form website: http://epress.lib.uts.edu.au/dspace/bitstream/2100/391/1/01front.pdf

Mabrito, M. (2006). 'A study of Synchronous Versus Asynchronous Collaboration in an Online Writing Class', The American Journal of Distance Education, Volume 20, Number 2, pp. 93-107.

Maeroff, G. I., (2003). A Classroom of One: How Online Learning Is Changing Our Schools and Colleges. New York: Palgrave Macmillan.

Marlow, C. (2004). Audience, structure and authority in the weblog community. Paper presented at the International Communication Association Conference, May 27-June 1, New Orleans, LA.

Marshall, S., (2006). 'Literature Review', NZ E-Learning Capability Determination, Victoria, University of Wellington, 20th March. Retrieved from website [12th January 2010]: http://www.utdc.vuw.ac.nz/research/emm/documents/20060320LiteratureReview.pdf

Martin, S., Sewani, A., Nelson, B., Chen, K., and Joseph, A.D., (2005). 'Analysing Behavioural Features for Email Classification', Proceeds 2nd Conference on Email and Anti-Spam (CEAS 2005), 2005, pp. 8 pg. Retrieved from website [12th January 2010]: http://www.ceas.cc/papers-2005/123.pdf

Melton, J., (2003). Learning Styles and Educational Technology: An Overview, Learning Styles & Ed Tech. Retrieved from website [12th January 2010]: http://jklmelton.net/2003/melton2003.pdf

Mertens, D. M., and McLaughlin, J. A. (2004). Research and Evaluation Methods in Special Education, Corwin Press.

Meško, D., (2007). ICT – Challenger for Education in Slovakia, Ministry of Education of Slovakia. ICETA, 5th International Conference on Emerging e-Learning Technologies and Applications, Slovakia, 6-8 September

Miles, M. B. and Huberman, A. M. (1984). Qualitative data analysis: a sourcebook of new methods, Newbury Park, CA: Sage Publications.

Milliron, M. D., (2004). The road to dot calm in education, Journal of Asynchronous Learning Networks, Volume 8, Issue 1, pp. 1-6.

Milliron, M.D. and Prentice, M., (2004). "Anytime, anyplace and the community college: ten emerging insights", Journal of Asynchronous Learning Networks, February, Volume 8, Issue 1.

Mingers, J., (2001). Combining IS Research Methods: Towards a Pluralist Methodology. Information Systems Research, Volume 12, Number 3, pp. 240-259.

Mitchel, P. (2000). The impact of educational technology: a radical reappraisal of research methods. In Squires, D., Conole, G. & Jacobs, G. (Eds), The Changing Face of Learning Technology. University of Wales Press, Cardiff, UK.

Mock, K., (2001). An Experimental Framework for Email Categorization and Management. In Proceedings of the 24th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval, ACM NY, pp. 392-393.

Monari, M., (2005). 'Evaluation of Collaborative Tools in Web-based E-Learning Systems', Masters Degree Project, KTH Numerical Analysis and Computer Science, Sweden.

Moody, P. B., (2004). 'Reinventing Email', IBM Research, Cambridge. CSCW 2002 Workshop: Redesigning. Retrieved from Website [12th January 2010]: http://peach.mie.utoronto.ca/people/jacek/emailresearch/CSCW2002/submissions/Lotus-pmoody%20cscw%20email%20workshop%20final.pdf

Moore, M. G., (1989). 'Three Types of Interaction', The American Journal of Distance Education, Volume 3, Number 2, pp. 1–6.

Motamedi, V., (2001). "A Critical Look at the Use of Videoconferencing in United States Distance Education." Education, Volume 122, Number 2, pp. 386-394.

Muirhead, B. (1999). Attitudes toward interactivity in a graduate distance education program: A qualitative analysis, PhD Thesis. Retrieved from Website [12th January 2010]: http://www.bookpump.com/dps/pdf-b/1120710b.pdf

Murray, T. (2003). 'Toward Supporting Information Quality in Rhetorical, Dialogic, and Collective On-Line Communication, AIED, retrieved from Website [12th January 2010]: http://www.education.umd.edu/EDHD/faculty2/Azevedo/AIED/metacogWorkshopPDFs/murray.pdf

Myers, M. D. (1997). 'Qualitative research in information systems', MISQ Discovery, retrieved from website [12th January 2010]: http://www.qual.auckland.ac.nz/

Myers, M.D. and Avison, D.E., (2002). Qualitative research in Information Systems, London: Sage Publications.

Nanno, T., Fjiki, T., Suzuki, Y., and Okumura, M., (2004). 'Automatically Collecting, Monitoring, and Mining Japanese Weblogs', International World Wide Conference, Proceedings for the 13th International World Wide Web, WWW2004, Poster Session, pp 320-321, May 17-22, New York.

Natanson, M., (1970). 'Alfred Schutz on Social Reality and Social Science', In Maurice Natanson, ed., Phenomenology and Social Reality. The Hague: Nijhoff.,

Negash, S. and Wilcox, M. V., (2008). Chapter 1, E-Learning Classifications, Difference and Similarities. In Negash, S., Whitman, M., Woszczynski, A., Hoganson, K., and Mattord, H., (2008) Distance Learning for Real-Time and Asynchronous Information Technology Education, IGI Global, Hershey: Information Science Reference

Nichols, M., (2003). 'A theory for eLearning', Educational Technology & Society, March, pp. 1-10.

Nicholson, S.A. and Bond, N. (2003). 'Collaborative reflection and professional community building: An analysis of preservice teachers' use of an electronic discussion board', Journal of Technology and Teacher Education, Volume 11, Number 2, pp. 259-279.

Northover, M. (2002). Online discussion boards - friend or foe? In A. Williamson, C. Gunn, A. Young & T. Clear (Eds), Winds of change in the sea of learning: Proceedings 19th ASCILITE Conference, pp. 477-484. Auckland, New Zealand, 8-11 December. Retrieved from website [12th January 2010]: http://www.ascilite.org.au/conferences/auckland02/proceedings/papers/193.pdf

O'Neil, T. (2006). How distance education has changed teaching and the role of the instructor. Paper presented at the E-Leader Conference, Slovakia. Available from website [12th January, 2010]: http://www.g-casa.com/download/ONeil_Distance_Education.pdf

Oliver, M. (2000). "An introduction to the evaluation of learning technology", Educational Technology & Society, Volume 3, Number 4, pp. 20-30.

Orleans, M (2002). Phenomenology, Encyclopedia of Sociology. Retrieved from website [12th January 2010]: http://hss.fullerton.edu/sociology/orleans/phenomenology.htm

Orlikowski, W. and Baroudi, J. (1991). Studying information technology in Organisations: Research Approaches and assumptions, Information System Research, Volume 2, Number 1, pp. 1-29.

Paquet, S. (2002). 'Personal knowledge publishing and its uses in research'. Retrieved from website [12th January 2010]: http://www.knowledgeboard.com/item/253/2010/5/2008

Park, Y. J. and Bonk, C. J., (2007). 'Synchronous Learning Experiences: Distance and Residential Learners' Perspectives in a Blended Graduate Course', Journal of Interactive Online Learning, Volume 6, Number 3, Winter. Retrieved from website [12th January 2010]: http://www.ncolr.org/jiol/issues/PDF/6.3.6.pdf

Patton, M. Q., (2002). Qualitative research & evaluation methods (3rd Ed.). Thousand Oaks, CA: Sage Publications.

Peak, T. E. (2004). 'Distance Learning: An Overview', Partial fulfillment of EDIT6347. Retrieved from website [12th January 2010]: http://www.yellowdocuments.com/6366827-distance-learning-an-overview-

Pelz, B. (2004). '(My) Three Principles of Effective Online Pedagogy', JALN, Volume 8, Issue 3 (June), pp. 33-46.

Phillips, D. C. and Burbules, N., (2000). Postpositivism and educational research. New York: Rowan and Littlefield.

Phipps, R., (1999). 'What's the Difference? A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education', The Institute for Higher Education Policy, Washington, DC. Retrieved from Website [12th January 2010]: http://www.ihep.org/assets/files/publications/s-z/WhatDifference.pdf

Picciano, A. G. (2002). 'Beyond Student Perceptions: Issues of Interaction, Presence, and Performance in an Online Course', JALN, Volume 6, Issue 1, July.

Poulová, P., (2007). "Assessment of E-Learning Contribution to Learning of the Students and Academicians of University of Hradec Králové", ICETA, 5th International Conference on Emerging e-Learning Technologies and Applications, Slovakia, 6-8 September

Reeves, T.C., Herrington, J., and Oliver, R., (2002). Authentic activities and online learning. In A. Goody, J. Herrington, & M. Northcote (Eds.), Quality conversations: Research and Development in Higher Education, Volume 25, pp. 562-567. Jamison, ACT: HERDSA.

Reiff, J. C. and Powell, J. W., (1992). Learning differences and interactive computer program. Presented at the Annual Meeting of the Association of Teacher Educators, Orlando, FL. (ERIC Document Reproduction Service No. ED 346 087), February.

Rinear, K. (2003). 'Maintaining a Successful Distance Program: What Administrators Need to Know', Distance Education Report 7, Number 13.

Rogerson-Revell, P., (2007). 'Directions in e-learning tools and technologies and their relevance to online distance language education', Open Learning, Volume 22, Number 1, pp. 57-74, February

Rohall, S. L., (2002). 'Redesigning Email for the 21st Century', Workshop Position Paper, IBM Research, Cambridge. Retrieved from website [12th January 2010]: http://www.ischool.utexas.edu/~i385q/readings/Rohall-ND-RedesigningEmail.pdf

Romainville, M. and Nöel, B. (1998). 'Learning Support for First-Year University Student', Higher Education Management, OECD, Journal of the Programme on Institutional Management in Higher Education, Volume 10, Number 2, pp. 59-75, July

Rothkopf, E. Z. (1970). 'The Concept of Mathemagenic Activities', Review of Educational Research, Volume 40, Number 3, pp. 325-336, June

Rowe, N.C. (2004). Cheating in online student assessment: Beyond plagiarism. Journal of Distance Learning Administration, Volume 7, Number 2. Retrieved from website [accessed on June 16th 2008]: http://www.westga.edu/~distance/ojdla/summer72/rowe72.html

Rowley, J. (2000). 'Is higher education ready for knowledge management?, The International Journal of Educational Management, Volume 14, Number 7, pp. 325-333

Rowntree, D. (1987). 'Assessing Students: How shall we know them?' – 2nd Edition, Nichols Publishing

Ruggles, R. L., (1997). Knowledge Management Tools. Butterworth Heinemann Boston, MA.

Scheuermann, M. (2003). Leveraging Adult Student Value in the E-Learning Environment - A Pedagogical Shift. In C. Crawford et al. (Eds.), Proceedings of Society for Information Technology and Teacher Education International Conference 2003, pp. 2564-2566, Chesapeake, VA: AACE

Sederberg, L., (2003). Rubric Clearly Describes Exemplary Online Instruction, Distance Education Report, Volume 7, Issue 23.

Siemens, G., (2004). 'Connectivism: A Learning Theory for the Digital Age'. Retrieved from website [January 12th, 2010]: http://www.elearnspace.org/Articles/connectivism.htm

Simon, H.A. (1971). Designing organizations for an information-rich world. In M. Greenberger (Ed.), Computers, communications, and the public interest (pp. 37-72). Baltimore: MD: The Johns Hopkins Press.

Simonson, M.R. (1997). "Evaluating Teaching and Learning at a Distance." Teaching and Learning at a Distance: What it takes to effectively Design, Deliver and Evaluate Programs. Thomas E. Cyrs (ed.), Jossey-Bass, San Francisco, CA.

Sims, R., Dobbs, G., and Hand T. (2002). 'Enhancing Quality in 'Online Learning: Scaffolding Planning and Design through Proactive Evaluation', Distance Education, Volume 23, Number 2, pp. 135-148.

Slaton, J. (2001). 'Remembering community memory The Berkeley beginnings of online community', Retrieved from Website [12th January 2010]: http://articles.sfgate.com/2001-12-13/technology/17629551_1_mainframe-bulletin-board-cardboard-box

Sloffer, S. J., Dueber, B. and Duffy, T. M. (1999). 'Using Asynchronous Conferencing to Promote Critical Thinking: Two Implementations in Higher Education', 32nd Hawaii International Conference on Systems Science.

Spector, M., J. (2001). 'An Overview of Progress and Problems in Educational Technology', Interactive Educational Multimedia, Number 3, pp. 27-37.

Sproull, L.S. and Kiesler, S. (1991). 'Connections: New Ways of Working in the Networked Organization', Cambridge, MA: MIT.

Stewart, G. L., Carson, K. P., and Cardy, R. L. (1996). 'The Joint Effects of Conscientiousness and Self-Leadership Training on Employee Self-Directed Behaviour in a Service Setting', Personnel Psychology, Volume 49, Issue 1, pp. 143-164, March.

Stillson, H. and Alsup, J. (2003). 'Smart ALEKS ... or Not? Teaching Basic Algebra using an Online Interactive Learning System', Mathematics and Computer Education, Volume 37, Number 3, p 329-340, Autumn.

Stojanovic, L., Staab, S., and Studer, R., (2001). 'eLearning based on the Semantic Web', E-learning in the Semantic Web, WebNet 2001 Publications. Retrieved from website [12th January 2010]: http://www.aifb.uni-karlsruhe.de/~sst/Research/Publications/WebNet2001eLearningintheSemanticWeb.pdf

Strollberg, M., Strang, T., and Fensel, D., (2005). 'Automated Collaboration on the Semantic Web', GESTS International Transactions on Computer Science and Engineering, Volume 17, Number 1, retrieved from website [12th January 2010]: www.deri.ie/publications/papers

Sue, V. M. and Ritter, L. A. (2007), Conducting Online Surveys, Thousand Oaks, CA: Sage

Swan, K., (2001). 'Virtual Interaction: Design factors affecting student satisfaction and perceived leaning in asynchronous online courses', Distance Education, Volume 22, Number 2, pp. 306-331, January.

Tait, A. (2000). 'Planning Student Support for Open and Distance Learning', Open Learning, Carpax Publishing, Volume 15, Number 3.

Tattersall, C., Waterink, W., Höpperener and Koper, R. (2006). 'A Case in the Measurement of Educational Efficiency in Open and Distance Learning', Distance Education, Volume 27, Number 3, pp. 391-404, November.

Taylor, P. G., (1999). 'Making sense of academic life: Academics, universities and change', Buckingham: Open University Press.

Taylor, J. (2001). '29 Steps to Heaven? Strategies for transforming University teaching and learning using multimedia and educational technology', The Open University, Volume 22.

Teare, R. E., (1998). 'Implementing virtual support for workplace learning', Journal of Workplace Learning', Volume 10, Number 2, pp. 122-137.

Terrell, S. (2005). A longitudinal investigation of the effect of information perception and focus on attrition in online learning environments. Internet in Higher Education, Volume 8, Number, 3, pp. 213-219.

Terrell, S. (2006). Components of effective evaluation in online learning environments. In B. H. Khan (Ed.), Flexible learning in an information society (pp. 236-246). Hershey, PA: Information Science Publishing.

Terrell, S. (2007). Self-perceived causality for attrition from a limited residency doctoral program. Paper presented at the Annual Meeting of the American Educational Research Association (AERA), Chicago, IL.

Tham, C. M. and Werner, J. M. (2002). 'Designing and Evaluating E-Learning in Higher Education: A Review and Recommendations', Journal of Leadership and Organizational Studies, Volume 11, Number 2, pp. 15-25.

Thorpe, M. (2002). 'Rethinking Learner Support: the challenge of collaborative online learning', Open Learning, Volume 17, Number 2.

Thorpe, M., Tait, A. and Mills, R., (2003). 'Collaborative Online Learning', Rethinking Learner Support in Distance Education: Change and Continuity in an International Context, Chapter 16, Routledge Publishing.

Tosh D., Werdmuller, B., (2004). "ePortfolios and weblogs: one vision for ePortfolio development". Retrieved from website [12th January 2010]: http://www.morrisville.org/classrooms_curriculum/hive_portal/documents/ePortfolio_Weblog.pdf

Tsinakos, A. (2003). 'Asynchronous distance Education: Teaching using Case Based Reasoning', Turkish Online Journal of Distance Education – TOJDE, Volume 4, July.

Vakkari, P. and Järvelin, K., (2005). Explanation in information seeking and retrieval. In A. Spink & C. Cole, (Eds.) New directions in cognitive information retrieval, (pp. 113-138). Dordrecht, the Netherlands: Springer.

Valentine, D. (2002). 'Distance learning: Promises, problems, and possibilities', Online Journal of Distance Learning Administration. Retrieved from website [12th January 2010]: http://www.westga.edu/~distance/ojdla/fall53/valentine53.html

Vega-Gorgojo, G., Bote-Lorenzo, M. L., Gómez-Sánchez E., Dimitriadis, Y. A. and Asensio-Pérez, J. I. (2006). A semantic approach to discovering learning services in grid-based collaborative systems. Future Generation Computer Systems, Volume 22, Number 6, pp. 709-719

Voigt, J. (1985). Patterns and routines in classroom interaction. Recherches en Didactique des Mathématiques, Volume 6, Number 1, pp. 69-118.

Volery, T., (2000). Critical success factors in online education. The International Journal of Educational Management, Volume 14, Number 5, pp. 216-223.

Vygotsky, L. S (1978). 'Mind in Society: The development of higher psychological processes', Cambridge, MA: MIT Press.

Walsham, G. (1995). 'The emergence of Interpretivism, Information Systems Research', Volume 6, Number 4, pp. 376-394.

Warren, C., and Karner, T., (2004). Discovering Qualitative Methods. Los Angeles: Roxbury Publishing Company.

Watkins, C. and Mortimore, P., (1999). Pedagogy: What Do We Know? Understanding Pedagogy and its impact on learning. P. Mortimore. London, Paul Chapman Publishing Limited.

Webster, J., and Hackley, P., (1997). Teaching effectiveness in technology-mediated distance learning. The Academy of Management Journal, Volume 40, Number 6, pp. 1282-1309.

Wegner, E., McDermott, R. A., and Snyder, W. (2002). Cultivating communities of practice. Cambridge, Mass.: Harvard Business Press.

Whitehouse, C., Durbin, C. & Shah, H. (2002). The Role the New Opportunities Fund ICT for Teachers Initiative has played in the UK, Drawing on the Experiences of SIfT, an Approved Training Provider to the Scheme. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2002* (pp. 319-323). Chesapeake, VA: AACE.

Whittaker, S. and Sinder, C., (1996). 'Email overload: exploring personal information management of email', CHI '96 Vancouver Papers, April 13-18.

Retrieved from Website [12th January 2010]: http://dis.shef.ac.uk/stevewhittaker/emlch96.pdf

Wilkinson, L. and Buboltz, W.C., (1998). E-mail: Communication of the future? (Report No IR-018-890). Washington, DC: Society for Information Technology & Teacher Education International Conference. (ERIC Document Reproduction Service No. ED421170) March.

Williams, M. (2000). Interpretivism and generalization. Sociology, Volume 34, pp. 209-224.

Williams, D. D. (2002). 'Improving use of Learning Technologies in Higher Education through participant oriented evaluations', Educational Technology & Society, Volume 5, Number 3, pp. 11-17.

W3C organization (2008). 'W3C Semantic Web Activity'. Retrieved from website: http://www.w3.org/2001/sw/

Zao, L., and Yang, Z. Y., (2004). "Factors influencing distance-education graduate students' use of information sources: a user study". Journal of Academic Librarianship, Volume 30, Issue 1, pp. 24-35.

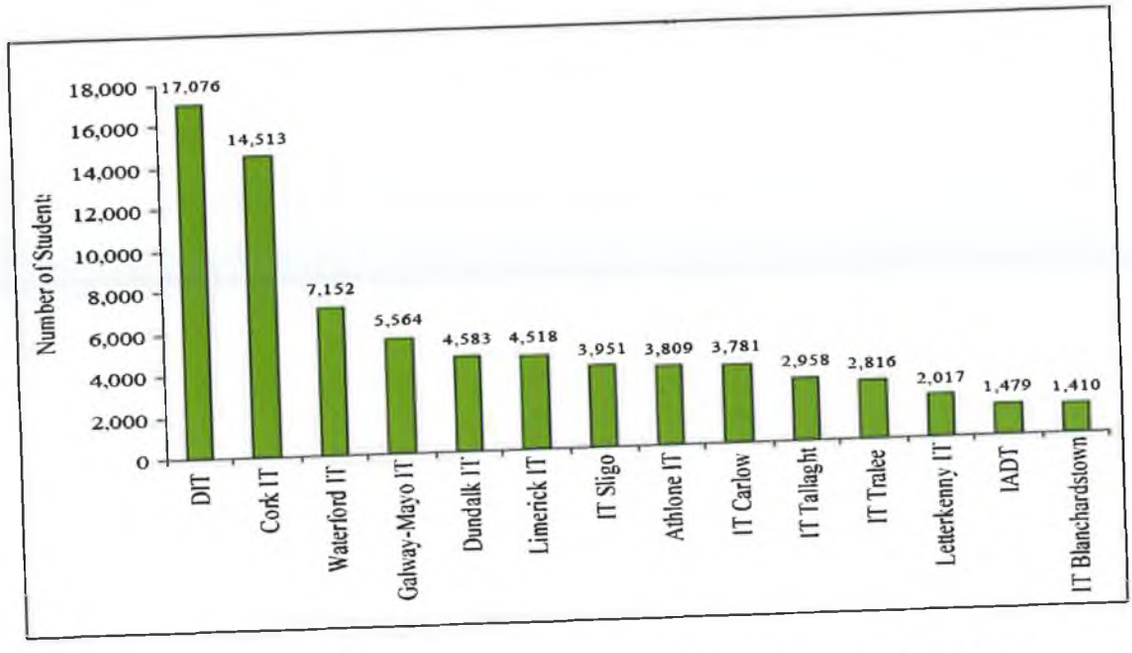
Zvacek, S. M., (2007). "Changing Roles for Teachers and Learners in Online Courses: Evolution, Not Revolution." ICETA, 5th International Conference on Emerging e-Learning Technologies and Applications, Slovakia, 6-8 September

Appendix A

STUDENT POPULATION WITHIN THE IoTs

Departments	Athlone IT	Blanchardstown IT	Carlow IT	Cork IT	Dublin IT	Dundalk IT	Dun Laoghaire Institute of A	Galway-Mayo IT	Letterkenny IT	Limerick IT	Institute if Technology, Sligo	Institute of Technology Talla	Tralee IT	Waterford IT
Business	1292	716	675	4554	4083	1618	563	1277	824	826	2313	1613	902	1627
Humanities	1130		519		3587	779		712	49				191	1470
Science	547		291	1426	1835	643		633	90	1224	693	680	94	800
Engineering	840	694	612	3939	5405	934		1026	329	992	945	502	407	993
Hotel and Catering					2166			358				163	300	
Information Technology			395			609			262				218	
Art & Design				4594			863		200	585				
Health Science / Nursing									263				704	873
Education / Adult Education														1389
Part-Time Students			1289											
TOTAL	3809	1410	3781	14513	17076	4583	1426	5564	2017	3627	3951	2968	2816	7152

IOT Student Population (Adapted from the HEA)



Institute of Technology's Student Population (Adapted from the HEA – Role of the Institutes of Technology in Enterprise Development: Profiles and Emerging Findings

Appendix B

RESEARCH INSTRUMENT

An Evaluation of the Effectiveness and Efficiency of Online

1. WELCOME!

DEAR STUDENT,

I am conducting a survey amongst students to find out more about student learning habits and experiences. The aim of this research is to evaluate whether students are satisfied with the current level of online support while students are participating within an online course, across Irish Institutes of Technology (IOTs).

This questionnaire will only take you approximately 12 MINUTES to complete.

Your responses and opinions are very significant to this study. Without your help, this study will not be complete.

PLEASE BE ASSURED THAT ALL THE INFORMATION PROVIDED WILL BE TREATED IN ABSOLUTE CONFIDENCE AND USED SOLELY FOR THE PURPOSE OF THIS RESEARCH. STUDENTS' PERSONAL INFORMATION WILL NOT BE PUBLISHED AND THE FINDINGS WILL USE AGGREGATE DATA ONLY!

Thank you for your time,

Noel Carroll

2. Section 1. Background Information

1. What is the name of your Institute of Technology?

2. Please indicate which age category you belong to:

- ○ 17-20
- ○ 21-24
- ○ 25-28
- ○ 29-31
- ○ 31-34
- ○ 35+

3. Gender:

- ☐ Male
- ☐ Female

4. Please indicate whether you are a standard applicant student or a mature student:

- ☐ Standard Applicant
- ☐ Mature Applicant

5. What department do you study in?

6. Please indicate what NQAI level you are currently studying at:

- ☐ Higher Certificate (Level 6)
- ☐ Degree (Ordinary)(Level 7)
- ☐ Degree (Honours)(Level 8)
- ☐ Higher Diploma (Level 8)
- ☐ Masters(Level 9)
- ☐ PhD(Level 10)

Other (please specify)

7. Is English your first language?

- ☐ Yes
- ☐ No

8. If English is NOT your first language, please indicate which of the following English courses you have successfully completed:

- [ ] International English Language Testing System (IELTS) course
- [ ] English Cambridge Course

Other (please specify)

3. Section II. Online Activity Information

SECTION 2 provides information on your level of computer usage and to determine how much time you spend online. It also evaluates the method and speed of online support available to you.

9. Please indicate your level of proficiency in using the following:

	Very Inefficient	Average Proficiency	Very Proficient
A computer for general computing purposes	○	○	○
The Internet for general browsing purposes	○	○	○

10. Please estimate the average number of hours you spend PER DAY using or exploring the Internet:

Average number of hours: [ ]

DEFINITION: Asynchronous Support Tools

Asynchronous Support Tools are tools that allow interaction intermittently with a time delay. This allows students to participate according to their schedule, and be geographically separate from the lecturer, for example, email, discussion boards and weblogs.

DEFINITION: Weblog

A Weblog (or Blog) is a type of website that uses a dated log format for adding its content. It is usually moderated by a single person who creates the material themselves, edits submissions from other contributors, for example, www.weblog.com

DEFINITION: Wiki

A Wikl is a collection of websites, that allows you to edit, delete, or modify the content on the web, for example, http://en.wikipedia.org

DEFINITION: Discussion Board

A Discussion Boards is a forum on a Web site for the discussion of a specific topic or set of related topics, for example, www.boards.ie

11. Please indicate your level of use of asynchronous support tools while participating in an online course:

	No Use	Moderate Use	Extensive Use
Frequency using asynchronous support tools	○	○	○

12. Please specify the level of importance you place on each of the following asynchronous tools to successfully complete an online course:

	Not Important	Important	Vey Important
File exchange (file transfer protocol – to exchange files)	○	○	○
Email (excluding attachments)	○	○	○
Email (message and attachment)	○	○	○
Phone (text messaging)	○	○	○
Wiki	○	○	○
Discussion Boards	○	○	○
Weblogs	○	○	○

Other (please specify)

13. Please list in order of preference, two online asynchronous tools that you use to request online support from your lecturer:

1st Preference:

2nd Preference:

14. Please estimate the average response time, in HOURS, for your queries to be dealt with using the tools you identified in question 13 above:

1st Preferenced Tool: HOURS

2nd Preferenced Tool: HOURS

4. Section III. Satisfaction with student support

SECTION 3 will determine whether you are satisfied with the level of asynchronous support available to you.
It specifies certain activities and questions whether this is true, false or whether you have no opinion in relation to certain activities.
This section also questions your level of usage with three online tools; email, discussion boards, and weblogs.

15. Please indicate which of the following statements you believe to be are true, false or whether you have no opinion

*DEFINITION: A Virtual Learning Environment is a software system designed to help lecturers by facilitating the management of educational courses for their students, for example Moodle and Blackboard

	True	False	No Opinion
The course content is easily accessible	◯	◯	◯
Communication with other STUDENTS taking this module is easily achieved through the use of asynchronous tools, e.g. e-mail	◯	◯	◯
Communication with my LECTURER teaching this module is easily achieved through the use of asynchronous tools, e.g. e-mail	◯	◯	◯
A FAQ section relating to this module content is provided online	◯	◯	◯
Technical support, when required, is readily available to me	◯	◯	◯
I am satisfied with the speed of feedback from my online assignments	◯	◯	◯
Training regarding the use of Virtual Learning Environment* features is available to me when required	◯	◯	◯
Support by way of online tutorials is available 24/7	◯	◯	◯
I have easy access to the Internet while undertaking this module	◯	◯	◯
Group activities is a critical part to successfully completing this module	◯	◯	◯
Reflection on what I have learned is encouraged throughout this module	◯	◯	◯
I work productively on my own in achieving module objectives	◯	◯	◯
I feel that face-to-face contact with my lecturer is necessary to learn within this module.	◯	◯	◯
I am motivated to achieve high results within this module	◯	◯	◯
In this module, I moderately request additional online support from my lecturer.	◯	◯	◯

Other (please specify)

16. Please indicate your level of use with WEBLOGS to receive support from the following people, while participating in an online course:

	No Use	Moderate Use	High Level of Use
Fellow Students	◯	◯	◯
Your Lecturer	◯	◯	◯

17. Please indicate your level of use with EMAIL to receive support from the following people, while participating in an online course:

	No Use	Moderate Use	High Level of Use
Fellow Students	○	○	○
Your Lecturer	○	○	○

18. Please indicate your level of use with DISCUSSION BOARDS to receive support from the following people, while participating in an online course:

	No Use	Moderate Use	High Level of Use
Fellow Students	○	○	○
Your Lecturer	○	○	○

5. Section IV. Support for Course Content

SECTION 4 evaluates how your lecturer 'expects' you to access or download the course material, and whether you prefer to work on assignments as an 'individual' or within 'groups'.

NOTE: Please indicate the percentage (out of 100%) for EACH question.

19. Please estimate the PERCENTAGE of core course content (out of 100%) you are expected to access in each of the formats, to successfully complete an online course, specified below:

Text Books and hard copy articles (hard copy, offline materials)	
Online textual core course content – Web Pages containing text	
Online core course content in the form of Video/Animation	
Online core course content in the form of audio	
Other	

20. Please estimate the PERCENTAGE of core course content (out of 100%) you are expected to access using the following asynchronous tools, to successfully complete an online course, specified below:

Web Browser (To view content, browse relevant web sites etc.)	
File exchange (file transfer protocol – to exchange files)	
Email (excluding attachments)	
Email (message and attachment)	
Weblogs	
Discussion Forum	
Online Assessments	

21. Please estimate the PERCENTAGE OF LEARNING (out of 100%) you are expected to achieve as an individual task, and as a group task, to successfully complete an online course:

Individual Work	
Group Work	

22. Please estimate the PERCENTAGE OF SATISFACTION (out of 100%) you feel in working with an individual task, and with a group task to successfully complete an online course:

Individual Work	
Group Work	

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6. Section V. Usage of Online Asynchronous Support Tools

SECTION 5 evaluates which learning activities do you use asynchronous tools, what characteristics you like about these tools, and whether they are useful to you in providing you with online support.

NOTE: For your convenience, you may leave boxes blank if a specific tool is NEVER used within your learning activities (e.g. leave Weblogs column blank if you NEVER use Weblogs to successfully complete the online course you are studying)

23. Please specify your INTENSITY OF USE of the following asynchronous tools in each of the activities listed below or choose 'N/A' from the drop down box if not applicable, to successfully complete an online course:

	DISCUSSION BOARDS	WEBLOGS	EMAIL (excluding attachments)	EMAIL (including message and attachment)
Communicating with other students				
Communicating with your lecturer				
Carrying out a group learning task				
Carrying out a learning task individually				
Gathering information				
Listening to course material				
Managing course material				
Planning a group learning task				
Planning an individual learning task				
Reading course material				
Revising course material				
Self assessment exercises				
Receiving Student Support				
Providing Student Support				
Viewing course material				

Other (please specify)

24. Please specify your level of SATISFACTION WITH THE CHARACTERISTICS of using the following asynchronous tools or choose 'N/A' from the drop down box if not applicable, to successfully complete an online course:

	DISCUSSION BOARDS	WEBLOGS	EMAIL (excluding attachments)	EMAIL (including message and attachments)
Speed				
Usability				
Feedback				
Communication				
Delivery				
Content				
Effectiveness				
Efficiency				
Satisfaction				

Other (please specify)

PLEASE NOTE

EXPLANATION: PREVENTIVE SUPPORT:
•Available at start of academic year
•Precautionary measure of skills needed to succeed in the course

EXPLANATION: REMEDIAL SUPPORT:
•Addresses shortcomings of student results
•Set deadlines for students to solve problems
•Sessions throughout the year for immediate feedback on academic performance

EXPLANATION: STUDY SKILLS SUPPORT:
•Support students to develop skills
•Raises the quantity and quality of student success
•Match of education and skills for the demands within industry

25. Please specify your level of SATISFACTION with online support provided by your lecturer, in using the following asynchronous tools, or choose 'N/A' from the drop down box if not applicable, to successfully complete an online course:

	WEBLOGS	DISCUSSION BOARDS	EMAIL (excluding attachments)	EMAIL (message and attachment)
Preventative Support				
Remedial Support				
Study Skills Support				

Other (please specify)

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7. Section VI. Additional Information

The final section, SECTION 6, is an open question to allow you to voice any of your opinions, concerns, frustrations, ideas or any additional comments in relation to your experiences in seeking online support from academic staff or students in relation to the online course you are studying.

26. Please provide any additional comment that you feel is important, in successfully completing your online course:

THANK YOU FOR YOUR TIME AND PATIENCE TO COMPLETING THIS QUESTIONNAIRE!

Email:

Dear Student,

If you are currently participating in learning through an online platform, whether as a fully online course or partially online as part of your studies, I would sincerely appreciate if you could take the time (approximately 12 minutes) to participate in this online questionnaire on student learning support which is available at:
http://www.surveymonkey.com/s.aspx?sm=W7gqTEHciYi9iVkIYYGkKA_3d_3d

Your responses and opinions are very significant to this study. Without your help, this study will not be complete. Please be assured that all the information provided will be treated in absolute confidence and used solely for the purpose of this research.

Thanking you in advance for your support and insight that will lead to the fulfilment of this research.

Kind Regards,

Noel Carroll

Postgraduate Research
Business Studies Department
Galway-Mayo Institute of Technology
Dublin Road
Galway

Telephone: (091) 742431
Mobile: (087) 754 222 4

Email: noel.carroll@gmit.ie

Re: Research Questionnaire Distribution

Dear Course Coordinator,

As a postgraduate student in Business Studies, I am currently undertaking imperative research at the Galway-Mayo Institute of Technology (GMIT). The research focuses on the Effectiveness and Efficiency of Online Asynchronous Support tools for the Function of Learning in third level education. I am writing to ask for your assistance in the completion of a questionnaire relating to the evaluation of Online Asynchronous Support within an e-learning environment.

I would sincerely appreciate if you could take the time to distribute this questionnaire to a number of students across all departments, currently participating within any form of an online learning programme. Student's responses and opinions are very significant to this study. Without your help, this study will not be complete. Please be assured that all the information provided will be treated in absolute confidence and used solely for the purpose of this research.

I appreciate that time is scarce at this time of the year, but if you could find the time next week to distribute and collect these responses, I would be extremely grateful. A total response rate of approximately 20 students from your Institution would be significant (i.e. 4 from each department). Please feel free to contact me at the above phone number or e-mail address, should you have any questions regarding this research.

Thanking you in advance for your support and your student's insight that will lead to the fulfilment of this research.

Yours Sincerely,

Noel Carroll

12 February 2008

Kevin Heffernan,

Dept. of Business,

GMIT,

Dublin Rd,

Galway

Phone 091 742356, Mob: 087 6062466

email kevin.heffernan@gmit.ie

Dear Sir/Madam

Mr Noel Carroll is undertaking vital research here at the Department of Business, GMIT. Noel is looking at students perspectives on the effectiveness of Asynchronous Support Tools while undertaking e-learning. We in this college, are just beginning to embrace technologies to mediate learning and feel that this research will be very informative in supporting us in the development of pedagogically sound modules for e-learning delivery. You can be assured that a summary of the findings will be available to you. In addition all participants are guaranteed anonymity as results will be presented in aggregate only.

Your support in achieving the objectives of this research is vital. I am very aware of the huge pressures on your time as administration work mounts. Please be assured, that if you can offer your support, it will be both valued and appreciated.

Yours Faithfully

Kevin Heffernan (Research Supervisor)