The quality factors which influence online learning and impact on the student experience

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The quality factors which influence online learning and impact on the student experience.

By

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BA (Hons), MSc

Thesis Presented to the Faculty of Science, Health & Education of the University of the Highlands & Islands

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Abstract

The quality factors which influence online learning and impact on the student experience.

Michael Macinnes Smith

This dissertation identifies six measures of quality and correlates their level of association against an indicator of quality and effectiveness, partly derived from a model tested by Peltier et al, (2003). The dissertation researches online student-learner attitudes from three universities in England, Scotland and Ireland. These cohorts were almost entirely off-campus distance learners, with a predominance of female, adult-returner students studying Higher Education degrees and modules.

A mixed methods approach adopted a Likert-scale survey questionnaire, a series of focus group sessions and an open-ended online question on student perspectives, focused on the key indicators associated with the quality of student online experience. The methodological framework is explained in detail to provide a basis upon which follow-up research can be progressed.

The research aims to identify the most pertinent quality factors important to the online learning experience. The following factors were found to be directly correlated with quality in online education (strongest correlation first): tutor-student interactions; knowledge of delivery technologies; student-student interaction; ICT access and skills; course design; and preparedness and readiness for online study. The sum of these measure’s correlations with the quality of the online education experience accounts for 70.4% of variance in student perspectives. Other socio-demographic factors (e.g. age, gender, level of education, location, hours worked per week and study mode) were studied and the sum of these factor’s correlations with the quality of the online education experience accounts for a further 10.5% of variance in student perspectives on this issue.

Further research opportunities identified in this dissertation are connected with developing further knowledge on the relationship between quality, student satisfaction and retention in the online education context.
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Chapter 1 - An Introduction to Distributed Online Education

1.1 Introduction to Online Education

Since before the turn of the Millennium, staff at the Further and Higher Education Institution, Lews Castle College UHI, a Campus of the University of the Highlands and Islands in the Outer Hebrides of Scotland have been piloting and developing a form of distance-based education which can be described as online distributed learning and which will be commonly referred to in this report as online education (Paulsen, 2002). The more commonly used term ‘e-learning’ has links with a focus on electronic learning rather than online communications between learners and tutors (ibid, p1). This process has been mirrored in many education institutions across the globe as the Higher Education sector seeks new ways of delivering content in ways able to meet the needs of current and future generations of business and indeed society as a whole (Fillion et al, 2009).

As more and more students demand flexibility in their timetables to fit in with their work priorities, increasing numbers of traditional teaching Higher Education institutions are turning to online learning as a means to satisfy the competing demands of new students (Nagel & Kotze, 2010). As a result there is currently a boom in online courses worldwide. Participants who would never previously have considered training and education relevant to them or even a possibility given their circumstances (e.g. work, family...etc) are signing on for online courses in significant numbers across the globe (Slevin, 2008).
In the UK context, this shift towards online education has been encouraged by Higher Education national policy aiming to promote the growth of technology in Higher Education to meet the needs of a growing number of students with decreasing resources overall (Cotton & Gresty, 2006). For example, the Higher Education Funding Council for England (HEFCE) Strategic Plan 2006-11 seeks to encourage institutions to utilise technology to enhance teaching, learning and assessment, promote technical innovation amongst lecturers and aims to develop open resources with the assistance of Joint Information Systems Committee (JISC) pilot projects [Higher Education Funding Council for England (HEFCE, Updated 2009)].

In the UHI instance this form of education has been instigated as a means primarily to overcome geography and latterly to better suit a student cohort that is increasingly well represented with adult returners. The three main online courses in the UHI instance (Health Studies, Child & Youth Studies and Sustainable Rural Development) during the academic year 2009-10 had an average adult learner enrolment rate of 81% of. Distance Education in this instance has initially been about widening access to residents located within a rural and remote region of the British Isles. The University of the Highlands & Islands had extended access to its courses at the centre of its 'mission' and some campuses such as Stornoway have been a central node for the development of online distributed learning during the 1990s and the first decade of the 21st century.

Rennie, (2005) outlined the history of developments at the Stornoway campus suggesting an explanation for the development-focus relating to the 'scattered, sparse population' which was very remote form any 'major university library'.
Initial developments in distributed learning technologies (Rurtel) in the 1980s and early collaborations in the early 1990s (with the Association of Community Enterprises in the Highlands & Islands) to deliver course content at a distance within the Highlands & Islands, were the foundations for the early adoption of World Wide Web activities within the Higher Education curriculum at the Lews Castle College UHI campus in Stornoway.

These initial blended learning forays into distributed learning were soon to lead to a form of fully online distributed learning (2003 onwards) or online education that is the focus of this research study. This was by no means a straightforward process for the staff involved in pioneering initiatives that pushed boundaries and often involved conflict with quality managers, technical support staff and other academics, as recognised by Salmon, (2002):

"The early adopters of teaching with computers were considered mavericks. They found it necessary to substantially change their teaching practice, to welcome computers with open arms took courses for themselves, incessantly asked questions of experts, acquired the earliest computers at their school or for home use. ...." (p.2)

1.2 Distributed online education or e-Learning: A Definition

There are a number of definitions that help to focus the current research. It will be practice in this research study to consider and refer to online education for the most part. However, it is acknowledged that much of the literature use the term e-learning when referring to online education. Consequently, there will be references to both forms of distributed education throughout and so an attempt at refining our definitions is outlined in this section.

"With the growth of the Internet and large networks, students now have an opportunity to utilize asynchronous and synchronous communication tools, as well as to choose the time, place, and pace of their education....It also gives students the opportunity to interact with a diverse group of fellow students." (Harper et al, 2004, p.586-7)
Willems (2005) focuses on the flexibility element in her considerations of distance learning:

"....to define learning as flexible connotes the freedom for learners from potential participatory barriers in education, generated, for example, by family or work commitments, financial challenges, a disability, or the learner’s geographic location." (p.429)

She qualifies her definition of flexible learning by pointing out the inflexibilities inherent within the paradigm related to issues such as set deadlines, the requirements to access particular technologies, sometimes at particular times. This clearly implies some additional hidden costs and inflexibilities in technology, location and pace of learning. The importance of being upfront with such issues so that potential students can make considered choices is highlighted by Willems (2005).

Technological change in society is without doubt having an impact right across the education sector and not just in online education (Tzouveli et al, 2008):

"It is a common fact that technological developments cause continuous changes to every sector of the modern society. Education itself could not remain passive and unconcerned; all traditional teaching techniques are revised and re-evaluated and the new ones are introduced. Internet-oriented applications try to satisfy current educational needs by closing the gap between traditional educational techniques and future trends in technology-blended education."

(p.224)

In the UK and Europe it is a form of distance education commonly associated with the terms online, flexible and distributed learning. According to Davidson and Elliot (2007):

"Terms synonymous with online learning include e-learning, web-based instruction, online classes, Internet courses and virtual learning. On the other hand the traditional approach to teaching is typically regarded as face-to-face in a class." (p.512)
What is clear from the definitions above is the lack of actual clarity in the sector of what online education actually is and this was illustrated effectively by Guri-Rosenblit (2005) in identifying up to 15 common terms used in association with and to define e-Learning. Njenga and Fourie (2010) went further and suggested that most educators just do not understand exactly what e-learning actually is. Their attempt at a definition of e-learning is as follows. E-learning in their view is:

“...the use of electronic technology and content in teaching and learning. It includes, but is not limited to, the use of the Internet; television; streaming video and video conferencing; online text and multimedia; and mobile technologies.” (p.201)

Whether this definition adds anything to those above discussion is questionable, but it is certainly a more recent attempt at clarifying this component of the teaching sector. Likewise, Kirkwood (2009) based in the Open University in the UK states that a variety of terminology has been used to:

“...describe the application of ICT to learning and teaching, including computer-assisted learning, e-learning, online learning, telelearning, technology-enhanced learning.” (p.108)

In most instances above, there has been an emphasis on both the 'learning' element fused with the 'technology' element to determine some new form of distance learning that provides new learning opportunities through the application of new technologies. For example the European Academy for Sustainable Rural Development, (2008) defines distance learning as:

“...learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its resources.” (p.11)

In China where 2 million students seek to enrol on 500,000 available Higher Education places each year (Gu, 2006), the traditional face-to-face approach is the dominant form of education. Yet, in recent years China too has sought a new form of provision based on servicing students whomever they are, wherever they are, whenever they wish and however they wish (Gu, 2006).
These four conditions are really fundamental drivers to the establishment of online education and provide a clear rationale on why online education is becoming such an important element of the education sector across the world. Increased flexibility of product and service provision to match changing customer demand is a fundamental business strategy and as applicable in the public education sector as it is in private enterprise.

Online education needs to be considered as a clearly distinct entity from distance learning per say, which has actually been in existence for many decades. (Peltier et al, 2003). Distributed learning in the form of online education has been one of the primary drivers in the growth of distance education over the last decade and it is this component of the distance learning mix that will be the focus of this research.

In summary, efforts to help define and understand the terms online education or e-learning are valuable up to a point, but clearly there are differing forms and levels of engagement with online education through its varying definitions. Traditional forms of distance learning (such as correspondence courses) are under increasing scrutiny as their relevance to changing ideas of flexible education is questioned. E-Learners are now a growing component of the distance learning market and as further technological opportunities open-up across the globe, its further development and expansion seems likely (Birch & Burnett, 2009).

In referring to online education as off-campus distance-learning then often a form of education is being described that has provided opportunities for distance study that were not available in the past. This may have been due to both geography and to the constraints of time and travel, to attend more conventional face-to-face courses (Wagner et al, 2008).
1.3 An Online Distributed Learning Model

The development of an online distributed learning model does not simply involve the re-packaging of existing traditional content by uploading some slides and course content into a course management system such as Blackboard (Fish & Wickersham, 2009). Fillion et al, (2009) identify four recurring questions that are in their view of importance to online education models: What are we teaching? What should we be teaching? What is the best way to teach it (pedagogy)? What are the impacts on students?

This is important background to enable one to fully understand the context and scope of this research study and so in order to illustrate the process, it is worth briefly describing the evolution of the fully online undergraduate Honours degree in Sustainable Rural Development at UHI. This case study had its beginnings in 1998 (Rennie, 2003).

At this time the first extensions of teaching outside the classroom at the undergraduate level, using broadband technologies, involved video-conferencing (VC) as a means to extend course delivery. This video-conferenced content was complemented by email and as time went on, synchronous chat via NetMeeting and also eFax for the delivery of non-digitised content. By 2001 audio-conferencing has been added to the mix along with asynchronous forums. A complicated delivery mix is then streamlined with the discovery of the Blackboard Virtual Learning Environment (VLE).

As a fully networked model is evolved then not only is course content delivered at a distance but so is it being increasingly taught from multiple sites by tutors at remote campuses. By 2003 a fully online education course is developed with Blackboard at its core being supported by weekly VC and audio/online chat conferencing tutorials.
Prior to reviewing the parallel development of the wider online education sector it is worth considering some pertinent points about this development model. The UHI model evolved to extend the market, being located in a small and demographically scattered rural island community. The move to online delivery was ultimately driven by commercial survival within a small community. This has not necessarily been the driving force in most parallel developments and so this research will also examine some of these parallel developments in some depth to provide a wider contextual background to this study.

Within this context there are a series of key factors and indicators that have been highlighted by the literature across the world that are of key consequence to the delivery and resultant experience and arguably, resilience of e-learners. The next section will briefly consider these common issues in the context of the UHI development model.

1.4 Rationale for developing an online distributed learning model

In the Lews Castle College UHI case study instance the early adopting of new technologies and related pedagogies has been a constant. The evolution of the course design has been influenced in the first instance by a core group of practitioners with an active interest in new technology and how it may enhance the course delivery experience and flexibility options for those students located off-campus. The mode of delivery has also been influenced significantly by the student group who are largely composed of adult learners often with external work and family commitments. Such a student cohort has, for the most part, been open to experiencing new technologies that can enhance the flexibility of their studies. Many of these adults are part-time students and indeed this element of the HE sector has grown to make up 39% of all HE students in 2005/06 in the UK.
Of the 2.3 million learners in the UK in 2005/06, 0.9 million were part-time students and 1.4 million were full-time students (Committee of Inquiry into the Changing Learner Experience - CICLE, 2009). This large and growing component of part-time students are increasingly seeking more flexible means to study and online education for such students is becoming an ever more sought after form of delivery suited to the 21st century student cohort. Dutton et al (2002) and Birch & Burnett, (2009, p. 118) found that the vast majority of present-day distance learners are now part-time students who also have full time jobs.

Concannon et al, (2005, p. 502) also recognise this change in the student cohort (lifelong learners) in Ireland and its associated demands to utilise technology to increase flexibility. This explains the increasing demand in the sector for increased flexibility in teaching and learning provision and so the rise in demand for online e-learning, in particular. Nagel & Kotze, (2010) identify the increasing work priorities of modern day students and so the increasing demand for increasingly flexible online study course options.

Dutton et al (2002) also found that such online students were twice as likely to have childcare responsibilities in comparison to their on-campus peers and so tended to choose the flexibility of online study options. Scarafiotti, (2003) describes the typical distance learning student at Rio Salado College as being:

".....a female 25 years or older who is a savvy consumer and strapped for time, as she manages a family, works full-time and is enrolled in 3-6 semester credit hours......" (p.52)

i.e. what is considered to be a part-time student in the UK. Rennie, (2008) further highlights many of the changes above and summarises that the 'relentless trend' in the sector has been one in which educational provision has become both more student-centred and flexible in its delivery.
As a result of the trends outlined above, feedback and student satisfaction has increasingly focused on how flexible and distributed the delivery model has been. In the wider online sector, JISC, (2007b) stated that their findings indicate that students increasingly expect 24/7 access to their learning resources. This has clearly influenced course design and development through time. Student participation and attendance have also been key indicators of success.

Shih et al, (2008) found in examining 444 selected papers in the field of e-learning research and trends that many existing studies within the field are/were still focusing on on-campus students and that more focus needed to be placed on off-campus adult learners in future studies.

This current research study is aiming to address this particular issue and has focussed almost exclusively on off-campus students. Amongst this adult group (and the staff team) in the UHI case, the synchronous versus asynchronous delivery debate has been important in this context too, along with the face-to-face versus online education debate.

Recent experiments with e-assessment and related peer review and Web 2.0 tools have also been introduced opportunistically and piloted in response to new knowledge within the teaching team and subsequent feedback from each student cohort. Increasingly, the 'digital native' (Prensky, 2001) (i.e. young person who has been immersed in technology from an early age) will be attracted to study on Higher Education courses and this brings new challenges as expectations increase.

Yet this is not the full picture as there remains elements of the potential user group that lack the skills, technical know-how, resourcefulness, equipment and/or bandwidth to effectively engage within the online environment (Shephard et al, 2007; Guri-Rosenbilt, 2005; McVeigh, 2009).
As Wellman et al., (2003) point out, notions of connectivity are moving from physical travel hubs (i.e. airports and ferry ports) to networked hubs (i.e. internet routers) moving digital data across the world. In short, the world has changed and a connected and globalised networked society is rapidly developing. Within such a paradigm, learning online over the internet makes perfect sense for young, technologically-proficient students and can be seen as a natural application of internet technologies in a globalised world.

"Each person is a switchboard, between ties and networks. People remain connected, but as individuals, rather than being rooted in the home bases of work unit and household. Each person operates a separate personal community network, and switches rapidly amongst multiple sub-networks." Wellman et al., (2003, p.17).

The challenge for online Higher Education courses is to become established components within each student’s ‘sub-network’ and develop an active learning community therein (Ellison et al, 2007). As quality standards increase across the globe in line with learners’ expectations then so do the pressures on the academic developer and their institutions, who in many instances may not fully understand the challenges of what delivering online courses brings to their institution.

Such pressures have been apparent at UHI and this has not been surprising given the evolutionary nature of the development model. Such a development model based on experimentation with both pedagogy and delivery systems has been recognised in the US context as being associated with many of the most successful distance education programmes (Oblinger et al, 2005). The UHI approach, in responding actively to changing student demands, is rightly termed student or learner-centred (Willems, 2005; Shih et al, 2008; Stephenson et al, 2008, Lee et al, 2009a) whereby the student’s needs are considered central to the teaching and learning process.
Indeed Willems, (2005) interestingly likens this student-centred approach to the increasingly prevalent consumer-centred culture associated with modern day Western mass-consumerism, whilst Shih et al (2008) predict that such student-centred instruction will become the dominant trend in education by 2020.

Lee et al, (2009a) describe this paradigm shift in education towards student-centred education as being one of the most significant changes in the field of education. Online education in so far as it is increasingly able to provide opportunities for a student-centred approach to education is therefore well placed to expand within such a framework.

In UHI a ‘quality’ experience seems predominantly linked with addressing the factors mentioned above and indeed these very factors have been discussed extensively in the wider literature which will now be considered.

From this background three key questions are central to our understanding of how to take online distributed online education forward:

- What are the primary quality indicators applicable to online learning?
- What delivery models & related techniques are most appropriate to meet student needs?
- What are the design implications for online courses?

These three primary questions have evolved out of not just the academic department’s experience and context, but also from a pilot study testing an initial hypothesis.

The speed and reliability of the e-learner’s Broadband connection was initially investigated as a key factor in the distributed online learning experience, but subsequently discounted as a ‘major’ area of research interest (refer to appendix 1).
This was largely related to a change in government policy in Scotland which provided a commitment to rollout broadband to every community in Scotland by the end of 2005. £29M of public money (£24M from the Scottish Executive and £5M from the European Regional Development Fund) was committed in partnership with BT to upgrade the 378 rural and remote telephone exchanges in Scotland by December 2005 to provide ADSL broadband (Scottish Executive, 2005). Yet broadband and internet availability rapidly became a relatively minor factor in the overall range of factors that influence the online distributed learning experience in the region and did not become the online education driver anticipated (Smith, 2001).

Currently internet availability from home across all of the UK has risen from 73% in 2009 to 76% in 2010 (Ofcom, 2010). Broadband access to the internet has also risen sharply from 62% of all household connections in 2005 to 97% of all internet connections in 2010 (Ofcom, 2010). At the same time PC/laptop ownership per household in the UK increased from 76% to 78% between 2009-10 (Ofcom, 2010). The broadband and internet infrastructure for home-based online education is now in place across much of the UK too.

In appendix 1 the results of the pilot survey on broadband are presented which clearly discount broadband as a primary factor in the quality of the online experience. Hence an initial hypothesis associated with this research study was rejected.

Instead an appreciation of the wider factors that influence the online education experience were gained and so the focus of this research changed to examine these wider quality factors that influence and benefit the online education experience. A snapshot of what these quality factors might be was also derived from the pilot study and is charted in appendix 1 along with the feedback specifically on broadband as a 'quality factor'.
A reliable level of broadband was indeed found to be a quality factor, but one that was an important contributory factor impacting on the quality of the online education experience rather than being a primary contributory factor to the quality of the online education experience. Increased bandwidth has without doubt been an enabler of online education in the developed world and there are without doubt a series of perceived benefits of online education recognised across the world that provide the main rationale for this approach to teaching and learning both in the academic and commercial sector (Childs et al, 2005).

The main assumption of this research is that there are quality factors that can be identified as being associated with the online education experience, that when encountered will result in improved student satisfaction and retention. Further research will be required to establish the exact nature of this relationship. The hypotheses to be tested that are central to this research are outlined later in this section, on page 17.

Online education is thought to have a number of key advantages. Firstly, larger educational or commercial organisations servicing multiple sites can seek to utilise online education as a cost efficient means to develop skills training to numerous sites at once and so reduce time and drive down fixed costs (Childs et al, 2005; Scarafiotti, 2004).

Secondly, as the up scaling of learner groups take place then online education can deliver content to numbers beyond the limitations of the bricks and mortar classroom environment. Again, clear efficiencies can be theoretically achieved (Childs et al, 2005; Scarafiotti, 2004, Lee et al, 2009a).
Thirdly, from the learner point of view, online education is about convenience and the flexibility of study. Translated into the commercial sector this allows the delivery of 'just-in-time' training as and when necessary and in the education sector it can mean wider access for non-traditional students (i.e. adult returners) (Childs et al, 2005; Winterbottom, 2007; Meyer, 2003; Wang & Woo, 2007).

Fourthly, online education systems have the capacity to track user progress and also to assess their competencies through interactive content and related quizzes and assessments in a much more instantaneous manner than the classroom environment. (Childs et al, 2005).

Fifthly, there are clear cost savings to student commuters being able to work from home and progress their studies, likewise in the commercial sector where online education can save many thousands of pounds annually on reduced transport costs for classroom-based training events (Childs et al, 2005).

Piskurich (2006, p.19) also identified over fifteen independent advantages of e-Learning. There have been numerous attempts to develop an instrument to predict online learning success (Bernard et al, 2004a) and it is an underlying principle of the present study that a range of quality measures can be established.

1.5 Quality in e-Learning: A Definition

It is important to question the concept of 'quality' in online distributed education. The outcomes might be considered to be higher student satisfaction, higher student achievement, higher student retention, increased demand/recruitment, improved institutional efficiency and so increased income and resources to further develop quality practices (Hirumi, 2005).
From an institutional perspective a quality course is one where satisfaction levels are high and efficiency, effectiveness and access are maximised (Lorenzo & Moore, 2002). Institutions aiming for 'efficiency' will seek to keep the costs of online education contained whilst achieving maximum income and outcomes from their investment. Often quality processes will result in additional costs. So will they actually result in increased retention and student achievement? The focus of this study is to determine the primary factors that are associated with a quality online education product and so determine the influence ‘quality’ can have on the student experience and their resilience. As Nagel & Kotze, (2010) point out:

“Unfortunately, not all online courses provide high quality learning experiences, as many consist of little more than books behind glass with little or no interaction.” (p.45)

This study will examine the literature and determine the key dimensions of a quality online education experience. The research component will then seek to gauge the influence of the identified dimensions (refer to Ch. 5 on Methodology and Theoretical Approach) on the quality and effectiveness of the online education experience. It will also seek to determine the consequences of both optimising quality and failing to fully implement quality systems in online education. Sun et al, (2008) found that of all the factors tested against student satisfaction, it was course quality that had the strongest association with satisfaction. This validates the central focus that perceived quality factors are having within this research study, in an attempt to add to the existing body of knowledge in the sector. In addition, the notion of ‘quality literacy’ expounded by Ehlers, (2007) is relevant within the current research, as it is about the skills and abilities that allow individuals to progress quality development. It is not something that can be learned in books or by training, but instead is a concept and ability that requires experience and practice (Ehlers, 2007, p.101). This knowledge and experience is further expanded here by a comprehensive literature review. The research hypotheses are as follows:
Hypothesis 1 – Students that are measured as having enhanced levels of ICT access, skills and knowledge appropriate to online learning, will rate their online learning experience as being of higher quality than that of the wider student sample population.

H0 – Students that are measured as having enhanced levels of ICT skills, access & knowledge of online learning will not rate their online learning experience as being of higher quality than that of the wider student sample.

Hypothesis 2 – Students that are measured as having enhanced levels of readiness and preparation for online learning, will rate their online learning experience as being of higher quality than that of the wider student sample population.

H0 – Students that are measured as having enhanced levels of readiness and preparation for online learning will not rate their online learning experience as being of higher quality than that of the wider student sample.

Hypothesis 3 – Students that are measured as having enhanced levels of tutor to student interaction/communication, will rate their online learning experience as being of higher quality than that of the wider student sample population.

H0 – Students that are measured as having enhanced levels of tutor-student interaction/communication will not rate their online learning experience as being of higher quality than that of the wider student sample.

Hypothesis 4 – Students that are measured as having enhanced levels of student to student interaction/communication, will rate their online learning experience as being of higher quality than that of the wider student sample population.

H0 – Students that are measured as having enhanced levels of tutor to student interaction/communication will not rate their online learning experience as being of higher quality than that of the wider student sample.

Hypothesis 5 – Students that are measured as having enhanced levels of satisfaction with course design issues, will rate their online learning experience as being of higher quality than that of the wider student sample population.

H0 – Students that are measured as having enhanced levels of satisfaction with course design issues will not rate their online learning experience as being of higher quality than that of the wider student sample.

Hypothesis 6 – Students that are measured as having enhanced levels of knowledge of delivery technologies will rate their online learning experience as being of higher quality than that of the wider student sample population.

H0 – Students that are measured as having enhanced levels of knowledge of delivery technologies will not rate their online learning experience as being of higher quality than that of the wider student sample.
2.1 The growth of online distributed education

The continuing growth of online education in many parts of the world has been at a faster rate than overall Higher Education enrolments (Allen & Seaman, 2010). In the United States (US) this spectacular growth (19% per annum as opposed to 1.5% per annum for traditional Higher Education courses during 2009) is anticipated to continue for years to come (ibid, p.5). An example is Rio Salado College in the US that had 500FTE (10% of college enrolments) engaged in distance learning in 1995. By 2003, being an early adopter and offering new online content, online enrolment growth led to 4000FTE (48% of college enrolments) being recruited, this being a rise of 6000 individuals to 22000 individuals engaging in Rio Salado's online courses (Scarafioti, 2003). Such growth has been significant within the education sector in the US in particular. Outside of the US this growth has been much more limited according to Garret, (2004) as online education with only a few exceptions has failed to reach the status, scale and sophistication of many of the US-led initiatives in the online education field. Yet, as reported by Sun et al, (2008), the worldwide growth rate in online education is now 35.6% and online education is emerging in their view as the new paradigm in modern education across the world. Demand for online courses continues to exceed the supply of online courses (Moloney & Oakley, 2006). Indeed, Moloney & Oakley, (2006) made the very interesting point that 65% of private-for-profit and public institutions considered online education critical for their future.

Evidence produced by Allen & Seaman, (2010) shows that 80.8% of larger institutions consider online education as being 'critical to the long-term strategy of the intuition' (p.10).
Kimberly et al, (2004) similarly reasoned that as more people are now seeking a second degree and more people aiming to advance their careers by taking flexible training courses, then online course provision must continue to grow. The advances in home computing power and the growth of regional broadband networks and global communication networks have made this growth of online education possible.

"Because of the development of faster computers, improved telecommunications networks, and the development of readily accessible software the availability of courses and programs through online teaching has been growing exponentially." (Andresen, 2009, p.249)

Furthermore, in the knowledge economy of the 21st century there is a need to constantly keep one's skills up-to-date and so online education makes it possible for lifelong learning to occur without students requiring to be out of their workplace or away from their home life for extended periods of time (Wagner et al, 2008). Also from the lifelong learning perspective, Brown, (2001) highlights the needs of employers in the globalised world to meet increasing demands for ever changing and evolving skills requirements. Distance learning allows adult returners who have busy work and home lives the flexibility and cost effectiveness (savings on travel costs) to study and update and develop their skills as necessary (Park & Choi, 2009).

The huge growth in demand for Higher Education across the globe is paralleled by the even faster growth in online education. A 1.5% growth in Higher Education in the US between 2002-08 was matched by a 19% growth in online education (Allen & Seaman, 2010) and more than one in four of education students in the US now take at least one online course (ibid, p.5). This same Sloan Consortium report investigated the impact of the global economic downturn on demand for online courses and found an increase in demand for online courses being reported by 87% of public institutions in the US (ibid, p.7).
In the European context (Debande, 2004) found there are good reasons for this growth and ‘four principle rationales’ (ibid, p.191). Firstly, social reasons, in so far as the education sector is simply reflecting the wider penetration of technology into society.

Secondly, there are vocational reasons whereby the education sector must prepare students for workplace by providing them with the key skills expected with regards to technology. Thirdly, pedagogical reasons, as new technology can enhance the delivery of existing courses through new methods based around new technology. Lastly, catalytic effects in terms of cost-effectiveness, the re-shaping of power relationships and the extension of skills and knowledge opportunities to the disadvantaged were identified (ibid, p.191).

Yet the online education has not been without its high profile failures. In Scotland in 2002 ‘Scottish Knowledge plc’ folded. It was made up of 13 Scottish Universities and 8 colleges and sought to gain a major foothold in the global online education market. This was followed up by additional public and private funding being channelled into the ‘Interactive University’, based in Edinburgh, as Scottish Knowledge had been before it. This time this effort was aimed at interactive online education for global e-education markets (Re VICa, 2009) and was led by Herriot Watt University. This global focussed online education initiative folded in 2007. However, neither of these initiatives based in Scotland were as high profile as the UK eUniversity initiative launched in 2000, which subsequently folded in 2004 after spending £62M of taxpayers money and only attracting 900 students over the period. Its failure was put down to being supply-led rather than being demand-led, having a poor marketing strategy and being technology-driven rather than learner-driven (HCESC, 2005).
In short, although there are many figures that show the rapid growth taking place internationally in this sector (Ginns & Ellis, 2009) over the last decade, the examples above demonstrate that the fundamentals must be right if online education is to become a dominant and sustainable element in the mix of learning styles and practices of 21st century education. Some of the lessons learned from UK eUniveristy include a focus on being demand-led, active monitoring and evaluation of the delivery model and being ‘learner-centred’ in approach.

2.2 Background factors shaping the online education sector

Currently (2010) the global economic downturn and related government spending cutbacks in the UK and Europe are set to significantly impact on regional and national economies. Demand for Higher Education is currently outstripping availability in the UK. In addition to the recruitment impacts from the current economic crisis, Mayes (2001) also points to increased demand for online learning originating from widening participation to include previously excluded groups from Higher Education and also from a new lifelong learning emphasis in the 21st century knowledge economy. This combined with increased PC ownership and internet connections in the home and workplace means that the basic infrastructure for online learning is now increasingly available amongst both urban and rural communities. The Open University in the UK is one example, according to Mayes, (2001) of an e-university that has developed and grown to service this increasing demand/market. However, Mayes (ibid, p.466) also points out that most universities are now experimenting with web-based instruction, seeking to recruit overseas students and seeking to tap into the work-based Continuing Professional Development (CPD) market.
A number of background factors have been identified as being important with regards to the successful development of online distributed learning at the institutional level. Faculty buy-in and associated administrative support has proven to be essential along with a focus on quality programmes/schemes and student support (Moloney & Oakley, 2006; McAlister et al, 2001). Other key success factors identified by Moloney & Oakley, (2006) that are shaping the sector include specialised support units, training and tutor support (e.g. technology and instructional helpdesk services) appropriate financial models, course design that maximises participation and also marketing resources to grow the product.

Emerging issues relate to training provision, salary, workload, intellectual property rights, promotion and tenure and how these are all impacted upon by online education (Moller et al, 2008b). As Birch & Burnett, (2009) contend, “...with less free time to devote to research and other activities that lead to promotion” (p.122) the adoption and diffusion of online education technologies by academics and faculties will often be slower than one might expect.

However the Committee of Inquiry into the Changing Learner Experience (CICLE), (2009) identified a range of drivers to change that indicated that more than just finance training and were required to instigate lasting change in Higher Education:

“....digitisation of learning materials, a receptive audience of learners and a cadre of teaching staff connecting the two through their interest in experimentation and innovation in approaches to learning and teaching.” (p.8)
In the UHI case study course these factors were indeed typical of the instigators of change and remain so to the current day. Meanwhile, in the US, 'open admissions' in the community college sector (similar to the Open University in the UK) where a large percentage of online students reside, is an additional factor in the successful up-scaling of online distributed online education for the non-traditional adult market in particular.

“Equality of opportunity for all students to attend public higher education in their state, without regard to their background or preparation, is a foundational principle of higher education policymaking in the United States. Opportunities to attend open-admissions institutions, usually community colleges, exist in nearly every state...” (Bastedo & Gumport, 2003, p. 341)

These community colleges in the US have greater numbers of distance education students – 48% as opposed to 31% in more traditional ‘four-year institutions’ (Ives, 2006). Demand for online courses is said to originate from the competing pressures on adults of work, family and life in general, making the traditional higher education, face-to-face route, less feasible (Ives, 2006; Thor & Scarafotti, 2004). Sun et al, (2008) claim that online education liberates learner interactions in time and space and so meets the demands of the modern 24/7 society. In the UK in general moves towards online education(particularly in recent years) have also been driven by the need to teach ‘smarter’ rather than ‘harder’ to become more efficient as a sector (France and Fletcher, 2007). Motivations from the academic side have been related to efficiency and most UK universities are now providing online content to support student learning (France and Fletcher, 2007).
Anecdotal evidence given by academics on their online student demographics in a study by Blakelock & Smith (2006) demonstrated a similar demographic to that outlined above. 80% of their survey respondents characterised their online students as non-traditional adult returners, sometimes in remote locations and often more motivated than their traditional on-campus students. Moller et al, (2008b) also identified this very point highlighting how important distance learning was becoming to established professionals (for continuing professional development) and lifelong learning of a variety of kinds. They emphasised how this ‘non-traditional’ student segment was becoming an increasingly large element of the overall student body in the US. Dutton et al (2002) found that those students choosing online study tended to be part-time students. Also of note is the fact that adult returners are from a wide range of backgrounds and so it has been argued will need enhanced customised support, in comparison to their more traditional counterparts in the classroom (Hummel, 2006). This may prove more costly from the institutional perspective.

Blakelock & Smith (2006) also allude to the lack of solid information on online student demographics and questioned how quality online courses can be developed without a better understanding of the clients for whom the service is being provided. Within this context the recurrent theme, from information received from respondents, was ‘quality’ (Fish & Wickersham, 2009).

Queries’ relating to how quality can be measured to ensure the online product is not only ‘as good as face-to-face’ but also how one might achieve quality (e.g. given the lack of recognition of the workload of online educators) are commonplace in the literature. Hill, (2006) recommends that online facilitators must create and make time to respond to student e-mails and postings and recognise that online delivery will require more time committed than a conventional face-to-face class.
If quality is to be achieved then the additional time requirements of the online facilitator require to be recognised by faculty. Time needs to be allocated to reduce teaching loads and allow time for the development of instructional materials and to allow tutors to adapt to the online learning environment (Fish & Wickersham, 2009). This online tutor role may also include course administrative duties and course (VLE) enrolment duties, roles previously undertaken by departmental and faculty administrators (Njenga & Fourie, 2010). It has been argued that simply providing a range of flexible learning options and access to information will not necessarily result in deep learning.

Arguably, increased tutor input is required in the online environment (Willems, 2005; Guri-Rosenblit, 2005; Njenga & Fourie, 2010; Carroll et al, 2009). In highlighting this problem Blakelock & Smith (2006) identified from their study that some institutions were engaging in distance learning, yet had no idea why. Moller et al (2008b) suggest that the move towards online education by many institutions has not been planned, but instead a prime motivator for institutions has been competition for students.

The institutional move into online education has been compared to staking out their claim for territory without actually knowing what lies beneath (i.e. what the benefits are likely to be). Njenga & Fourie, (2010) suggest that those institutions and faculties adopting a modern and innovative approach to ICT at the institutional level, are seeking to improve their relative competitiveness within the sector and this itself is part of the motivation of this often costly level of developments taken forward in the online education sector.
In this context perhaps it is not surprising that a detailed knowledge of online education practices were not known at the management level within such institutions. Although achieving an excellent geographic spread from US institutions the reliability of the Blakelock & Smith (2006) study conclusions do need to be challenged, given there were only 37 respondents. On the other hand, such points of interest appear to be of a robust nature and appear throughout the literature (Marshall & Mitchell, 2002) as institutional development has often happened only after early-adopters of online education courses have already developed and begun delivering content online.

Ultimately, both faculty and institutional buy-in are essential to progress online education successfully (Moller et al, 2008b). With rapid change at the institutional level the potential for some students (not willing or able to adapt to new technologies) to be disenfranchised is high and so needs consideration too (Willems, 2005). There are also perspectives that question the future of distance learning as a separate element of the Higher Education portfolio, as society as a whole becomes ever more inter-connected. The danger is that it is the technological innovation related to this interconnected Information Society that is driving e-Learning, rather than planned pedagogic approaches (France & Fletcher, 2007; Njenga & Fourie, 2010).

Cairncross (1995) coined the phrase the 'death of distance' as she described how the importance of distance in education and indeed other human activities will become irrelevant as communications technology and related services develop. Muirhead (2005) questions whether the 'death of distance' will lead to the 'death' of distance education per se, but this is contested.
To counter this, Guri-Rosenblit, (2005) advocates that each institution should play to its strengths rather than attempt to develop fully online courses right across the curriculum and that ultimately strategic collaboration in delivery is the optimal solution to develop the online education curriculum.

There are innovative models in the sector which do appear to have a solid niche and the potential to increasingly shape the future direction of online education in the UK and beyond. For example, Walden University in the US has no ‘bricks and mortar’ and yet hosts over 22,000 Masters and Doctoral students using the eCollege online learning software suite by Pearson. It aims are to transform working professionals into scholar practitioners (Riedel et al, 2007). This model is aimed squarely at the adult returner market and the recognition that removal of students from their professional or work and social environments is not often feasible for the amount of time necessary, to enhance their qualifications (Riedel et al, 2007).

Within the online education sector there has been an increasing focus, during the last decade, on the primary objectives of participation, engagement and collaboration and a related focus on problem-solving and creativity skills. The influence of learner-learner communications in the learning process via communities of learning should not be underestimated and so should be a clear objective and aim of quality, in the online education context (Djoudi and Harous, 2001; Perez, 2004; Moller et al, 2008a).

Communities of (e-) learning, described by Rovai, (2002) as being typified by connectedness and feelings of membership, along with friendship, cohesion and satisfaction, have become increasingly possible as computer ownership across the Western world has increased substantially along with internet access. In 2009, 70% of UK households had internet access (ONS, 2010).
Online students have increasingly collaborated from home, out-of-hours, in the evening with and without tutor input. A recent study by McVeigh, (2009) found that student nurses were confident in their abilities to be independent learners, yet only half found that they had equal confidence in their online education abilities. This questions again just the impact that student ICT skills might have on their overall quality of experience.

From the business perspective online education has some clear advantages even although its front-end costs can be high. It is not a cheap option (Njenga & Fourie, 2010; Guri-Rosenblit, 2005; Moller et al, 2008a; Childs et al, 2005). There are both hardware and software costs, training and support services, internet access costs, electricity costs, e-waste (disposal of old kit), copyright costs and the actual time required by subject experts to produce and adapt the initial materials (Njenga & Fourie, 2010; Guri-Rosenblit, 2005). There are nevertheless some significant savings in its training costs, for example the overheads normally associated with the classroom environment. At the same time it can provide on-demand access to materials and content as and when necessary and can be fully scalable across the business (Moller et al, 2008a).

Yet, there is evidence in the literature that would suggest that completion rates on online education courses can be significantly lower than those of classroom-based courses. 13% of students registered on OU courses dropout before the course starts and of those who start the course, 38% fail to submit their first assignment (Simpson, 2004). In addition, if access to tutors is limited or the design does not suit the student’s circumstances or the course content studied appears to have little relevance to the learner’s needs then motivation and completion rates have been found to be lower (Garland, 1993). Dutton et al, (2002) found that online study status reduced the likelihood of course completion by 20%.
Frankola, (2001) also reports an increased dropout rate of 10-20% being reported by course administrators for online courses. On the other hand, adults in work had higher completion rates in courses that were vocationally relevant to the workplace and/or used relevant case study material (Childs et al 2005; Carroll et al, 2009). Retention rates within online education will ultimately drive how the sector is shaped in future years as high dropout rates are widely considered to be associated with a lack of quality with regard to content or pedagogy, or support (Garland, 1993). This is not always the case as Rovai, (2002) explains. Adult returners will often register on an online course to gain knowledge (and not credit) and once this knowledge has been gained they may often dropout. In other instances according to Rovai, (ibid, p.320) the physical separation of distance will lead to feelings of isolation and disconnection that will impact on online course dropout levels in the absence of a strong sense of community.

Njenga and Fourie (2010) postulate that, ‘technopositivist ideology’ has meant that the focus of online education has been less on quality issues of any depth, but rather on technology and all its ‘bells and whistles’, i.e. technology over education. Such a technological orientated approach has without doubt shaped the sector as it appears today. This has not always led to optimised e-learning courses being designed with quality as the top priority.
2.3 Quality in Online Distributed Learning

Indicators of quality in online Higher Education are often contentious and this research is an attempt to clarify the role and importance of identified quality indicators in online education. Traditional quality monitoring systems on both sides of the Atlantic have focused on measuring traditional indicators related to traditional students with very little benchmarking on online education participation, student support and indeed ICT satisfaction (Bacsich, 2005; Jara & Mellar, 2010). For example, Oblinger et al (2001) and Ehlers (2007) point to the role of academic and student services in providing a quality experience that is both interactive and reactive to needs.

Yet overall monitoring and evaluation systems have tended to take a secondary role, as available funds have been channelled towards the development of e-learning content rather than the monitoring of online content (Cotton & Gresty, 2006). Holsapple & Lee-Post, (2006, p.71) state that the overall success of online education initiatives can effectively be gauged within their ‘E-Learning Success Model’ by analysing the development process undertaken linked to the design, delivery and outcomes. In this model of assessment the system design (quality, information and service factors) has a direct impact on the delivery system and the resulting user satisfaction and so ultimately on the system outcomes resultant from engaging in a particular online education course.

There is actually limited agreement on the definition of 'quality' in distance education and little evidence of online education effectiveness (with varying research results often contradicting each other) and this clearly presents a problem for the sector (Moller et al, 2008b; Cotton & Gresty, 2006).
In the UK, Sharpe et al. (2006) found that seven institutions visited during a research project for the HE Academy into the student experience were encountering problems in developing evaluation systems for ‘blended e-Learning’.

More recently in the UK, Jara & Mellar (2010) examined four case-study online courses at Higher Education institutions and found that existing quality procedures in the UK are failing to capture sufficient information on online education by students. They found that some online education courses were detached from mainstream offerings and so feedback was perhaps not as vigorously sought as that from face-to-face ‘core business’ students. There was often a detached and disaggregated development team, and this was in addition to a distributed teaching team often on part-time contracts and a number of associated management/communication problems. Finally, Jara & Mellar, (2010) found that the very fact that students were distant from the centre and their tutors led to problems of feedback collection. Not surprisingly they found that moves towards online student-evaluation surveying helped to improve feedback collection. The increased use of Virtual Learning Environments (VLEs) has further enabled such online feedback (Brennan & Williams, 2004).

Of the key concerns impacting on quality outlined in the literature, the lack of skills amongst tutors and educators is considered a fundamental constraint (Harper et al., 2004; Bernard et al., 2004b) as is student preparedness and attitudes towards online learning (Ives, 2006; Bernard et al., 2004b; Holsapple & Lee-Post, 2006; Garrison & Kanuka, 2004). Nevertheless, Sharpe et al., (2006) found that tutor engagement in course design was considered a critical success factor in blended e-Learning.
Furthermore Deka & McMurray (2006) in a study of 35 teleclass distance learning students (perhaps surprisingly) found that levels of study skills were not closely correlated with online student success, although reading comprehension was found to be a significant factor. Schrum & Hong, (2002) found that students need to understand upfront the time involved in their studies, consider what flexibility they have in their existing external commitments, and what support systems they have in place, if they are to prepare successfully for their studies.

Rio Salado College in the US, a leading institution in progressing online education, allows students to also preview course content in addition to providing flexible start dates (every fortnight) to enable students to start at a time that suits them (Thor & Scarafoiiti, 2004).

Similarly, in terms of fixed timetabling Saba, (2005) has questioned the flexibility of the existing semester system with set start and finish dates. He questions whether this is really in the best interests of the flexible distance learner. This traditional timetable is based on the agrarian timetable and the need for on-farm labour in the summer and early autumn (ibid, p.265).

Rio Salado College in the US argues that flexibility is at the core of its brand and so it offers start dates every two weeks for 90% of its online courses (Scarafoiitti, 2003). These ‘rolling starts’ provide a level of flexibility in access not apparent in many other online courses that still model themselves on the 2-3 traditional semester system.

In the business sector where online education has also experienced considerable growth, the quality has arguably not always a high priority (Moller et al, 2008a). Instead, online education can be seen as a cost-effective means to meet training needs and is evaluated on logged learner hours, rather than on its overall quality (ibid, p.71).
Of additional concern is a lack of effective evaluation (ibid, p.70) which has meant that many online education courses will just not attain sufficient regular feedback to be able to adopt the most suitable forms Instructional Design for their student cohort.

For example Chaney et al (2009) recommend that online education design should be about the promotion and generation of communications between students and instructors. At present most online content is frequently being developed by faculty staff who have had no previous experience with instructional design and the outcome is often a product based around the principles of what works in the classroom (Moller et al, 2008b).

Yet in terms of quality assurance, Mayes (2001) maintains that such online web resources have become a ‘major issue’ for the sector and suggests a form of ‘kitemarking’ of quality as being the way ahead for the sector. In some online courses where staff input to the whole online experience is considered a central component, minimum requirements have been set out for instructors in terms of skills, knowledge and commitment. For example specific demands are expected of staff involved in delivering the Sheffield College and Chartered Institute of Personnel and Development’s Certificate of Online Learning (Cowham & Duggleby, 2005).

In the Sheffield College and Chartered Institute of Personnel and Development’s Certificate of Online Learning model, the Course Director, is supported by a designated clerical support officer and teaching team are also supported a course administrator who is also an online learning specialist.
To maintain quality, an instructor's guide has been produced which details information on how to deliver the course and also how to moderate the online classes which staff must adhere to. The course director is available in addition to a web board for questions from instructors and new staff moderate in teams with more experienced staff initially. A teaching-staff-only web space in the VLE is also used to make suggestions to improve the course and modify assessments and is the forum where the course team agree changes and the course leader subsequently implements them.

In another instance, the Universitas 21 Global (U21G) initiative (a network of 18 universities across 4 continents) delivers education entirely online and has aimed to ensure high quality standards. U21G has set a prescriptive set of guidelines on how to take forward module development through conception, working with an Instructional Design team to actual development (including peer review).

Such guidelines on expectations of online education course quality standards, format and communications should also be provided to students according to Sharpe et al (2006). The final U21G product is described as 'interactive online courseware' and contains additional input from content editors and media developers to ensure its consistency in terms of quality within the course materials approved for use (Chua & Lam, 2007). The Quality Assurance within the U21G content authoring process is therefore clearly set out. It adheres to quality practices and its standards are about creating a consistent and recognisable product of high quality across its network, recruiting a high standard of experienced online staff and adhering to agreed technical standards.

Interestingly, the uploading of the content itself is undertaken as part of a collaborative learning task by the tutors involved to further help gauge their suitability for tutoring using the U21G platform.
Finally, all courseware is reviewed by U21 ‘Pedagogica’ and approved for use or sent back to the developers for additional work. This quality focus on courseware ties-in with the importance placed on this element of the online learning experience as outlined by Mayes (2001, p.470).

Moller et al (2008b) question the quality of courseware being produced in the sector and make the points that firstly, basing new educational design around the classroom delivery model is flawed as there is not a wealth of evidence to show that the classroom based approach is particularly effective. Secondly, that because of faculty staff's limited knowledge (in many instances) of technology, they are only ever going to provide a limited version of what they could provide with a wider knowledge. Thirdly, for staff with limited knowledge such development can be very time consuming and can lead to a sense of isolation and feeling of being overworked.

Where staff time has been focused on producing an online product, feedback has often been good. In an online pilot project at the University of Stirling it was found that 85% of (the 94) students returning questionnaires responded positively when asked if they enjoyed their course content being delivered online via screencasts and podcasts (Winterbottom, 2007). Students liked the flexibility and thought such content was a great revision tool. Some students on the negative side thought this mode of learning made them feel remote from their lecturer, unless they were highly motivated or managed their time well then they would often put-off accessing the online content and so begin to fall behind. Others who did access the content thought it took too long to go through due to the pausing and rewinding necessary to pick up on key points made (ibid, p.7).
Childs et al (2005) identified and summarised a number of drawbacks of online education that will impact on the quality of the online education experience. There are significant upfront design and development costs for online education courses involving both technology (including related software licenses) and staff training and support costs (Birch & Burnett, 2009). If these are not fully understood at the institutional level then the resulting product may be under-funded and fall far short of the best practice in the sector.

Birch & Burnett (2009) as part of their research clearly articulated the time management issues from the academic staff perspective:

"Interviewees revealed that time is required for thinking, conceptualising, researching, strategising, planning, learning about and coming to terms with the required technology, training, developing, editing, updating and maintenance. Early adopters and non-adopters expressed concern about the lack of time to experiment, share experiences with colleagues, adapt their content and attend the requisite training." (p.124)

Other identified issues that could impact on the quality of the online education experience included a lack of built-in interaction, possibly making online education less attractive and indeed less valuable to learners. The potential static nature of online education means that some institutions may confuse information provision with learning rather than a much more engaging and interactive experience that requires to be resourced.

Lastly, Childs et al, (2005) found that a lack of planning and implementation strategies could lead to failure of courses at the institutional or organisational level. Without such a planned 'change management' approach being taken forward then continued institutional buy-in from senior management and indeed staff level may not become apparent.
Overall, Childs et al, (2005) found in a meta-analysis of the literature that persons on technology-based courses tended to achieve better results than those in classroom based situations. This in itself must be part of the rationale for e-Learning.

Saba, (2005) states that online distance education has the ability to be a customised form of education able to provide Personal Learning Environments (PLEs), ideally suited to the post-modern culture where key skills such as critical thinking and problem-solving skills are highly valued. Ultimately the ‘quality’ product in the online education literature is one which develops students as independent learners (yet gives them clear direction) but at the same time strives to develop an online community. In doing so, it seeks an enhanced level of social and academic interaction (between the students and their tutors) and timely and constructive feedback (including acknowledgement feedback) from tutors (Birch & Burnett, 2009; Cowham & Duggleby, 2005; Hirumi, 2005, Rovai, 2000).

This latter element, feedback, is considered by some researchers to be the most important support mechanism in a variety of educational contexts (Hummel, 2006). Mayes, (2001) considered feedback or rather its lack of quality and frequency to be the ‘achilles heel’ of the e-university. In addition, he considered online student discussion and the means by which it is structured, managed and assessed as being a key quality indicator on the quality scale.

Core to the theory behind this current study is the premise that if a quality experience can be provided to online learners then learners' satisfaction and so retention levels will increase in conjunction with such improvements.
This would be an opportunity for follow-up research. This premise seems to be
backed up by Chua & Lam (2007, p. 146) whose review on the U21G online
courses initiative (including 615 respondents measured on a 5-point Likert scale)
showed that the approval ratings of 86% on course subject and courseware and
82% for instruction translated into a student retention rate of 95%. They suggest
that the Quality Assurance (QA) practices being pursued by U21G are having a
positive impact on student retention.

In this instance student feedback is complemented by instructor feedback on the
quality of their course including the workload, online courseware, the assessment
instruments and the quality of the students. Drawing on the U21G experience Chua
& Lam, (2007) suggest that QA practices in online courses should focus on five
primary areas, namely content authoring, courseware development, recruitment,
pedagogy and delivery.

One of the big questions must be whether new standards are required for learning
and teaching in the online education context although the development of such
standards and guidelines for diverse educational delivery models may be costly in
terms of cash and staff time (Hirumi, 2005). Many attempts are being made at
benchmarking in education, but relatively few are currently being focussed on
benchmarking online education or the increasingly important areas of IT provision
and support of the teaching experience at the University level (Bacsich, 2005;
Mayes, 2001).
Chapter 3 – Differing Approaches to Online Education

3.1 Approaches to Online Course Design

Educators, during the last decade in particular, have had the option to use the internet, particularly the World Wide Web, to facilitate enhanced interaction and participation amongst off-campus distance learners.

“Online learner participation is a process of learning by taking part and maintaining relations with others. It is a complex process comprising doing, communicating, thinking, feeling and belonging, which occurs both online and offline.” (Hrastinski, 2008, p.1761)

This use of the World Wide Web in Higher Education (HE) has literally become a global phenomenon (Chung, 2005). The important point about this is that access to information and content has become widespread in the 21st century and so, as McCombs & Vakili, (2005) point out, designing an educational approach around the simple provision of content and information is no longer tenable. Instead, educational design using technology should focus on improving communications amongst learners, providing access routes to accurate and relevant information and help form learning communities at a distance (ibid, p.1583). Rennie, (2005) also makes the point that quality online course design is no longer about access to information, but more about the online literacy skills to discriminate between useful and credible data in comparison to less robust and ‘grey’ forms of internet content.

Ultimately, past experience in the traditional classroom teaching context does not prepare staff (or students) for the design and delivery challenges of online-based learning and asynchronous learning networks (Sax, 2003). Within this context, the primary design task for HE staff in developing and delivering online education content according to Kirkwood, (2009) is to develop student understanding of the learning experience they are signing-up for and its rationale.
The process of how to progress their learning needs to be explicit. A cohesive approach to design is possible through a direct alignment with the course’s learning outcomes, so that design decisions originate from the key rationale of these learning outcomes (Ellis et al, 2009). Indeed a strong underlying online design philosophy was found by Bird, (2007) to be an important underlying factor in student success. They found that those online tutors mimicking traditional classroom approaches were more limited in their design of content to utilise newer innovative technological approaches, required to engage with students in online environments. According to Cook & Dupras, (2004) it remains common practice to use lecture notes from a traditional classroom environment as the starting point for new online courses by uploading such material to a VLE and then labelling it an online course. Such ‘courses’ are quick and easy to produce and are in actual fact repositories of information rather than being effective learning tools. Such products are labelled ‘shovelware’ (Morrison & Anglin, 2006).

Fein & Logan, (2003) after reviewing the literature, advocate that traditional lecture content must not be simply uploaded without adjusting the activities and assessments. Their findings advocate that successful online instruction can only be achieved if the content is designed around the pedagogy appropriate to the learning context. Connolly et al, (2007) also make the point in their ‘Results’ (n=33) that one just simply cannot take the content from a traditional face-to-face course and upload it online without major considerations related to its design and organisation. The teaching focus, modes of interactivity and assessment, need to be thought through (ibid, p.49-50) and were highlighted in particular.
An example of ‘shovelware’ is outlined by Bishop et al, (2007) in outlining a course where the move towards online learning was undertaken in a short space of time. The online learning environment (n=98) was filled with traditional ‘chalk and talk’ content, without initially a corresponding pedagogical shift. Ultimately a move towards generating less ‘passive’ content and more interactive task-based content was shown to be effective in generating more meaningful discourse within the online environment. Yet, the form of the content is not necessarily of major concern in the view of Martens et al, (2007) as they argue that it is not necessarily how interesting or challenging the online experience is, but rather how it is perceived by the student.

The presentation and clarification of the learning tasks within the online learning environment are therefore of particular importance and need to be matched to learner expectations. However, this is not to say that online courses should not be structured and designed to achieve a pre-agreed and determined set of learning objectives, just as is the case in any traditional face-to-face classrooms scenarios. For example, according to Durkee et al, (2009) best practice dictates that specific activities should be built-in to first year modules to enhance ICT skills of relevance to the modules students are studying. A student-centred activity-based approach is designed as:

"....it is understood that people learn by active construction of ideas and building skills, through exploration, experimentation, receiving feedback, and adapting themselves accordingly" (Sharpe et al, 2006, p.35).

Nagel & Kotze, (2010) in a survey of students (n=64), which although limited in size for drawing wider population generalisations, found that innovative course design, could actually allow much bigger class sizes online. Methods of blind peer review and self-plagiarism checking were both found to engage the student and aid the development of a cognitive, social and teaching presence that was essential for an established Community of Inquiry.
This approach was very much in the constructivist mould and also concluded that when students took direct responsibility for the quality of their own and each other's learning, they attained a higher learning experience than would otherwise have been possible.

Shea et al, (2003) are specific proponents (this work being cited 109 times in Google Scholar) of the cognitive, social and teaching presence design approach within online learning environments. They define these important design approaches as (ibid, p.65):

"Cognitive presence is the extent to which students are able to construct and confirm meaning through sustained discourse in a community of inquiry..."

"...social presence is viewed as the ability of students to project themselves socially and affectively into a community of inquiry."

"Teaching presence is the design, facilitation and direction of cognitive and social processes for the realisation of personally meaningful and educationally worthwhile learning outcomes."

Bird, (2007) and de Bruyn, (2004) also subscribe to an interactive student approach being integral to that which builds understanding amongst peers. This approach seeks to make sense of information examined, within a set of 'scaffolded' learning activities based on student collaboration and social interaction. This social interaction around the content, Bird, (2007) claims is at the core of the constructivist design model in contrast to 'passive transmission' models where information is relayed from tutor to learner.

Furthermore, Bird (ibid, p.156) suggests that reflection requires social interaction to be effective. In short, Bird (ibid, p.156) indicates that in his view the fundamental 'ingredients' of online course design include 'content, knowledge construction and reflection'.
Rabe-Hemp, et al, (2009) largely agree with such design priorities, but also add that to achieve online learning, an additional design element is required and that is enhanced levels of student-to-faculty communications. In their research comparing on-campus students with online students, online students were found to spend more time in preparing for their course and additionally, felt closer to their tutors in the faculty too.

In related research by Ferdig, (2006) and Cook & Dupras, (2004) in producing a guide for effective web-based learning, it was found that innovate pedagogy requires students to actively participate and collaborate together. When they do, then the benefits of education are potentially further increased as social (non-formal) communications and interaction are enhanced within online education student groups or communities of learning.

Furthermore, Sims, (2008) after an extensive literature review states that when elements of both formal and informal collaboration occurred with formal and informal learners, then online education was able to provide a 'super-pedagogical' layer over that of traditional methods. Bishop et al, (2007) recognise a similar process going on within the online learning sector and talk about a paradigm shift incorporating the move away from traditional lecturer-based teaching to that favouring student-centred learning. Mason, (2001) reports just such an occurrence in the Open University in the UK with online staff focussing on ‘collaborative small group activities’, ‘real-time events online’ and also ‘innovative online assessment’ as a means to empower student-centred learning.

Levy et al, (2003) summarises such constructivist design theories as being approaches resulting from the premise that knowledge cannot be easily transmitted from one individual to another and passively accumulated.
Instead, constructivist approaches must provide opportunities for learners to actively engage and experience knowledge construction, be able to reflect on it, provide personal perspectives and receive feedback and ultimately assimilate multiple viewpoints. Similarly, Short et al, (2006) discuss putting student learning needs at the forefront of course design and in so doing focus on creating the conditions for collaborative learning to construct knowledge.

Kuboni and Martin, (2004) justify this approach by arguing that human beings in general construct knowledge rather than simply acquiring it and they do this often in a group setting. Whilst, Martens et al, (2007) make the point that constructivism is not a specific design per say, but rather a design philosophy based on the notion that learning is enhanced and created through learner collaboration. Further findings from Baran & Correia, (2009) concur and suggest that student-led facilitation and indeed moderation of online learning classes is a useful strategy and can lead to enhanced levels of motivation.

These enhanced levels of motivation were found to enable students to come up with innovative ideas and generally lead to the development of a committed and involved participatory online learning environment. Such a strategy can reduce tutor teaching loads whilst also enhancing the social presence of all participants in the learning group. However, it needs to be recognised that the students in this study were post-graduate students who were also teaching professionals. This obviously limits any population generalisations that may be taken from the study results of Baran & Correia, (2009). Rabe-Hemp et al, (2009) found in related research that social presence is not necessarily a result from enhanced levels of student-student online participation. Students must reveal their personal identities in such online communications and this, they argue, is one the major pedagogical challenges facing faculty designing student collaboration as part of their coursework.
"From designing the course to setting up the site, seeding conversations and responding to questions, a facilitator’s job requires countless hours and daily attention if participants are to feel supported in their learning processes."
(Godwin and Kaplan 2008, p.5)

Fox & MacKeogh, (2003) also focused on online teaching loads and advocate forms of online techniques and methods of learning that minimise demands on tutor time whilst at the same time promoting 'higher-order cognitive skills'.

In a survey of students (n=25) it was found that asynchronous approaches that asked students to undertake some reading and defend or oppose particular arguments in discussion with their peer group, ask questions of them to extend knowledge and understanding, complemented with a reflective exercise, only worked to a partial extent. On the plus side, it was found that using this constructivist approach resulted in time spent by tutors supporting this teaching methodology was commensurate to those teaching face-to-face.

Murphy et al, (2005) also recognise this 'plus side' and identify course design techniques as being the means to enable the empowering of students to be less passive within their learning and to become active facilitators of their own learning, so as to help tutors to reduce their teaching load. However, Fox & MacKeogh, (2003) concluded that as assessment is a key (facilitator's tool and) influence in stimulating meaningful participation in the online environment, then future such experiments in online collaboration would benefit from formal assessment. Some of the students had expressed little value in using their limited time engaging in activities not obviously related to assessment. Yet it might be argued from the constructivist perspective that online courses have some further fundamental requirements.
Durkee et al, (2009) highlight that a new paradigm of anytime and anywhere learning will only happen if the use of technology is correctly applied within distance learning to overcome many of the barriers of distance. Experience, at an early stage, with a range of technologies, is advocated in this instance and so they are built-in to the course at an early stage.

Yet, crucially, as Murphy et al, (2005) point out, such technology is ultimately only an enabler of student interaction aimed at idea exchange, meaning negotiation and reflection on multiple perspectives, and so only a ‘cog in the wheel’ of the constructivist learning process.

Godwin and Kaplan (2008) are also firm advocates of experiential learning as being a core component of all online courses. In an attempt to make virtual connections resemble real connections, they started workshops with online participants (n=180) from around the world by instigating paired interview activities as an initial activity for participants. These events were designed to develop experiential activities through social interaction, collaboration and the establishment of a community of practice.

"Online learning does not only take place by delivering excellent well-designed educational content, but includes the use of online collaboration and communication tools for learners to exchange opinions and information, to accomplish tasks together, and to develop supportive online ‘communities of practice’.” (Woodill et al, 2004, p.13)

In another example outlined by Scarafioti, (2003), Rio Salado College in the US has issued ‘Keys to Instruction’ which are guidelines or ‘scaffolding’ to ensure that students become actively involved in their weekly lessons and individually or collaboratively summarise their experiential learning on an on-going basis. Andrade et al, (2008) describes the term ‘scaffolding’ which is used in much of the literature. It is about the processes that simplify the learning task for the student.
It comprises conceptual types of scaffolding (e.g. what the parameters might be in solving a task), metacognitive types of scaffolding (e.g. the thinking approaches that might be of use), procedural scaffolding (e.g. how the resources and tools are to be used) and strategic scaffolding (e.g. an outline of alternative approaches that might be appropriate).

Strijbos et al, (2004) and Hudson et al, (2006) add further to the design knowledge base when they define the important distinction between cooperation and collaboration. In the former instance (cooperation) individual tasks are allocated within a group through a division of labour to complete an overall learning task or objective. In the latter instance (collaboration) students must construct knowledge together in a co-ordinated supportive community of practice through discussion, discourse, problem-solving and reflection on both the perspectives of others and their own views in forming knowledge.

Preventative methods such as assessment to avoid ‘free riders’ is considered to be essential if social cohesion is be achieved within the ‘community of practice’. Yet the issue of ‘scaffolding’ or pre-structuring such group collaborations is also considered as being central to the success of the design process (Strijbos et al, 2004, p.412). Too much structuring by the tutor may lead to forced and artificial communications and too little structuring will lead to fragmented and disjointed input where interaction increasingly becomes seen as an optional activity and so falls away. Of additional interest, (ibid, p.414) is the consideration of how group sizes impact on the collaborative process and differing interaction patterns. There is some evidence (although not significant) from their results to show that ‘dyads’ (two-member groups) incur benefits, particularly for lower-achieving students, for participation in collaborative learning environments.
More research in this area is suggested, although Krause et al. (2009) found that in their research active participation and interaction was present in all their dyad groups. In comparison to individual performance, dyad groups performed better (in problem solving tasks in particular) benefitting from a 'great knowledge-base' and better 'collective information processing'.

Overall, Strijbos et al. (2004) highlight the importance of differing techniques and methods of group collaboration within the course design process. Similar research the same year by Koszalka & Ganesan, (2004) also points to group collaboration as being important and they maintain that student learning develops out of discussion and interaction with their peers which helps to shape their understanding of the module content being reviewed/examined. They assert that online courses that promote engagement with resources in a social environment will be the most likely to enhance the learning experience for students. Their research (n=78) focused on modules that: "included information on the theory, instructions to complete module activities, and some form of social interaction (learning)...." (ibid, p.249) and compared two online delivery models with face-to-face teaching. The enhanced online teaching based on the social constructivist model scored higher in ratings in almost all categories and also in descriptive feedback provided by students.

The above practitioners are of the opinion that as it instigates both action and reflection, experiential learning (the constructivist approach) provides a powerful platform to develop online relationships even for those geographically remote across the globe. This then must be considered a fundamental element of the course design process. The problem-based learning approach and learning-by-doing are methods that can be easily individualised to work effectively or can be used to generate collaboration across geographic boundaries via the development of associated groupwork.
Ellis & Calvo, (2006) make the case that such collaboration needs to also be combined with reflection and the developing of new perspectives originating from activity-based discussions with peers.

Conole et al, (2004) in the context of design approach, make the very important point that the diversity of approaches in online education can prove increasingly overwhelming for not just practitioners but also researchers. As a result they developed a pilot model to be considered at the course design stage to enable an audit of pedagogic approaches to be undertaken by practitioners as they develop their content. More research was required on this model's limitations, but the point is that online education approaches are in a state of flux as multiple design approaches are implemented.

Many online courses have been derived from on-campus courses and started out as a collection of information from tutor notes assembled together. This 'course' content tends to consist of information with little consistency in appearance and usability and is uploaded to a VLE (such as Blackboard or Moodle) to 'create' an online course. This is termed 'shovelware' by Morrison & Anglin, (2006). Such a lack of course design and minimalistic pedagogic approach within online courses is now a rare occurrence in the literature it is argued, as a more focused 'constructivist' approach (Huang, 2002) is being taken to using technology to develop the online education product.

Figure 3.1
According to Hudson et al, (2006) the interface of pedagogical, technological and cultural dimensions (Figure 3.1) are of central importance to the problem solver/team co-ordinator aiming to design effective online learning environments.

Yet another perspective is from Garrison, (2006) who suggests that at the centre of any meaningful educational experience is both ‘reflection’ and ‘discourse’. Therefore the development of a ‘community of enquiry’ (important to the constructivist approach) can only be achieved in recognising the importance of these key factors and designing an educational experience around them. In his view, the online environment provides an excellent opportunity to address these factors and create a collaborative, constructivist learning experience (i.e. a community of enquiry) within which we find ‘fully engaged and responsible learners’. Shea, (2006) goes on to make the link between these online communities of inquiry and cultural issues. The fact is that in the real world we live and learn and work in communities.

This is cultural. Online learning environments should therefore, in his view, seek to be reflective and mirror such cultural attributes to facilitate the most optimum learning environment for online learners. Xie et al, (2008) concur and suggest that reflection is the means by which students integrate new learning into existing knowledge, accumulate further understanding and so achieve a higher-order level of learning than might otherwise have been possible. Their student research (n=27) although limited in its generalisation potential due to its small sample, indicated a significant positive correlation between level of reflective thinking and course grades. There is certainly much logic to these arguments and it would appear that through the intuitive design of participatory learning, reflection and social online activities, such communities of learners can be brought together as a cohesive community.
Overall then, there can be little doubt that the pedagogy of online online education includes a modified role for the instructor or tutor who must engage students effectively and encourage initiative and debate amongst the learning group. Students must be provided with the skills to seek out the primary information resources and be linked into such information gateways via direct links or through library databases, e-books and e-journals. This 'content' element of online learning is one of three 'C's (Bird, 2007) essential for online course design. To 'Content' (which needs to be relevant to the learner) he adds 'Construction' (learning by doing in a socially interactive environment to construct knowledge) and 'Consolidation' (the process by which learners gain new understanding through a process of reflection). Tutors designing and delivering online courses must in Bird's (ibid, p.160) view consider whether their proposed online learning activities focus sufficiently on the three 'C's.

Kanuka et al, (2008) also identified constructivist instructional methods that were well structured, provided clearly defined roles and responsibilities and provoked students to explicitly confront the views of others that had specific advantageous qualities to encourage higher level thought processes. The very level of reflection available to online students, in an asynchronous environment for example, encourages students to plan their participation more and take risks and express themselves in a way that would not feel confident in doing within a live face-to-face class (Biesenbach-Lucas, 2003). This expression of identity is of significant importance to developing communities of practice in which online learning can thrive (Rabe-Hemp et al, 2009).

According to Richardson & Ice, (2010) in the online teaching environment discussions are commonly focused around three primary instructional learning strategies: case studies, debates and topical discussions.
Firstly, with case studies, students are able to examine real-life examples of relevance to their course and extrapolate general principles by exchanging opinions and ideas. This can be thought of as a means to 'bridge the gap' between theory and practice. Secondly, debates in the online environment aim to develop student's critical analysis skills by encouraging them to develop a high level of understanding on a specialism. Their aim is to encourage justified and substantiated arguments that are robust enough to hold up against peer scrutiny. An example might be a group exercise debating the pros and cons of nuclear energy. Thirdly, through topical discussions on tutor-led issues, students are encouraged to research and reflect on a particular topic and gain insights through active discussion based around considering and responding to questions set by tutors and other students. This is an obvious example of a social constructivist approach to learning.

So the tutor 'sage on the stage' from the classroom becomes the facilitator 'guide on the side' (King, 1993) in the online context and in effect, manager of the online learning environment who will influence pedagogy and instructional methods (Bailey & Card, 2009).

This approach though may not always be culturally compatible, for example in courses with enrolled students from an African or Asian background. Such students culturally look to their tutors to closely direct their studies and impart knowledge directly to them (Olaniran, 2009).

A form of online distributed online education that adheres to constructivist principles may therefore not be universally well-received across the globe and this is an important point for many online course designers with aspirations of global enrolments.
This issue aside, an understanding of how roles and demands (including input time) change in the online learning environment must be understood, to enable effective design and subsequent delivery. According to Rovai, (2000, p.289):

“Some instructors feel that once they design their course and place it online their job is mostly done, that the community of learners will take care of itself and thrive, and learning will occur. What is likely to happen in such situations is that sense of community will wither away unless the community is nurtured and support is provided in the form of heightened awareness of social presence.”

Anderson et al, (2001) focused on the very specific role for the tutor in online learning courses and detailed a ‘conceptual framework’ of indicators of teaching presence that tutors and researchers can use to test teaching presence in the future. Murphy et al, (2007) for their part summarise the redefined role of the social constructivist online tutor as being one related to ‘modelling, coaching, scaffolding and mentoring’. For example in terms of scaffolding, (ibid, p.346) the need to explain to students the role of participation within the group is highlighted and the parameters of such contributions are explained. Other strategies, in terms of preparation for the constructivist approach, included getting students to read one of five articles on online moderation, ask them to compare face-to-face with online, and then to produce guidelines for facilitating online discussions.

Barron, (2003) focuses on the time taken for quality course design and teaching overheads and concludes that web-based courses are more time intensive. She qualifies this by referring to not only the on-going development time needed, but also due to the increased level of tutor-student interactions during delivery mode.

Maintaining high quality tutor-student engagement (teaching presence) online can therefore be an expensive from of education and is clearly dependent on good design in the first instance.
Rovai, (2002) also specifically recognises the importance of student-tutor interactions, but emphasises the changing nature of this relationship as the years progress. He advocates that there needs to be an alignment of teaching style and learner stage. Rovai, (2002) points to the evolution of e-learners from their early years as ‘dependent learners’ to their intermediate stage of becoming ‘interested and involved learners’ and finally accomplished ‘self-directed learners’. If there is a weakness in recognition of these stages then there will be a design mismatch that will lead to student dissatisfaction and unnecessary costs for the institution.

Rovai, (2002) further points out that new learners will be seeking structure, rather than a focus in dialogue, in the initial stages of their studies. On the other hand, at the opposite end of their study experience students will be seeking dialogue and will place less importance on structured content. Appreciating the evolution of the online learning student experience must therefore feed-in to the design of online courses.

Such interactions are an important means to help students achieve higher order thinking patterns (Tenenbaum et al, 2001) and a set of specific activities to aid this constructivist learning process, and so influence course design, has been identified by Tenenbaum et al, (2001, p.102):

1. Arguments, discussions and debates
2. Conceptual conflicts and dilemmas
3. Sharing ideas with others
4. Materials and measures targeted towards solutions
5. Motivations toward reflection and concept investigations
6. Meeting student needs
7. Making meaningful, real-life examples.

Importantly, evaluations of the effectiveness of online courses can often be linked to how the online environment has been managed.
Kirkwood, (2009) and Hew & Cheung, (2008) also highlight how within this online learning environment the facilitator role must better understand the drivers of student study behaviour, such as what they need to complete and engage with for assessment purposes, what level of encouragement is required, how best to moderate online discussions.

These multiple roles can add up to additional time implications for the online instructor/content designer and in turn can have motivational impacts for the student/learner. Morris et al, (2005) also refer to additional roles (e.g. an additional pedagogical role) in addition to the managerial role and so one can understand the additional time input requirements expected of online facilitators. Bailey & Card, (2009) go on to describe a social role as being a necessity for the online tutor and facilitator. In addition the informal technical support role and continued updating role of course design (in response to technical change) provided by online facilitators have been identified (as described in section 1.2) as being a further pull on the time resources available to the online tutor or facilitator (McAlister et al, 2001).

The modern day conduit for all such interactions is increasingly the institution’s Virtual Learning Environment (VLE) perhaps Blackboard or Moodle or some other similar type of managed learning environment. The popularity of such VLEs was highlighted in a student survey (745 respondents) by the University of Dundee which found that 91% of respondents found the VLE allowed them to study at a place and time of their choosing.

A further 87% stated that the VLE was a useful resource that includes all the information needed for their studies (Weyers et al, 2004).
The VLE (Blackboard) in the UHI 'case study' course instance is the means by which the majority of online content is accessed and interactions managed. In this instance too, the VLE is considered to be a key design element of online education courses.

In this context one can suggest that online interaction must be important, and indeed studies by Peltier et al, (2003) and Kanuka et al, (2008) found that the facilitator's role and presence as an active participant in online courses is rated of high importance by students and essential for ‘....moving students to higher levels of understanding and critical discourse’ (Kanuka et al, 2008, p.269). However, the most important contributing factor to online effectiveness according to Peltier et al, (2003) was found to be course content and the least important 'primary' factor surveyed was that of student-student and/ student-tutor interaction. This latter finding is at odds with much existing research (Godwin and Kaplan 2008; Djoudi and Harous, 2001; Perez, 2004; Moller et al, 2008a; Carroll, 2009, Morris et al, 2005; Bailey & Card, 2009; Cornelius & Gordon 2008; Fish & Wickersham, 2009) that considers online collaborative learning as being the most crucial element of the learning process.

Indeed, Sims, (2008) questions whether collaborative online education is not actually the key to on-going and future lifelong learning. Nevertheless these are interesting perspectives and cannot be dismissed due to the level of student feedback examined. It can therefore be argued that understanding of the changing expectations and roles of academic staff should be increasingly fundamental to online design philosophy.

Carroll et al, (2009) found in a meta analysis of UK literature on online education that a good online education experience had a close link to the usability of the learning environment in which learners resided.
So both an understanding of facilitator roles and the usability of the online learning environment have potentially important implications for the design of online education spaces and places (Barron, 2003; Carroll et al., 2009). For example knowledge of facilitation techniques is essential for online tutors to stimulate participation. Such techniques include at the basic level ‘giving own opinion or experiences’, ‘questioning’ and ‘showing appreciation’ (Hew & Cheung, 2008, p.1117).

Likewise, providing students with the appropriate skills, knowledge and self-discipline to engage effectively with the course content and the motivation to engage with such skills and knowledge is essential to student success in online education (Hirumi, 2005; Schrum & Hong, 2002; McAlister et al, 2001; Keller, 2008). Poor design therefore will not only impact on student persistence but also on instructor burnout, in trying to deliver high levels of on-going assistance and teaching presence, as described by Hogan & McKnight, (2007). The importance of design cannot be underestimated. Concannon, (2005) found that poor design resulting in the poor navigation of materials was an important factor in students’ lack of ability to find resources online, quickly and easily.

However, ultimately the most crucial issues amongst the students surveyed were the provisioning of technical support, peer to peer support and tutor support. Lee et al, (2009a) also found that design had a major impact on perceived student satisfaction with their courses. Their findings suggest that the easier to use an online education course is, then the higher the perceived usefulness learners attribute to online education. A compelling case for a focus on ICT usability and intuitive, consistent and simple online education student interfaces that are well managed is presented. Student burnout is identified as being a problem if online content has not been properly designed.
On the one hand Diaz & Entonado, (2009) show that activity-based learning can have a positive effect on the motivation of online and face-to-face students alike. However, they also found that a predominantly constructivist approach that focuses on learner-orientated tasks may become overwhelming for the online student and has the potential to lead them to give up their studies. On the other hand the constructivist approach if executed effectively within online learning can lead to more permanent and in-depth knowledge being retained by students (Karatas & Simsek, 2009).

In the absence of a highly structured and planned task-orientated approach to online discussions it is by no means a given that online discussions will be interactive and collaborative and anything other than 'serial monologues' (Kanuka et al, 2008). However, Kanuka et al, (2008, p.263) did note that what Discussion Boards do is to allow students to enter into ‘reflective deliberation’ and this online instructional method is central to many online courses. Richardson & Ice, (2010) went further and from their research into instructional strategies and found that of the students surveyed, 47% preferred topical open-ended discussion exercises, followed by 36% opting for online debates on particular topics or issues and only 17% opting case study-based investigations and analysis. This has clear implications for instructional design within online courses.

Within the literature several other key instructional methods are considered to be central to effective instruction and link back to the constructivist activities outlined by Tenenbaum et al, (2001) above. Kanuka et al, (2008, p.262-63) outline some of the key methods that can be used. The ‘nominal group technique’ is where a clearly articulated problem is presented to students and they are asked to provide and prioritise solutions. Then with instructor assistance a list of priority solutions are agreed, after more the extreme suggestions are discounted.
Next, ‘group debate’ is used by online instructors to enhance student confidence and their ability to express viewpoints as two groups are asked to present opposing positions then defend their perspective and attack that of the other group. In addition, the ‘invited expert’ is recognised as a means to enable students to make connections and understand where their course content integrates with the ‘real-world’.

Also highlighted are ‘webquests’, web-based inquiry activities directed by instructors pointing students towards carefully selected websites or web resources that will provide them with diverse perspectives on a particular topic that will require evaluation skills and sometimes role-play to complete.

Deka & McMurray, (2006) identified key characteristics for student success in distance learning classes. These include reading ability/comprehension, confidence in abilities and a willingness to maintain interaction between themselves and their instructors. The challenge for online course design is to recognise these success factors and design learning content and activities that develop these particular capabilities as students progress through their courses. The approach recommended by Bird, (2007) indicates that there are ‘substantial advantages’ in articulating clearly the rationale behind the teaching approach and ethos to students. This can help spell-out exactly the level of participation required of students in their online activities and discussion forums in a ‘high-quality networked collaborative’ online education environment.

Sharpe et al, (2006) reporting for the HE Academy in the UK recommend that ultimately pedagogic research should run parallel with course development and course re-design to maximise the quality of course developments. This current research exercise is representative of this recommendation.
3.2 Asynchronous discussion forums

"The growing popularity of online education, particularly among mature and part-time students, stems from students’ ability to access their courses asynchronously – when it is convenient to them." (Steinberg, 2004, p.188)

According to Chung, (2005) the most pronounced difference between pre-Internet and post-Internet distance learning is related to the ability of learning to be offered asynchronously. The impact of this change is truly revolutionary he claims in so far as now, not only the barrier of distance can be overcome, but also barriers related to time can be eliminated too. However, the increased use of asynchronous discussion boards as learning and teaching tools in higher education has far outpaced our knowledge and understanding of how they should be designed and moderated to effectively support student’s learning needs (Baran & Correia, 2009).

Nonetheless, an increasing amount of research on asynchronous networks has been undertaken during the last several years investigating the effectiveness of asynchronous discussion boards/forums within the framework of online education. At the very least, asynchronous discussion boards provide a very useful means for instructors to 'monitor, observe and chronicle' student engagement (Crawley et al, 2009, p.174) with the course materials for the duration of the course. The tutor by setting weekly tasks on subject content can develop on-going opportunities for the participation of students and so intellectually engage them more fully with course content than they would otherwise be able to do in the traditional classroom setting (ibid, p.174). According to Morse, (2003), subsequent to an extensive literature review, there are a number of benefits that accrue when participating in asynchronous learning networks.
In comparison to the classroom and other synchronous learning activities, this form of learning has increased flexibility, higher participation quality and quantity, enhanced communication openness and access and post-participation review and access for study purposes (ibid, p.38).

An important component of this process is termed e-moderation and this includes the summarising and weaving together the ideas of students (and student groups) in taking forward discussion board interactions. E-moderation is typically a primary tool used in asynchronous online delivery whereby tutors/facilitators/instructors interact directly with the student group to aid and encourage collaboration and learning (Ellis et al, 2009; Salmon, 2003). Key questions include what form of communication requires to be moderated on asynchronous discussion boards and how it should be done?

An early task for the online instructor in the discussion board environment is the establishing of ‘netiquette’, norms and ground rules (Wang, 2008, Rovai, 2007) in the first week of the course to establish the type of communications that should dominate thereafter. Subsequently, a focus on missing students should be pursued by instructors to ensure communications are established (e.g. by email or text) with late starters as soon as possible after they enrol. Such actions then require to be followed-up by ‘basic technical facilitation’ skills for new users (Wang, 2008).

Clearly, another primary challenge for the online instructor within asynchronous networks relates to getting the balance of input right to stimulate discussion, but not take over. Instructors must also consider the forms of participation that will be of most value to their student group (Mazzolini & Maddison, 2007). The authors maintain that in a large group the instructor would not be expected to respond to every point, but would need the skills to enter the discourse at the correct time to comment, ask a question or redirect the discussion.
It is just not the balance of tutor input, but also the balance of interaction overall that is important. It is vitally important that students do not become overwhelmed in dealing with large numbers of messages being posted in their asynchronous forums. In such a situation timely message retrieval becomes an important enabler of further discussion (Oliver & Shaw, 2003; Ross et al, 2004).

The importance of getting the balance right cannot be underestimated as the Mazzolini & Maddison, (2007) showed on average, the more an instructor posted then the less frequently students posted and the shorter the overall discussion thread was. That said, they also found that the length of a discussion thread was not an indicator of quality. In addition, in instances where instructors attempted to increase the level of student interaction by posting more and more themselves, the less they succeeded in their efforts. Enhancing asynchronous class communications then is not just about the amount of interaction initiated by the instructor, but also must be about the type and timing of such interventions.

Mazzolini & Maddison, (2007) found that students surveyed appreciated most ‘wrap-up’ postings at the end of each discussion forum and instructors who used this practice were rated highest for enthusiasm and expertise.

One instructor posted that in addition to the ‘wrap-up’ postings, a series of ‘light touch’ postings during each two-week forum to correct misconceptions or to steer the discussion was most appropriate. Discussions that were progressing well were considered to be best left alone, in the view of another instructor, until ‘wrap-up’ postings at the end. These practices tended to correlate most highly with student satisfaction. Another interesting instructor comment was made with regard to answering questions early in a discussion board discourse. This practice can in effect close the thread as many students take the instructor’s word ‘as gospel’ and so further discourse from students is stunted.
Paulus, (2006) attempted to categorise student contributions by examining the discourse of 21 postgraduate students by dividing them into functional components. She found ‘phase 1’ communications (ibid, p.12) that ‘stated new observations’, or provided ‘support with evidence’ or communications that were responses ‘with opinion, feedback or information’ and others that were about ‘elaborating’ on existing discussions’. Identifying ‘disagreement’ and ‘supporting one’s position’ were two further functional elements identified as being ‘phase 2’ communications (ibid, p.14). Finally, ‘phase 3’ functional components (ibid, p.18) were notes as ‘identifying areas of overlap among conflict’, ‘proposing a compromise’ and ‘responding to requests for feedback on compromise’.

With regard to general communication functionality, Paulus, (2006, p.13) found that students also used the functional elements of ‘mitigate, appreciate and support’ to connect with each other within the discussion forum. Similarly, Wang, (2008) identifies ‘appreciating and acknowledging’ contributions (ibid, p.862) as a means to motivate participants. Instructors’ contributions can take the form of positive feedback, praise and encouragement to help develop an inclusive, supportive and interactive online community.

The notions of ‘separate knowing’ and ‘connected knowing’ Paulus, (2006, p.23) are clearly crucial to the type of discussion that forms in asynchronous discussion boards and how participatory it is likely to be for all elements of the class. For example a more ‘connected knowing’ and cooperative discourse may be a more supportive environment suited to female participation too (Guiller & Durndell, 2006). On the other hand males may prefer a more ‘independent and argumentative’ online environment, often not suited to the wider group (ibid, p.379).
In terms of contributions within the online environment a comparison by Caspi et al. (2008) found that male students tended to dominate face-to-face environments whilst women tended to dominate online environments where they feel less intimidated and more protected. Evidence from the literature seemed to show that females prefer web-based communications more than males (ibid, p.722).

Ultimately, the point is made that students, both male and female, may need to be taught the correct language for the effective sharing of knowledge and construction of meaning from online discussions (Guiller & Durndell, 2006). Consequently, an effective e-moderator must be able to understand the nature of the online communications discourse, including gender issues, to effectively moderate a discussion board dialogue. Salmon, (2003) describes the role of the e-moderator as 'meaning making' rather than 'content transmission', as it might be in a traditional class setting. The online learner according to Salmon, (2003) gains or constructs knowledge through interactions with his/her peers via specific guidance from their tutor/e-facilitator.

However, there are different types of online environments and some may not be suitable for the entire student group unless actively managed by course instructors. Inexperienced students in a less supportive environment that is more challenge-oriented can result in conflicts that cannot be easily overcome and so lead to the demotivation of sections of the student group. Quickly and effectively picking up such elements of the discourse that are unhelpful to the overall context is often difficult though, even for experienced instructors. One of the main reasons identified by Ross et al, (2004) is the lack of usage of appropriate message subject headings.
Repeated use of the 'reply' function by most students means that picking up the
direction of threads at a glance is not possible and so a fuller process of scanning
each and every posting must be undertaken to decipher where particular
discussions are heading and this is a lengthier process for online tutors. On the
other hand, Bishop et al, (2007) discuss the problem of discussion forum domination
by a few students, a practice which turns-off other students from participation in
such forums.

Rovai, (2002, p.9) defines this tutor/instructor role in facilitating group discussion as
being that of an: ‘encourager, harmonizer, compromiser, gatekeeper, standard
setter, observer, or follower’. Skills in performing these roles successfully in the
asynchronous environment can be the catalyst that enables the development of a
strong and cohesive online community. Such e-moderation or more specifically, the
effective management of the asynchronous environment is a key factor in online
education success in the asynchronous context according to Rovai, (2002). Rovai,
(2007) goes on to emphasise the specifics of managing the online asynchronous
environment effectively and points towards emphasising student-to-student
interactions and the development of a social presence by instructors who should, in
his view, work to ensure an inclusive learning community to maximise the
effectiveness of asynchronous online learning.

However, such asynchronous communications (discussion boards) have been
found to be at odds with other more common forms of social networking on the Web
which are much more prompt and instantaneous. Some users have been found to
be less enthusiastic for 'asynchronous' participation and tend to use such
communications less often (JISC, 2007b; Oliver & Shaw, 2003).
In instances where low priority is given to interactive discussion boards then discussions become limited and strained. Consequently, a solution employed by course leaders to address such a lack of student participation is to subsequently credit participation and make it an element of assessment. This is commonly undertaken via some form of online group participatory exercises (Salmon, 2003; Rovai, 2007).

Oliver & Shaw, (2003), Groves & Donoghue, (2009), Picciano, (2002) and Palmer et al, (2008) however, found that some students interacting in discussion boards that were being marked were 'playing the game' and being motivated by extrinsic rewards. It was also suggested that their increased number of postings may be superficial and did not actually improve their learning and/or were not necessarily representative of a community of practice. Gerber et al, (2008) expand on this perspective and conclude from their research findings (n=164) that if students do not understand the link between their online activities and their performance achievement and final grade, they will just not be motivated to participate to any great extent.

On the other hand, Ho & Swan, (2007) suggest that as students collaborating online have time to reflect on other postings and their potential replies, by the time they compose a response it tends to be of higher quality in terms of accuracy and relevance and similar in actual fact to formal writing. In addition, Rovai, (2007) and Andresen, (2009) suggest that credit for participating in online discussions can motivate students to interact better with their peers and instructor. The creation of an external motivation factor is important for many students, who are not always motivated by personal interest and/or enjoyment.
Important in this context, in the view of Rovai, (2007) and Andresen, (2009) is the development of a parallel marking rubic that students can examine prior to the beginning of their participation on a given module.

Morse, (2003), as the result of a literature review, found that technical frustrations within asynchronous online environments impact on new and experienced participants alike. Failures of both software and hardware and consequent reliability issues lead to unresponsive links to key web-based resources and so users' expectations of technology are not met. In addition, Morse, (2003), also identifies other potential problem with asynchronous communications stemming from the lack of coordination typical when new groups of learners are formed online. Some students will have an ICT skills deficit in comparison to others and feel they are being left behind. Other students will fail to recognise the differing timings in receiving feedback and comment in an environment which is built around time flexibility. This can lead to frustrations and loss of motivation, as expectations do not match the reality.

In addition, Weller et al, (2005) assert that lack of participation, a resistance to participation, unfocussed and fractured discussion and discussion domination by one or several students leads to a less than optimal experience for asynchronous online learners. Furthermore, Groves & Donoghue, (2009) as part of their findings explained that many students did not acknowledge or understand the importance to the learning process on providing feedback to their peers in the asynchronous environment. At the same time they rated the feedback they received from their peers as being very important. Ross et al, (2004, p.119) on examining another VLE came up with a similar insight:

"A particular problem with hierarchical threading arises from the fact it is not possible to reply to more than one message at a time; this makes it difficult to have a general conversation, let alone a convergent discourse."
Clearly the asynchronous tools being employed to encourage student course participation must be suitable and effective. This was a point that Groves & Donoghue, (2009) felt needed to be better highlighted to students in the future.

Macdonald, (2003) also researched the value of asynchronous learning environments and makes the important case that asynchronous communications importantly enable the flexibility to allow opportunities for part-time students that would not otherwise be possible. This particular form of communications also permits users to work collaboratively at a distance and so is key tool within the context of online learning.

Yang & Tang, (2003) instead of focusing on the technology investigated the nature of the networks that develop in online classes. They found some evidence in their research to support the hypothesis that advice networks (more formal and work-orientated than friendship-based social networks) play a significant role in the quantity and quality of discussion forum postings. Advice networks could explain 20% in the variance of posting-quantity and 34% in the variance in posting-quality performance.

Clearly, other factors also impact on both the quantity and quality of discussion board postings. Rafaeli & Sudweeks, (2003, p.97) in examining a random sample of publically available discussion boards found evidence for the notion that support and advice networks are important to the workings of online discussion boards and the result is a type of communication that is supportive and favourable to the learning environment:

"Although more opinionated, interactive messages have a higher propensity to agree. Interactive messages are significantly more humorous, and more likely to contain self disclosure. Interactive messages are more than twice as likely to contain first-person plural pronouns in reference to members of the list, indicating that interactivity is associated with a sense of involvement and belonging....."
In this instance interactivity is described as being a construct pertaining to the allure and pull factors of computer mediated groups. The more interactivity is a characteristic of communications the stronger the online community is likely to be and so the more appropriate the learning environment it will be. Rovai, (2000, p.287) also focuses on the development of online communities in asynchronous learning networks as being essential to address issues of student isolation via the development of an active social network amongst the online learning group:

"...skillful online instructors can build and sustain community by encouraging and facilitating equitable interactions whereby members of the community feel valued and benefit from sharing ideas, experiences, and resources."

More detail on this 'social' characteristic of online learning in general, is outlined in section 5.3, focusing on the 'Social aspects of distance learning: building online communities'. This said, there can be little doubt that class size has an impact on the level and nature of communications within module discussion boards. In instances where there are too few students participating, the inevitable result is a limited discourse (Rovai, 2002). Yet fewer students allow additional opportunities for enhanced instructor engagement with individuals and their contributions. Too many participating students on the other hand, although providing a wider and more stimulating discourse, reduce opportunities for individual engagement with the tutor and may increase the 'information overload' i.e. the student workload (of reviewing postings that have gone before) to a level that discourages input from sections of the online group (Hewitt & Brett, 2007, p.1260).

Hewitt & Brett, (2007) suggest that an online class size of between 8 and 30 is optimum for online communications, although the numbers put forward in the literature tended to be from personal instructor experience rather than from evidential research.
The desired outcome in terms of class size in an asynchronous networks seems to be large enough to allow lively debate, but not too large to overwhelm students. According to Hewitt & Brett, (2007) this can lead to increased student anxiety (ibid, p.1260) and so less engagement and potentially the loss of students from online courses. In their study of 28 online courses at the University of Toronto, class sizes ranged from 5 to 19 in number. This was illustrated in their research findings that found that students in larger classes opened less of their peers’ contributions than those in smaller classes. Their level of reading was considered to be ‘scanning’ (ibid, p.1265) significantly more so than those students in smaller classes too. Their findings also showed that students in larger classes actually took more notes, but shorter in length than those students in smaller classes.

However, as Ho & Swan’s, (2007) research found, student participation is also dependent on the length of individual student’s discussion board postings. Lengthy postings were found to contain obscured points or too many points to make an easy or simple response and so led to a loss in engagement. Lengthy postings were found to be non-conducive to encouraging wider group participation and so a clear role for instructors in managing both class sizes and the size of postings on asynchronous discussion boards can be identified.

Also of note in Ho & Swan’s, (2007) findings is that there is a strong correlation between the quality of student contributions on asynchronous discussion boards and their final module grades. They ask the question: are such discussion boards the ‘testing-ground’ where students develop the effectiveness of their writing ability and so consequently go on to gain higher grades? (ibid, p.11) This is an interesting question and a potential area of follow-up research.
Irrespective, if this is the case or not, Ho & Swan’s, (2007) study suggests a link between the formation of discussion board contributions and the successful achievement of student learning outcomes. Palmer et al, (2008) note a similar link based on several reviews of recent research studies connecting the number of postings that students make with their final mark and achievement of course learning outcomes.

3.3 Synchronous Discussions / Debate

Synchronous online chat or Instant Messaging (IM) software is a relatively recent tool in the online education sector and judging by the lack of a large amount of literature on the subject, it currently remains a non-mainstream form of progressing online education. Nevertheless, it does have already recognised advantages as a mode of distance delivery for online education:

“....chats give learners the opportunity to transform their personal meaning into shared solutions through a nonlinear process of asking questions, exchanging information, connecting ideas, and defending solutions. Chats provide a space in which to explore the multidimensional nature of an issue in an informal way.” (Stein et al, 2007, p.113).

Furthermore, IM is increasingly being employed across industries in the global information society that have multiple offices and locations and so it is becoming increasingly a key employability skill sought by employers. In its role as an instant communications channel it is has a number of advantages in developing new social networks of learners. According to Weller et al, (2005) it is important that the potential for this type of communications medium is understood within the educational context. Rabe-Hemp et al, (2009) identify the potential of synchronous chat as being one of the primary technological means to meet the very real pedagogical challenges faced by tutors i.e. a means by which online learners can reduce the social and emotional distances between themselves and their peers.
It is argued (ibid, p.214) that synchronous chat may be a fundamental tool required in the development of a sense of community.

Saba, (2005) asserts that there is a clear need to further explore the use and role of synchronous interaction so that designers and academics can provide quality synchronous instructor-learner and learner-learner communications, complemented by responsive asynchronous communications. Kuyath & Winter, (2006) suggest that in terms of media richness, 'young adults' perceive a higher social presence to be achievable from IM, rather than email. Young adults place IM higher on the media richness scale than email, although lower than telephone conversations.

Weller et al, (2005) further claim that IM will be one of the technologies that students bring with them to their studies and will be used in many instances, irrespective of institutional policies, for informal and social interaction in the educational context. For example, the institutional blocking of MSN Messenger from campuses in the University of the Highlands network in Scotland led to online, off-campus, students by-passing the client software block and using MSN Web Messenger to continue their IM communications. Kuyath & Winter, (2006) suggest students use IM access to tutors as a means of equalising their access to that attainable by their on-campus counterparts.

There are a few examples in the literature of appropriate research regarding strategies for facilitating and delivering effective instructional strategies in synchronous teaching environments (Wang, 2005; Penman & Lai, 2003). However, one such example is outlined by Pan & Sullivan, (2005) in which they examined two student groups using Blackboard as their VLE at the University of Texas (n=12 and n=16) and using Skype as a teaching tool. Clearly, with such limited research subjects any generalisations from this research must be limited.
Nevertheless, student feedback detected clear advantages with Skype over Blackboard's collaboration tools. This appears to be one of the few papers in the academic literature that examines Skype as a teaching tool and so is of interest and significance (in the findings of Pan & Sullivan, 2005), given the extensive use of Skype worldwide.

There are without doubt instances where students actually become more engaged in their studies via online synchronous debates in comparison to the face-to-face environment. Stein et al, (2007) in a study of 31 students at a Midwestern university in the USA found that student social presence combined with teaching presence (from learner-moderated chats) ultimately led to what was termed cognitive presence (the extent to which participants are able to generate meaning through continuous communications) amongst the synchronous online chat groups.

A study by Greller & Mackay, (2002) also examined such tutor-student-student communications within chat tutorials in the UHI context and found an environment embodied by active multiple presences. Peltier et al (2003) explained such multiple presences being achieved due to students feeling 'freer' in the online environment. As a result they become more relaxed about contributing to class discussions, expressing their views and developing a form of trust with fellow online community participants.

However, as highlighted by Anderson et al, (2006) in instances where tutorial sessions are routinely saved, non-attendance and non-participation by students may be more likely. On the one hand, synchronous chat allows transcripts to be retained after useful tutorial sessions, yet on the other hand this practice of saving such events, may actually lead to students being less diligent in attending and participating in online synchronous chats.
Common concerns relating to the effectiveness of synchronous chat were highlighted by Bober & Dennen, (2001) who state that the underlying pedagogy of online chat is methodologically suspect. In their view, logistical issues such as time differences are often insurmountable and what is more those with typing skills, in their view, will dominate the synchronous chat environment. Add to this the loss of sync, loss of flow of discussion and interrupted trains of thought as contributors enter the conversation over a period of time replying or commenting on previous contributions student contributors may become overwhelmed and any structure is lost. Good manners may be ignored in this form of communication in their view and in effect chaos results. However, this is by no means inevitable. For example synchronous events can be opened and closed with an open-end question which is thought provoking.

This was found by Wang, (2005) and Anderson et al, (2006) to be an important strategy in eliciting student perspectives, stimulating student’s thinking abilities and promoting class-wide participation. Follow-up ‘probing and comparison’ questions were also shown to provoke intellectual responses within the synchronous chat environment (Wang, 2005, p.305). In short, tutors in Online Synchronous Discussion (OSD) environments require to re-engineer their thinking and approach in order to successfully facilitate online chat tutorials.

Penman & Lai, (2003) in their study of two separate teaching groups of 12 participants found that synchronous chat was a valuable teaching tool that had the capacity to generate higher-order thinking (e.g. interpreting and defending the students’ understanding of issues), particularly in the latter stages of the courses examined. Key skills students needed were the capacity to put across their points concisely in a form of language that their peers could understand.
Other student skills to make up for non-verbal interaction also proved valuable (such as emoticons) in the synchronous online environment according to Penman & Lai, (2003). Considering such pedagogy is important, as Cox et al, (2004) point out when reminding us that student interaction should not be confused with collaboration and learning. Synchronous chat needs to be more than simply an additional communications channel in the academic context. That said, its contribution as an additional communications support system for off-campus students cannot be underestimated.

Macdonald, (2003) highlights (and calls for wider recognition of) the importance of synchronous support systems for student and group support within the Open University in Scotland using software such as NetMeeting (also used at that time by UHI's online courses) as part of the SOLACE project. Its role is for both informal and more formal communications within online courses. More formal e-tutorials via live computer conferencing meet different quality indicators than face-to-face tutorials and the outcomes may be different too. In the UHI case-study example, synchronous online chat tutorials have arguably proved very effective when managed by experienced online tutors and continue to be used into the present day. Penman & Lai, (2003) illustrate such quality management techniques for facilitators as being related to their development of an informal and supportive environment and the ability to deflect questions back to the wider group for debate amongst the student group to ensure that the tutor did not dominate the discussion.

Online synchronous discussion (OSD) according to Wang, (2005, p.304) is:

"...more conversational in style and has a spontaneity and fluidity that can complement OAD for the purpose of online learning."
However, according to Wang, (2005) after a literature review on the subject, a number of researchers just view OSD as being an aid to creating a friendly and sociable atmosphere amongst distance online learners, rather than being an important additional tool for online learning. Wang, (2005) points to the pedagogy of questioning skills in the synchronous environment to facilitate effective discussion and the findings of his research, on an albeit limited number of 31 students, provides evidence for knowledge construction occurring in synchronous chat environments.

A similar thought process motivated Loch & Macdonald, (2007) to investigate the use of MSN Messenger for teaching maths to off-campus students, mostly in-work, and studying at a distance. Tutorial chats sessions were scheduled for the evenings. MSN and Web Messenger (its web-based alternative) is another technology that was used by the UHI case-study course in upgrading from Net Meeting, to provide synchronous chat tutorials. Piloting this software was prompted by technical problems (being kicked out or frozen screen problems) experienced by students, instructors and guests using the institution’s VLE.

According to Loch & Macdonald, (2007) the simplicity, usability and functionality of this synchronous chat software make it very attractive as a potential teaching tool. What is more it is free and many students have it on their home computers and are familiar with using it already in communicating with friends and family.

Brown, (2001) and Heiman, (2008) recognise that there are distinct 'social networking' advantages in linking-in to students home-based social networks by using the software that they use external to the institution. In academic terms, MSN Messenger software enables students to prepare and compose content before posting into the discussion and it allows participants to save the full transcript in .rtf format.
As in the asynchronous environment, the teaching style related to developing a friendly and supportive atmosphere to support collaborative online learning appears the optimal strategy for synchronous tutorials, in the view of Loch & Macdonald, (2007). Through basic management techniques an all-inclusive experience could occur by drawing-in initially silent students to the discussions and debate. Students for their part reported that online chat tutorials helped them understand the course materials and once familiar with the technology, they used it outside of class hours to support each other.

There is of course still a debate, as in the asynchronous discussion board environment, relating to optimum student numbers within online chat tutorials. Cox et al, (2004) studied a number of chat tutorial events held by the University of Cape Town (to complement a large face-to-face class) and analysed the input percentages from facilitators and students in differing class size events of up to 12 students. In one instance with 9 students present, students dominated 82% of the discussion. In a follow-up class with 8 students present, students dominated 73% of the discussion. However, in a further event in which there was only 6 students present, the facilitator dominated the chat, posting 58% of all contributions.

As student attendees fall below 9 persons it seems from this study that overall student contributions fall-off sharply too. It is also interesting to note, that in their findings, social postings almost completely disappeared in the third instance that was dominated by the facilitator. Nevertheless, 74.5% of students agreed that the chat tutorials helped them participate in their class and only 20% disagreed.

A study of an online course in Otago Polytechnic in New Zealand by Penman & Lai, (2003) saw a group of 24 students being split into two groups for the purposes of online synchronous chat.
In the UHI case study it is also common practice to break groups of 24 students into two groups to facilitate effective online synchronous chat tutorial sessions. According to Stein et al, (2007) the size of the student group along with their abilities in using the synchronous tools chosen within their course are key determinants of high-quality instruction.

Macdonald, (2003) on reviewing the role of online synchronous chat, highlighted an important role that synchronous computer conferencing can play amongst course teams and their inter-team and inter-student communications. In networked course team instances, those who frequently use Skype often also use it after hours or in instances where team members are working from home. Synchronous chat is therefore able to extend a communications presence between faculty members as well as between faculty members and off-campus students.

3.4 Web 2.0

Web 2.0 refers to a range of social software that uses the internet as a platform to enhance networking between individuals and groups irrespective of their geographic location. It is a set of communication tools and services that allow new forms of interactive communication, anytime, anywhere (Olaniran, 2009). It allows students to collaborate and construct knowledge via a range of structured learning activities and easily share them with a wide range of people potentially out-with the institutional framework for a longer time period than conventional coursework and materials allow (Rennie & Mason 2010).

In the 21st century information society Web 2.0 tools and services provide a means to manage the information overflow and more effectively review, select and organise information for optimum use (Redecker, 2008).
Given this definition it is little wonder that Web 2.0 is of increasing interest to Higher Education institutions that are involved in distributed online learning. In so far as these tools and services enhance interactivity and collaboration and allow the instantaneous publishing of content on the internet, a previously relatively static environment has arguably become much more dynamic and inclusive.

Wikipedia is a first class example of this. In many ways Web 2.0 is an extremely suitable tool for an online learning sector based around a pedagogy of constructivism and its focus on student participation, independent learning and first-hand experience. It is an innovative approach to education, as instead of providing the answers and imparting knowledge, tutors provide the scaffolding to enable students to find their own knowledge and answers.

Web 2.0 takes the operation of many elements of the student learning process away from the institution's control and transfers control to the student who should subsequently play a much more central role in their own learning (Redecker, 2008). This is very much supportive of social constructivist theories on learning where the online tutor becomes the 'guide on the side' directing activities, rather than the 'sage on the stage' (Chung, 2005) with a role of broadcasting and imparting knowledge. Students engaged with Web 2.0 should ultimately be able to better determine for themselves how and when they learn (McLoughlin & Lee, 2010).

For many online courses with high concentrations of adult learners this is very much a positive move to aid their learning opportunities.
In the UHI context, since 2003 and the validation of the fully online UHI Honours degree in Sustainable Rural Development, members of the case study course team have been piloting and trialling numerous new (Web 2.0) technologies for the delivery of Higher Education. Instant messaging (Net Meeting, MSN Messenger and Skype), Wikis (Wetpaint), Blogs (Edublogs), Picture Sharing (Flickr), Social Networking (Facebook), Video Sharing (Youtube), Podcasting (iSpeech), Syndication (RSS feeds) Academic Networking (Linkedin), Social Bookmarking (Delicious) are all technologies that have been piloted in the UHI Higher Education context by members of the case study course team. This type of trialling of Web 2.0 software in particular has been mirrored at many other higher education institutions (Klamma et al, 2007).

In the context of this dissertation we must therefore assess just how important Web 2.0 technologies are to the quality of the modern day online education experience. A notion of why this is so important has been relayed by the Committee of Inquiry into the Changing Learning Experience (CICLE), (2009) who examined 11-15 year olds involvement with Web 2.0 in the UK and found the following:

- Using email and instant messaging – 95%
- Having at least one social networking site – 75%
- Playing online multiplayer games – 60%
- Owning an MP3 player – 80%
- Owning a mobile phone with camera – 85%

It is this increasingly extensive ICT experience of New Millennium Learners (Pedro, 2006) prior to them entering Higher Education in the UK that prompted the CICLE Inquiry mentioned above. Clearly policy and strategy in current HE institutions in the UK needs to be informed of such changes so that it can begin planning for change. According to the Inquiry into the Changing Learning Experience, (2009) Web 2.0 or the ‘Social Web’ as it is also termed, is characterised as follows:
"Being accessible through a web browser and "...being supportive and encouraging of user participation in the sharing, consumption and generation of content, including through remixing and repurposing; and also amenable to developments in functionality consistent with user demand..." (CICLE, 2009, p.15)

The challenge in identifying the technologies that integrate online education into the ‘Social Web’ is about selecting the most appropriate technologies to create a learning community (Redecker, 2008) or community of practice (Wenger, 2000).

According to Durkee et al, (2009) and Redecker, (2008) in such a community of practice the opportunities for learning will increase as the numbers of students participating increases and so opportunities to exchange ideas, knowledge and experience are enhanced.

"Communities of practice are the basic building blocks of a social learning system because they are the ‘social containers’ of the competences that make up such a system. By participating in these communities, we define with each other what constitutes competence in a given context....Communities of practice grow out of a convergent interplay of competence and experience that involves mutual engagement. They offer an opportunity to negotiate competence through an experience of direct participation." (Wenger, 2000, p. 229)

Skype, Wikis and Facebook are three such Web 2.0 applications that can effectively develop such a community of practice (Durkee et al, 2009). Strong communities of interest or social networks form around common learning interests in the information society (CICLE, 2009) and are part of the scaffolding of the new collaborative learning process providing 'social and cognitive guidance and support' (Redecker, 2008). These communities of practice and social networks involving Web 2.0 further define the elements of web space according to the Committee of Inquiry into the Changing Learner Experience (CICLE), (2009). Personal space (where messages are sent and received) is complemented by group space (social networking sites such as Facebook) and also publishing space (such as Blogs, Wikis and Youtube) (CICLE, 2009, p.6).
It might be argued that one of the primary reasons why Web 2.0 is an important element of the modern-day learning experience revolves around its capacity to inject a high level of engagement and interaction into the online education experience. The traditional experience is primarily focused on one-way broadcasting, the consumption and absorption of information.

On the other hand, Web 2.0 allows a modification to this experience whereby learning becomes a production orientated, participative process based around problem-solving and learning by doing (Bonk et al., 2009; McLoughlin & Lee, 2010). McManus, (2003) claims Web 1.0 was a read-only experience where users sought out and downloaded information, whilst Web 2.0 can be considered as a 'read-write' experience and so quite a different contributing element to online education.

Web 1.0 has been compared to going to the library to find a book, in other words very much a one-way experience (Thompson, 2007). In Web 2.0 on the other hand, users are not just seeking information they are forming means to collaborate to enable them to contribute to information creation and the re-purposing of existing information. Yet there are institutional and organisational issues related to the use of Web 2.0 in Higher Education.

These are primarily related to: the privacy of student information (personal financial information and student assessments), data security, the ownership or copyright of online to information on external websites, how to assess material that is collectively created, cultural stresses amongst some ethnic student groups and the possibility of misuse and damage to the institution's reputation, when using Web 2.0 tools to support and develop education (Bonk et al., 2009; Olaniran, 2009; McLoughlin & Lee, 2010, Redecker, 2008, Franklin & van Harmelen, 2007).
As a result many institutions have drawn-up specific Web 2.0 policies and guidelines for faculty (University of Edinburgh, 2008) to enable the use of Web 2.0 tools in the educational context. Currently (JISC, 2009), active use of Web 2.0 tools and services in education remains mostly with the early adopters, as the use of wider Web 2.0 tools has not been generally encouraged by many UK Higher Education institutions. That said, increasingly the colleagues and peers of these early adopters of Web 2.0 are now beginning to look more closely at the new learning opportunities being made possible with Web 2.0 (JISC, 2009). The need for further institutional policies on Web 2.0 and Higher Education is essential to enable the development of innovative strategies to achieve Learning 2.0 (Redecker, 2008).

As Web 2.0 technologies move increasingly to become mainstream across many UK institutions (JISC, 2009) many pedagogic changes will arguably need to occur if a quality product is to be maintained to match 21st century learners' expectations.

For example, according to McLoughlin & Lee, (2010, p.32) increasing value needs to be placed on student-created online content as students increasingly become ‘prosumers’ (i.e. both producers and consumers) of knowledge and information. Ultimately in their view Learning 2.0 is about getting the balance right between ‘scaffolded and learner-directed learning activities’ to provide a future quality online education experience.

“...Learning 2.0 puts the learners at the centre of the learning process, yet in increasing their learning opportunities and improving their personal achievement, the role of the teacher as a designer, coordinator, moderator, mediator and mentor, is paramount to the learners’ success in seizing these new opportunities.” (Redecker, 2008, p.90)

It is the potential of this two-way, collaborative, enriched experience that has sparked much interest in the online education part of the education sector.
As Thompson, (2007) indicates, Web 2.0 has allowed the individual to become increasingly involved in uploading and sharing the content of the Web (e.g. YouTube video) where previously such rights were the preserve of the web site designer with a background in html coding. Blogs, Twitter, Wikis and Photo sharing sites are current Web 2.0 examples where individuals not only have the rights but also the ability to add and upload content to the internet from a web-connected computer anywhere in the world. Such content is then actively linked to subscribers via syndication (RSS feeds) that inform user of updates to content. Syndication can be thought of as the 'glue' that holds Web 2.0 together (Hahn, 2009). Without it, the Web 2.0 world would be a vast and disparate collection of resources with minimal active linkages.

This potential of Web 2.0 also extends to the potential re-engagement of those students who might have underachieved within the traditional educational system. It is arguably a more inclusive means of engaging with a wider range of students:

"The low barrier to entry, the playful and interactive character of social computing applications, the pre-valence of visual, audio and video material make Learning 2.0 particularly attractive to learners with a fragmented learning biography." (Redecker, 2008, p.12)

The Social Networking website, Facebook, on which many students now have a profile, is another example where adding content to the Web has become easy to accomplish and widely accessible. Durkee et al, (2009) in several surveys of 226 students at the University of East London found that student knowledge of formal VLEs was low in comparison to Web 2.0 tools such as Facebook which in some instances had 95% of the class already using it.
One of the conclusions of this research was that as so many students are already familiar with and using Web 2.0 technologies, they should no longer be seen as a barrier to communication in education, particularly in comparison to the use of VLEs as communication nodes, for which familiarity is much less.

In the UK experience, Web 2.0 usage in Higher Education has been patchy and has been driven by enthusiastic individuals and groups in course teams across a growing number of institutions (CICLE, 2009, p.30). However, as Redecker, (2008, p.40) asserts in a review of Learning 2.0 practices for the European Commission, it will take much more than training in UK Higher Education to make an impact. Much more radical changes in the social and cultural context of Higher Education will be required and directed at teaching staff. Digital illiteracy of Web 2.0 needs to be addressed if increasing student demand is to be met and more training and scaffolding will be required to support some groups of staff and students (JISC, 2009; McLoughlin & Lee, 2010; CICLE, 2009; Benson & Samarawickrema, 2009).

In addition, Web 2.0 can often be considered as an added layer of complexity for part-time adult students with many existing external work and family commitments. These students may already be managing multiple e-mail accounts and electronic platforms (e.g. VLE, Social Networks...etc) and so institution-led Web 2.0 additions may be a less preferred option for such learners (Bonk et al, 2009). Overcoming the complexity of using multiple service accounts to enhance the twenty-first century experience remains a priority. To some extent this may be addressed by populating web portals such as Netvibes, iGoogle and Pageflakes with the key services that students require to access from external and institutional sources.
However, a potential conflict may arise if students consider the entry of their educational environment (personal learning space) into their private social environment/space as being an intrusion or an 'unwelcome' addition (McLoughlin & Lee, 2010). This clearly needs to be managed carefully by academic staff. Issues of security, back-up, continuity, control and moderation and data protection all become potential problems outwith the institutional electronic boundaries (Franklin & van Harmelen, 2007).

In contrast, a further challenge for Higher Education sector is that 'digital natives' (Prensky, 2001, 2001a) or 'new millennium learners' (Pedro, 2006) will be enrolling increasingly in their courses and they will be experienced multitaskers using Web 2.0 technologies in their daily lives and expecting an active learning experience that is social and surrounded by rich media that is integrated into their digital world (McLoughlin & Lee, 2010). They will spend significantly more time reading and reviewing online chats, forums, emails and social networking sites than they will browsing through books. They may spend more time writing in such environments than they will spend writing up their coursework on paper.

To such students the immediacy of their tutors is important and according to Durkee et al, (2009) an appropriate technical interface is able to provide an effective social presence by increasing the immediacy of the tutor with the students. For example, being part of a Skype or Facebook group allows a student to be able to see when other users in the group are online and able to be contacted. Even if not utilised often such a social presence for remote students is much appreciated.

"...using Facebook, students take part in a community of practice: they become part of something bigger than just their class or their specific university studies. Their actions and interactions on the site help to nurture an approach and attitude conducive to lifelong learning." Durkee et al, (2009, p.297)
Some institutions have been very proactive in embracing change, for example Duke University in the US in 2004 provided free iPods to all incoming students to encourage Web 2.0 engagement and usage of podcasting, both the creation of content and listening to that of others. In 2010 this same institution is loaning out Apple iPads, amongst other media-creating technologies including 3D and HD video capture devices, to new and existing students (Thompson, 2007).

It is arguably those course teams and institutions with the capacity to change behaviour combined with a willingness to change established business models and appreciation hybrid organisations that will prosper in the transition to Learning 2.0 (Thompson, 2007). Web 2.0 is also about informal learning and not just explicit knowledge provision provided through formal courses. It is about building the social links and indeed communities within which knowledge is more easily acquired both directly and indirectly in gaining implicit knowledge too (Mason & Rennie, 2007).

“Online education and technology supported learning can be successful in formal learning, but can it also support the sharing of tacit knowledge? There is a growing interest in a number of emerging web-based services that might be harnessed to support this very purpose.” (ibid, p.197).

Wikis, blogs photo and video sharing and podcasts are five of the specific emerging services referred to in the above quote as being interactive elements of the internet that arguably, must be of considerable interest to teaching and learning in both a formal and informal context. As Durkee et al, (2009) point out the commonplace VLE used in the formal education sector is not altogether in tune with the wider changes in the use of the internet.

“Overcoming barriers to lifelong learning requires innovation in practice to keep pace with technological and social realities. Where computing has become more ubiquitous some groups have managed to successfully implement online education and Web 2.0 technologies.” (Durkee et al, 2009, p.293).
VLEs such as Blackboard do not allow 'student' users to upload information and resources. They are a closed system only operating in the environment of the particular institution managing them, rather than being an open system (CICLE, 2009). Open access is reserved for an institutional administrator and to a limited extent the VLE content designers and tutors in all but only a few implementations at UK universities.

The unique capacity of Web 2.0 technologies to allow students to collaborate and construct meaning and understanding together is lost as is the ability to engage and participate in wider global networks of learning and social networking (Durkee et al, 2009; McLoughlin & Lee, 2010). VLEs in most cases are closed systems that do not allow students to easily disseminate information amongst themselves and add to the 'bank of learning knowledge'. The very fact it is a closed system means that VLEs suffer (as institutional email does too) from a low level of student engagement in comparison to Web 2.0 services such as Facebook (Selwyn, 2007).

For example in using Facebook to develop a group of practice (instead of an institutional VLE), this then allows for mobile access via Smartphone to course communications too. Mobile access itself is currently a topical issue and according to JISC, (2005) one of the main challenges facing Higher Education is about finding out how mobile technologies are best deployed. McLoughlin & Lee, (2010) and Redecker, (2008) for their part, focus on identifying the importance of personal learning environments (PLEs) rather than VLEs in contributing towards the goal of attaining student-centred learning. So just what are PLEs?
“The idea is for learners to exercise ownership and control over their experiences, rather than be constrained by centralised, instructor-controlled learning based on the delivery of pre-packaged materials...PLE models challenge university and college teachers to harness the many resources that exist outside the formal spaces of the institution, to create opportunities for authentic learning that is personally meaningful and relevant to learners, and to capitalise on the interests and digital competencies that learners already possess.” (McLoughlin & Lee, 2010, p.30)

This paradigm shift in online education towards Web 2.0 and Learning 2.0 if continued may inevitably lead to the phasing out of the institutional VLE which will be replaced with more personalised learning environments integrated into mobile online tools and services.

Weller et al, (2005a) pointed to such a scenario maintaining that as users (both tutors and students) became more sophisticated consumers of online technologies, then so the demand for more reconfigurable solutions to servicing evolving student (and staff) cohorts will be required. As individual learners pursue a more active role in the learning process becoming active authors and commentators, then learning tools and services will need to become increasingly personalised around the individual learner and Web 2.0 provides the tools and services to enable this transition (Redecker, 2008).

The intuitive question asked by Conole and Culver, (2009) is whether the educational value is actually in the 'social object' content itself in Web 2.0 environments, rather than residing in the social interaction and associated learning in producing the content. This is certainly a research issue worth following-up by surveying students to assess how important they feel their peer-to-peer interaction is as part of their learning process.
McLoughlin & Lee, (2010) link this paradigm shift in education to wider shifts linked to the 21st century globalised information society. In this scenario social mobility is the norm and changing career paths are increasingly common as technology advances and applications create new employment opportunities not even thought about just several years ago. In such a world, it is claimed that lifelong learning will be the norm as individuals will require to engage in re-skilling at various junctures along their career path. The challenge for Learning 2.0 will be to appreciate such changes in its client market and begin to make the transition towards offering a more flexible non-traditional, user-centric pedagogic model, paralleling many of the changes in user roles related to participation, socialisation and collaboration which have been central to the evolving Web 2.0 paradigm.

Ultimately, as McLoughlin & Lee, (2010) intuitively note, there is a clear match-up between the learning and employability skills desired by many employers in the 21st century information society and those skills required and developed within the Web 2.0 social constructivist environment – i.e. networking, communication, collaboration and sharing skills. Integrating Web 2.0 tools and services into existing pedagogic models will aid the move from twentieth century ‘static’ distance learning teaching practices to new interactive millennium practices (Wallis, 2006). The Committee of Inquiry into the Changing Learner Experience (CICLE), (2009, p.9) clearly recognises an active role for Higher Education in the UK as being paramount to the future success of Higher Education:

“Higher education has a key role in helping students refine, extend and articulate the diverse range of skills they have developed through their experience with Web 2.0 technologies. It not only can, but should, fulfil this role, and it should do so through a partnership with students to develop approaches to learning and teaching....[HEIs should] explore ways in which the tutor/student relationship might be developed based on the Web 2.0 skills of students.”
Given this brief, a short review of three (Wikis, Blogs and Podcasting) of the more popular tools and services that are of interest to 21st century higher education is outlined below.

3.4.1 Wikis

Wikis allow the sharing and editing of web pages amongst members of a learning community or social network of learners. Members of the wiki collaborate and review content. No software downloads are required as users edit web pages directly through their browser. Wikis are considered to be social software based around interaction, reflection, cooperation and networking rather than competition (Bonk et al, 2009; Ruth & Houghton, 2009).

Wikis meet many of the demands of 21st century education to meet the competencies required by the knowledge workers of the future (Bernard, 2009). Despite reservations from traditionalists, wikis are considered to be a robust format which is able to provide self-directed collaborative learning opportunities for student projects, based on participation and feedback (ibid, p.5). Such teaching tools are collaborative and often based around problem-solving, whilst also often being student-driven and so rewarding and motivating for online learners.

Bonk et al, (2009) also make the point that collaborative Wiki-based Web 2.0 group exercises between remote student groups can help students understand the perspectives of others and it is maintained that the importance of such transformative learning cannot be underestimated in a 21st century globalised society. For example within the academic context the ‘page history’ feature of Wikis with its ability to track individual student contributions to interactive group exercises means that Wikis have much potential to manage and facilitate online group work (Elgort et al, 2008).
The quantity and quality of each student's work becomes more easily visible in a Wiki and so makes the marking of collaborative groupwork easier, as individual contributions to groupwork within a Wiki can be identified. This overcomes some of the traditional problems with groupwork whereby individual student contributions may have been uneven, yet some benefited by gaining higher marks than their input deserved, whilst some were left feeling that their contributions merited more than that of others in the group who contributed less (Elgort et al, 2008).

Elgort et al, (2008) further assert that the asynchronous nature of Wikis can have direct advantages for groupwork in comparison to face-to-face meetings where members of the group must respond to others on the spot and where these others may be a dominant group of students with the most well developed verbal skills.

Wikis, on the other hand by their asynchronous nature allow students with differing skills and styles to reflect and participate in a meaningful manner to class-based groupwork. Wikis are therefore arguably a more inclusive technology in the group work situation.

Findings by Ruth & Houghton, (2009) in examining the use of wikis by both undergraduate (n=28) and postgraduate students (n=58) recorded that this social software effectively stimulated community building amongst the student cohort (complemented by Instant Messaging) and ultimately helped to create a community of learners. Students were bound together in their creation of the text and they ultimately support each other's learning and become members of a 'community of inquiry' (Garrison, 2006).

"Participants in a group project wiki work together towards a common goal......applying what they know and have learned, and demonstrating their understanding in action. It is through the prism of this cooperative and collaborative activity that the processes of knowledge construction can materialise in a wiki environment." (Elgort et al, 2008, p.199).
In this sense wikis are potentially very important learning tools within the online constructivist paradigm. Knowledge is constructed within the wiki development process rather than being a means to access a body of existing knowledge to absorb (Ruth & Houghton, 2009). Yet, as is the case with many new technologies, in the view of Elgort et al, (2008) scaffolding (individual mini wiki tasks) is required to generate the level of group work participation that would justify the above statement. Wikis, in so far as they are considered social software, may encourage students to be less academic in their work and more informal, unless a level of ‘scaffolding’ is put in place to reinforce the level of academic rigour involved within wikis as well as other forms of coursework.

As in other forms of asynchronous learning, the balance and nature of tutor input must be finely judged to ensure that peer-to-peer interaction is encouraged and not stifled. The higher status given to tutor postings can create a ‘novice-expert’ scenario that may lead to less interaction rather than more, as is the case with classroom-based teaching where students retreat and simply seek to absorb information provided (Ruth & Houghton, 2009).

### 3.4.2 Blogs

Blogs are personal web space that are designed to enable the writing and uploading of content (posts) in a reverse-chronological order to ensure most recent contributions are displayed first. The software is also geared towards being updated on a regular basis (Farmer et al, 2008; Sharma & Fiedler, 2007). They are managed by authors (bloggers) and often revolve around the provision and distribution of hyperlinks of interest to the user along with associated information and editorial comments, reflection, analysis, opinions and observations (Armstrong et al., 2004).
Such features allow themed discussions to be easily developed in this online environment among users with similar interests or indeed amongst classmates studying the same module (Mason and Rennie, 2008a).

"Each Weblog post is time stamped, automatically archived, and assigned a permanent URL by the underlying Webpublishing system....The body of the post also exhibits certain common characteristics such as multiple links and expressive writing. Weblog authors tend to integrate numerous hyperlinks within their posts, where the hyperlinks point to material that is quoted, referred to, critiqued, praised or that somehow elaborates or illustrates the content of a particular weblog post."(Sharma & Fiedler, p.8, 2007)

The advantages of such blogs in education are that they are simple to use, they require no software installations, users have extensive control over the look of their blog site and their content becomes instantaneous available to readers for consumption and comment (Farmer et al, 2008). Furthermore, a key advantage of the blog interface is that it requires no HTML or web scripting experience and so is a widely accessible technology (Yang, 2009). For example, in a study by Tekinarslan, (2008) 39 out of 42 (93%) student respondents (with no previous experience of blogging) when asked about the nature of blogging considered publishing content in a blog to be an easy and straightforward activity.

According to Weller et al, (2005b) Blogs have some specific advantages for education that make their use appropriate to modern day Higher education courses. Blogs encourage interaction and comment and debate on user postings. Specifically, Blogs can be used to set up learning communities comprised of both students and tutors – i.e. class Blogs. Such ‘communities of practice’ brought about by blogging in the classroom environment not only encourage diverse perspectives but also increase student’s sense of ownership and involvement with their own learning (Farmer et al, 2008; Yang, 2009).
Yet Blogs do have disadvantages too. They can be prone to ‘vandalism’ and so related quality issues and unsuitable postings may occur. Control and moderation is difficult out-with institutional controlled software. Copyright infringements are possible and difficult to control external to Higher Education institutions and original content can be modified making it misleading and/or reducing its quality (Boulos et al, 2006).

However, of most value in education, according to Weller et al, (2005b) is the use of Blogs by students as reflective journals or portfolios, demonstrating their knowledge and thoughts and reflections on particular areas of interest. The traditional reflective learning journal used by Higher Education learners, can be combined with the immediacy of web-based publishing allowing the spontaneous recording of insight and meaning from conversations or other learning experiences, in the form of instantaneous Blog posts which can then be later revisited and reviewed (Armstrong et al, 2004; Sharma & Fiedler, 2007).

Yet the ability of blogs to reflect changing student perspectives through time and the growth in the depth and extent of their learning during the term, is also considered valuable by some students groups (Tekinarslan, 2008; Yang, 2009). Sharma & Fiedler, (2007) went further and emphasised the group reflection possible from multiple class blogs and the enhanced opportunities resulting for ‘meaning making’. The fit of blogs (personal web publishing) within learner-centred constructivist pedagogy is seen to have many advantages in allowing the self-organised learner to be able to access conversational learning tools and reflect on experiential aspects of the learning process (ibid, p.6). Publishing publically online to blogs necessitates that students consider and take ownership of their views and be able to evaluate their own perspectives, in public, against more established thinking (ibid, p.14).
This is an invaluable practice for students with a large element of autonomy over their learning focus. It allows both students and their tutors to evaluate their effectiveness and skills in the ‘learning by doing’ paradigm in which students assume control and accountability for their own learning. Blogging in this context, contributes to a transformational online environment (ibid, p.15) enabling the constructivist paradigm to be effectively rolled out to learner-centred higher education courses across the world.

Blog use in education is an already established pedagogical practice (Yang, 2009) particularly involving the use of the online reflective learning journals as assessments. The specific advantage of such online logs is that they can be easily shared with classmates who can then comment on them and add to the resource (Armstrong et al, 2004). Sharing such resources publically was viewed as being overwhelmingly positive in this particular study, but unfortunately with only limited student participants (n=11) it is difficult to form any robust generalisations.

Nevertheless, those students participating in this study did report that the process of blogging made them filter information and review and revise their learning on a weekly basis (ibid, p.9). What is more, such blogs were part of the process students used to get to know each other within their online class as they effectively displayed each student’s personal perspectives and insights.

Because of the public nature of the online publishing process some of the students considered it to be akin to a ‘public performance’ and an improvement in their information searching, literature review and overall literacy skills was a resulting effect recognised by their tutors (ibid, p.12; Tekinarslan, 2008). As with any publishing-based media it was also considered important in this study that students recognised and understood copyright laws (Tekinarslan, 2008).
3.4.3 Podcasting

Claims that podcasting enhances the educational experience has led to its growth as an educational resource in recent years (McGarr, 2009; Lee et al, 2009b). It is often described as a form of mobile learning referred to as m-learning (Lee and Chan, 2007; Evans, 2008).

Podcasting involves the distribution of audio files (and to a lesser extent video files) via downloads from the Web or distribution via subscription services such as RSS. Lee and Chan, (2005) describe podcasts as time-shifted radio broadcasts available over the internet. These files can then be played at the user's convenience on home computers or on portable media (Wolf, 2007; Lee et al, 2008) such as MP3 players or iPods, or on Smartphones (Blackberry, iPhone) or on PDAs (Palm) or more recently on mobile computing devices such as the iPad.

In the educational context these podcasts may simply be a like-for-like version of existing lecture material aimed at these students on the move, or it may include additional background or more in-depth material or finally some condensed clip that summarises the week's topic. This latter format was found by Evans, (2008) in a study of 194 m-learners to be one of particular benefit appreciated by learners and considered to be a more efficient method of revision.

Podcasts are a cost effective media to produce with minimal investment required in hardware and sound recording and manipulation software (Lee & Chan, 2005; Copley, 2007).
From the institutional perspective minimal training is required as podcasting does not require a substantial level of technical expertise. Furthermore, such content if designed well can be a lasting addition to the delivery tools used on distance delivery and also on-campus courses. Copley, (2007) found that recording a 45-minute lecture a 16 bits/second resulted in a file approximately 9Mb in size. This compares well to a 3-4 minute music MP3 track at about 4-5Mb in size. Audio streams have only minimal bandwidth requirements and negate the ‘click and wait’ norm when accessing media files over lower bandwidth broadband connections, particularly when subscriber content is ‘pushed’ to the user automatically (Lee & Chan, 2005).

The podcast is about capturing some of the essence of the traditional lecture which if practiced correctly, can inspire and lead to intellectual discovery whilst presenting demanding and stimulating ideas to students on their subject topic (McGarr, 2009). It can actively engage students with course material more than would otherwise be the case with traditional technologies (Evans, 2008). However, a poor podcast like a poor traditional lecture will simply result in the student transferring the information from audio to paper without much thought or analysis.

In short, poor podcasting is an uninspiring experience, at odds with more learner-centred strategies (McGarr, 2009, p.311). The point being made that the implementation of technology itself does not necessarily mean that it is characteristic of progress over more traditional forms of teaching. What it does provide, in the view of Lee and Chan, (2007) and Evans, (2008) is a flexible level of lifestyle-integration as a mobile technology (m-learning) not offered by conventional forms of traditional delivery. It allows the modern day adult learner with limited time an opportunity to engage with ‘just in time’ learning should they be able to access unexpected free time during the week.
In terms of appropriate lengths for podcasts, Lee & Chan, (2005) undertook research with 26 on-campus students into their daily ‘wasted time’ and concluded in their instance that 5 minute audio clips were most appropriate for their student group.

According to McGarr, (2009) the podcast has three specific advantages for education. It enhances the flexibility of education and so lecture content can be distributed to student’s desktops or media players as and when is convenient for them. Secondly, podcasts increase the accessibility to learning due to their portable format. Students can catch up (or stay up to date) with weekly content whilst on the move (e.g. whilst commuting or during lunch breaks...etc) and so benefit opportunistically during any free time they have. For many adult learners this enhanced access to content can be of significant benefit (Evans, 2008).

Thirdly, podcasting can enhance the learning experience by providing a form of communications that can be repeated and replayed and reviewed on numerous occasions so aiding student’s revision and potential depth of understanding.

"...the affective and cognitive benefits associated with audio, along with its cost effectiveness, make it worthy of serious consideration as a medium for enhancing and supplementing, but not replacing, teaching and learning activities." (Lee & Chan, p.111, 2005)

Yet, contrary to the accepted theory (McGarr, 2009), students in studies by Lee & Chan, (2007) n=18, Evans, (2008) n= 194 and Copley, (2007) n= 283 found that students rather than using such resources on the move or when undertaking other even manual tasks, where their attention would be split, actually tended to listen to podcasts in dedicated study-time at their home, rather than on the move. 80% of students in Evans’ (2008) study reported listening to their podcast course content from a home PC rather than on the move. Only 13% in Copley’s (2007) study listened to podcasts whilst doing other things.
As noted by Lee et al. (2009b) few students are subscribing to educational podcasts via RSS, but instead choosing to download them manually when they get a chance. Educational podcasts are not making it onto the portable media normally associated with audio files for which podcasts were designed. McGarr, (2009) further notes:

"The level of concentration and processing that is required to deconstruct and understand information delivered appears to limit the use of podcasting in this mobile way, particularly its ability to deliver complex material." (p. 318)

It is important that podcasting is learner-led rather than technology-led and its use should be guided by clear educational goals that aim to improve the overall student experience in response to an expressed need, rather than in a tutor-led attempt to revolutionise the teaching experience (ibid, p.319). Lee et al, (2008) point out that in instances where podcasts are simply used to supplement existing online content the danger will be that students just become the passive recipients of knowledge as they may do in the traditional lecture.

Students in numerous studies did value the flexibility of this form of educational content and Evans, (2008) points to these benefits being maximised when travelling or commuting, rather than when undertaking other activities that require more attention.

From the institutional perspective it is the reach of the technology rather than technology itself that is significant. At Harvard University, upon podcasting an existing Computer Science course into 65 individual podcasts, recruitment/subscribers increased from 60 onsite per semester to between 6,000 and 10,000 individual podcast subscribers in 50 countries worldwide. The reach and impact has been enormous (Malan, 2007) as has course recruitment subsequently.
Future studies of course will include increasing focus on the evolving Web 3.0 commonly titled the 'semantic web' as opposed to the 'read-write' Web 2.0, which has been the focus of this section (CICLE, 2009) – i.e. the constructivist approach. This maintains that learning is most effective when it directly supports the student in actively becoming involved in their learning within a wider community of learners in areas that are of relevance to their particular learning objectives. Demand from both students and employers in the coming years is likely to ensure that the 21st century skills required of graduates will be delivered through a constructivist pedagogy centred around the Web 2.0 Social Web. As well as relevant ICT skills, other skills demanded and potentially delivered via this approach are networking, teamwork, collaboration, self-direction and motivation, critical thinking and problem solving skills:

"...Web 2.0 has not yet been fully exploited in learning. The connection has not yet been made. In our opinion this, in itself, can be seen as a driver for change. The challenge is building a bridge so that Web 2.0 becomes as natural and reflexive in the study domain as it is already in the social domain." (CICLE, 2009, p.35)

3.5 Online Assessment Issues

The main challenge for the online assessment sector is arguably to ensure that students have a clear understanding of what is being asked of them in any particular assessed task. In online education in particular Scalise et al, (2007) refer to the understanding of what is being asked in assessments as 'high stakes' and Dennen, (2005) reports findings that indicate that student stress is reduced in completing assignments when it is clear instructions are present. This is because with the addition of technology into the online assessment mix it becomes very important that student understanding of what is being asked of them concurs with that of their tutors (Piskurich, 2006).
Dermo, (2009) in a research study of (n=130) undergraduate student views at the University of Bradford found support overall for e-assessment over more traditional forms of assessment and that students were not just ready, but also willing to take part in e-assessment as part of their studies. Although not an overwhelming endorsement of e-assessment with many returns grouped around the Likert-scale neutral point (3 in a scale of 1-5), it certainly shows that the modern HE student is not, on average, adverse to e-assessment. Paechter et al, (2010) in a research study (n=2196) found that student’s 'achievement goals' were more important to students than any other course feature.

Support for on-going continual assessment, that was able to demonstrate such progression goals being achieved was claimed as being one way that designers could modify their delivery, to maximise the motivation of students. Providing students with effective and timely feedback is one of the biggest on-going challenges facing the online education sector and yet it is considered crucial to the quality of the online education experience (Hirumi, 2005; Chaney et al, 2009; Denton et al, 2008; Rovai, 2000; Dennen, 2005; Thorpe & Godwin, 2006; Walker & Kelly, 2007).

In the latter’s research study (p.316) students (n=304) demonstrated a strong preference for feedback within 2-3 days. At the same time Dennen, (2005) recognises how ‘overwhelming’ providing feedback to all students can be for tutors. To this end France and Wheeler, (2007) experimented with podcasting assignment feedback (PAF) with a view to improving student feedback to distance learners. In almost all instances students reported that this form of feedback was preferred to the traditional paper-based proforma approach. More research is clearly needed to ascertain whether it was the speed of feedback that led to this preference or the actual format.
Another approach to improving the speed of feedback has been suggested by Nicol, (2007) and is related to the use of Multiple Choice Questions (MCQs) as a means to improve feedback times for students and to reduce staff overheads in marking. MCQs will automate both the provision of feedback and also the collation of test results. Although recognising some of the limitations directed towards MCQs (possible promotion of factual recall, lack of individualised learner feedback...etc) it is also pointed out that there are differing ‘flavours’ of MCQs that can be tailored more to challenge students more fully.

Nicol, (2007) analyses MCQs within a pedagogic framework of ‘good practice’ feedback to provide a ‘clear lens through which to design and evaluate practice’. A subsequent focus, as with JISC, (2007e, p.26-7), was on Confidence-Based Marking (CBM). This was seen as being a ‘critical modification’ to MCQs to encourage students to think deeply about their answer and reflect on their rationale before being able to justify committing to a ‘high confidence’ answer. Under MCQs with CBM, students not only have to select a multiple choice answer, but also a confidence-rated score associated with their choice.

The confidence scale has three points C= 1, 2 or 3. If the student’s choice is correct their score (m= 1, 2 or 3) depends on their confidence choice. If their answer is wrong, there are penalties (0 at C=1; -2 at C=2 and -6 at C=3). It is surprising in Nicol’s view that this assessment approach is not more widely used in Higher Education (ibid, p.58). JISC certainly highlight MCQs with confidence-based marking (CBM) as:

“...one example...which has shown how objective tests in higher education – often thought to be appropriate only for low-level knowledge testing – can assess higher order thinking in a consistently rigorous way. CBM also promotes a deeper level of learning by challenging students to evaluate how certain they are of their answer, so that they address the gaps they discover in their knowledge.”

(JISC, 2007e, p.26)
Denton et al, (2008) also focus on the impact that electronic feedback can have in facilitating rapid feedback between the tutor and the student. In this instance, electronic feedback marking-assistance software developed at Liverpool John Moores University includes a statement-bank of feedback remarks and comments that can be selected for use by tutors via drop-down menus. These statements can be combined to structure feedback by tutors in a fast and efficient way by tutors. This approach had to aspire to produce feedback that was:

"...easy to read, comprehensive, fair, balanced and relevant to the assessment. Moreover, the literature advises that it should identify areas of misunderstanding, highlight pleasing aspects and indicate parts that could be improved." (ibid, p. 490)

Recognising the above feedback aims, Denton et al, (2008) compared traditional written feedback with that produced by the 'statements bank' electronic software, amongst 169 students. The findings confirmed higher satisfaction ratings amongst those students receiving electronic feedback in comparison to those receiving written feedback. Furthermore, the study also confirmed that the amount of feedback provided was (statistically) significantly more in those instances where tutors used the electronic feedback software's statement bank to develop their feedback. Findings from the survey also suggested that the electronically generated feedback was considered to be of greater relevance (ibid, p. 496).

In recognising the potential criticism of possibly uniform and impersonal comments being the result from such software, an analysis of all feedback given (11 from 64 statements and choices from 14 standard comments) showed that no two class members were given identical feedback. Overall students preferred the electronic feedback method to the more personalised but less focused non-software generated feedback.
As in the above instances, there is nevertheless essential input time for management and usability to be dedicated to assessments and feedback by tutors. Not only do online electronic assessments and activities need to be planned well in advance, but because learners will sometimes be expected to work on these assessments on their own, the activities need to be more detailed and clearly articulated (Piskurich, 2006).

Relevance is also the keyword in the context of student participation, as studies have found that online education activities not perceived to be associated with assessment will only tend to receive minimal attention (Fox & MacKeogh, 2003; Strijbos et al, 2004; Kirkwood, 2009). On the other hand e-assessment of relevance to students will help motivate them (Palmer et al, 2008). Bird, (2007) contends that assessment itself should be used to foster online participation provided it is supported with the right scaffolding. Therefore planning assessment effectively is an important means to maintain student interest throughout the teaching term.

A study of students (n=55) by Chung, (2005) found that regular assessment did have a role to play. Students indicated that weekly quizzes could be useful as a 'pacemaker' to motivate them to keep up with their distance learning studies. However, in terms of providing assessment relevant to the workplace one of the most commonly used online assessment forms has been e-portfolios. These forms of assessment are rich in transferable skills and may be devised to serve as an important tool in motivating students to learn (Lin, 2008).

As Lane, (2007) points out some of the base skills in producing e-portfolio assessments are related multimedia literacy, online/web presentational skills, design skills, audience recognition and communication skills, as well as reflective learning.
The latter provides students with important knowledge in being able to apply such skills effectively in academic and professional fields. Furthermore, (Lane, 2007; Kirkham et al, 2009; Joyes et al, 2010) make the important link between such assessment and its importance and integration into strategies promoting lifelong learning and facilitating the transition from education to the workplace.

It is recognised that e-portfolios can help individuals throughout their working lives where up-skilling and additional knowledge acquisition will be important attributes to record for those individuals pursuing successful careers ‘riding the waves’ of technological innovation. As Lin, (2008) points out, e-portfolios can provide an opportunity for learners to engage and enhance their knowledge and understanding of innovative web-based technologies. In a study of 38 students it was found that those who created e-portfolios considered themselves to be hands-on learners who liked ‘learning by doing’ and so adhered easily to the constructivist mainstream approach to online learning. In addition, 87% of students in the survey identified direct benefits being accrued by the associated reflective processes involved in e-portfolio development (ibid, p.196). There were negatives relayed by this student group too, relating specifically to increased time commitment, uncertainty regarding purpose and audience and a lack of knowledge of the expected content.

However, Joyes et al, (2010) picked up on these issues and maintained that to be successful, the role and purpose of e-portfolios needs to be clearly articulated and their role put in context (e.g. lifelong learning). They also need associated learning outcomes closely aligned to the context and aims of the exercise. Otherwise, the implementation of e-portfolios can be problematic (ibid, p.24).
Learners need to take responsibility and ownership for such elements of continual assessment and this can only be achieved if the student is able to reflect on the learning gains being achieved by undertaking the process of e-portfolio development (Kirkham et al, 2009).

Much of the literature (Coll et al, 2007) does suggest that on-going assessment like that outlined (e.g. e-portfolios) is a key strategy to engage students and enhance participation. Yet as Mateo & Sangra, (2007) point out, one must also be aware of the criticisms too, such as student identity – i.e. the need to be sure that the student submitting electronic assessments is who he/she claims to be. Continual assessment of discussion boards is one means to build up a consistent picture of learners abilities and at the same time has proven itself to be a very effective element of online assessment (Klisc et al, 2009, p.678):

“The findings indicate that the incorporation of assessment had a significant positive impact on a number of discussion outcomes, including communication skills, amount of thought about the topic under discussion, awareness of differing perspectives, depth of thinking, critical analysis and reflection, and learning through the collaborative construction of knowledge.”

However, providing feedback is given promptly, alternative online continual assessment submissions can be viewed as an opportunity to introduce a more constructivist approach (Mateo & Sangra, 2007), particularly through group work, and this may be effective in meeting student needs. Baxter, (2007) in introducing continuing online assessment to a first year Psychology class (formerly taught solely face-to-face) found that student reading related to on-going group tasks was much more in depth than it might otherwise have been. Yet, it was also found that student-student interaction within the groups was not all it might have been (students were reluctant to add to and/or correct other students' work) and as a means to develop enhanced social interaction this group assessment method largely failed.
Nevertheless, it is widely recognised in the literature that on-going group assessment has many benefits, not least the development of ‘communities of inquiry’ or learning communities (Mateo & Sangra, 2007). There are of course problems with group assessment. Goertzen & Kristjansson, (2007) subsequent to a fairly limited although interesting qualitative study coding for social presence within the online discourse, suggest these forms of group assessment can either work very well or fail quite significantly. Non-participation by group members/leaders can have significant negative effects on the rest of the group. This is described as the ‘phantom partner’ effect. In addition to this effect they also identify the ‘lone ranger’ effect. The latter is a misunderstanding by what is meant by group collaboration by one or more members of the group, who tend to work independently rather than in collaboration with the rest of the group. Williams et al, (2006) also found evidence in a study of undergraduate students (n=130) from several different online courses that successful group working is dependent on individual group members and their attitudes towards developing trust and cohesion within the group environment. Such positive attributes, their findings show, are a key predictor of student and group learning and so they argue groupwork is an important tool for online learning.

Rovai, (2002) is also of the opinion that online participation is central to the constructivist learning process and is required to build a sense of community and so such participation should be graded to encourage participation and not left to chance. These gradings in his view should pertain to quality, quantity and timeliness of contributions. Klisc et al, (2009) are also advocates of the assessment of asynchronous discussion boards. Their findings suggest assessment should take the form of a reflective report on how the collaborative construction of knowledge went from the student perspective on the discussion board and what they learned.
Nagel & Kotze, (2010) highlight student benefits when being involved in peer review activities and makes the point that such participation can lead to increasing quality within online courses. 95% of the students surveyed also confirmed that they were able to produce better documents as a result of a peer review participatory process and 96% of those surveyed would recommend this peer review process for future courses. Feedback for online learners was also quicker from their peer group and this was also appreciated. Xiao & Lucking, (2008) found similarly high levels of support for peer review with 88% of students in agreement that giving feedback to their peers was a valuable means to develop their critical thinking skills.

In instances where online classes are larger and yet the demand for speed of feedback remained constant, tutors pulled together virtual archives of previous feedback and used this to be able to cut and paste feedback responses quicker than might otherwise have been the case. Other innovative approaches included students being given access to ‘turn it in’ software to review and modify their drafts before submission, if necessary. Thereafter they were also allowed a peer review of their proposed submission, before it was finally marked (Nagel & Kotze, 2010).

In instances of on-going online collaboration assessment projects (e.g. based on Wikis) it is not enough, according to Bonk et al, (2009) to simply set the task and let the student groups get on with it. Students highlighted that they needed due dates, how-to aids, grading criteria, prior examples and encouragement from their tutor, if participation was to be maximised. Self-directed collaborative learning is an ambition for remote student groups and so ‘scaffolding and task structuring’ is required on the part of the tutor. 77% of students (n=22) in Bonk et al.'s (2009) study agreed or strongly agreed that guidelines and instructional support helped them think about their project more clearly.
Brown & Voltz, (2005) added an additional caveat of importance to such collaborative group learning and that is the reflective 'summing-up' element whereby they state that experience only becomes knowledge through reflection, which is enhanced by timely and appropriate feedback. Post submission, research by Tseng et al, (2009) (although limited by numbers, n=46) found that encouraging comments and timely feedback helped students feel they are in a supportive, safe online learning environment. The result according to their findings is that such students in receipt of such assessment feedback will be more motivated to engage with their peers and participate more extensively in class-based groupwork.

Lastly, it is worth considering the type of task or question set and its impact on the quality of response in the online context. There appears to be only limited research in this area and of most note is that by Bradley et al, (2008) who examine this very effect on the dependent variables: word count in responses, degree of answer completion and levels of higher-order thinking demonstrated. In their study of undergraduate student discussions (n=114) in response to a varying number of questions, the top three question types to illicit quality responses were identified as: 'course link', 'brainstorm' and 'direct link' methods (ibid, p.898).

The coding scheme used was based on Bloom's Taxonomy and the study concluded that online instructors wishing to improve the quantity and quality of online discussions, often as part of an assessment, should consider using the top three question-types identified in this study.
Chapter 4 – Influencing Factors that Impact on Quality in Online Education

4.1 How to measure quality in online education

There are no clearly identifiable means to assess quality in e-learning in its various guises. Indeed, the question of how to deliver high-quality online learning is still a ‘debate in progress’ with often conflicting interests (Wiesenber & Stacey, 2005, p.401). However, there are a number of indicators which are mentioned throughout the literature and these include pedagogic approach, ease of use of technology, technical support, student-student/tutor interaction levels, accessibility levels to academic staff, speed and quality of feedback, course design and structure, institutional buy-in, course content...etc. Yet, as Dobbs et al, (2009) found, students that undertook online learning disagreed that the quality of online courses was lower than their face-to-face equivalents. However, students surveyed but who did not undertake online courses claimed that the quality of online courses was lesser than their face-to-face equivalents. So it seems student perceptions on the quality of online courses varies with their experience, or not, with such courses. This demonstrates that even from the student perspective there are varying perceptions of levels of online course quality.

In this section we will therefore review some of the latest thinking within the sector on the most important aspects of a quality experience and how it might be measured. In 2000 the Institute for Higher Education Policy in the US published 24 benchmarks for quality in education in a report called ‘Quality on the Line’. It provides a valuable starting point in highlighting the key themes which were of importance in 2000.
These key themes include: Institutional Support, Course Development, Teaching/Learning, Course Structure, Student Support, Faculty Support and Evaluation and Assessment. These factors will be further explored in this current study.

Alexander, (2001) in reviewing the literature found that there were three key determinants of the quality of the student experience: 1. Communications - prompt and informative feedback from instructors and participation from other students. 2. Time available to devote to the course – lack of time is a primary reason why students withdraw. 3. Skills and experience with ICT – access to appropriate technical support.

Similarly, Ellis et al, (2009) found that there were four key factors of meaning to the quality of the e-learning experience, albeit in supporting face-to-face classes. These were e-teaching, design, workload and interactivity. Their research (n=over 200) showed significant positive correlations between these factors and the quality of the e-learning experience. They conclude interestingly in stating that the improvement of quality in e-learning requires work on addressing student perceptions of e-learning and awareness-raising amongst student cohorts of the teaching strategy being employed and so the purpose of their inputs to the learning process.

Following on from student perceptions of quality, Wagner et al, (2008) introduce the concept of the various other stakeholders in e-learning and examine their individual responsibilities. In addition to the student, tutor and institution they also highlight the importance of the content provider, technology provider, accreditation body and employers. These additional stakeholders are not considered to be of significance in this particular study although it is worth recognising that in the wider e-learning context these criteria may be important too.
For example, as Stephenson et al., (2008) point out, it is going to be essential that quality assurance standards are flexible enough to allow tutors and departments to experiment with online teaching and learning methods to enable overall enhancement. Unfavourable limits to such experimentation will be to the detriment of the sector as a whole. Experimentation and incremental development is necessary as Anderson & Elloumi, (2008) point out, because the discipline of online learning incorporates a series of specialisms that require the building of knowledge in a number of areas, specifically in the: "...practice of pedagogy, of psychology and sociology, of economic and business, of production and technology." (p.2).

A study by Ellis et al., (2009) found that if the sector is to improve the quality of the student experience of online learning then it is fundamental to change student perceptions on what e-learning involves and how various elements (such as online interactions) contribute to the overall learning experience. For example Koszalka & Ganesan, (2004) and Pelz, (2004) assert that the literature and their own experience support the notion that when students collaborate and engage actively with the course content and interact socially their learning becomes more successful and the more of the content they learn. The importance of this approach would seem to be another important pre-entry activity for learners new to e-Learning to address quality issues.

Pelz, (2004) maintains that a series of 'icebreaker' activities at the beginning of online courses are therefore essential in introducing students to the concept of student-led participatory discussions. This also provides an early opportunity to introduce and develop social links within the student group within ungraded activities. Ultimately, according to Rennie, (2003) it is the quality of this personal contact and support that is given to students that is the primary educational factor in the success or otherwise of online modules.
In the view of Gu, (2006) quality education is derived from quality processes and not necessarily by looking at module results. So we need not only to take into account the learner’s process of learning but also the course development process, the teaching process and the online delivery process. Peltier et al, (2003) on reviewing the academic literature, identified six clear areas which can be associated with effective online teaching:

1. Student-student interaction;
2. Student-instructor interaction;
3. Instructor support and mentoring;
4. Technology used in information delivery;
5. Course content;
6. Course structure.

Other academics also identify similar issues. Paetcher et al, (2010) consider from the literature very similar aspects of design and delivery that impact on student experience and satisfaction and so ultimately upon quality: course content design, student-tutor interactions, student-student interactions, flexibility of engagement and learning achievements and satisfaction. Wiesenber & Stacey, (2005) in reviewing the results of a transnational e-learning project associate quality with the following areas: program design, program delivery, teaching approaches, the quality of the tutors, the student cohort and the administrative support provided by the institution. Peltier et al, (2003) go on to make the very important distinction that the ‘top-down’ delivery method of traditional classroom-based activities is not the one often applied in the online environment but instead online educators will often rely (in the marketing education sub-sector at least) on peer-to-peer learning via the discussion boards and group projects. To measure quality we must therefore attempt to understand and compare the depth of learning experience gained from both these activities. The need for an active online facilitator has already been noted (Peltier et al, 2003; Barron 2003; Carroll et al, 2009; Baran & Correia, 2009; Kirkwood, 2006) as being a key dimension found to be of importance to the online learner.
Piskurich, (p.22, 2006) develops this idea further and lists thirty-two key ideas on how 'to be a better online facilitator'. To reinforce the validity of his list, Piskurich also combines this list with what learners reported they needed from online facilitators and what they felt facilitators could have done differently but did not actually do in their experience (e.g. show empathy, provide a clear overview...etc). Although of much interest and relevance, this list (as above) has been drawn-up based on personal experience rather than actual research and so needs to be considered in context.

Bailey & Card, (2009) in surveying 'award-winning' online instructors and Keeton, (2004) in surveying a group of 'effective' online instructors found that there were a common set of pedagogic practices utilised by the survey groups to deliver effective e-Learning. If implemented together it might be argued that they define a quality experience for the online learner in the experience of those experienced instructors: Fostering relationships; Engagement; Timeliness; Communication; Organisation; Technology; Flexibility and delivering and promoting High Expectations were all considered important practices by Bailey and Card, (2009, p.154) for online instructors.

Online tutors needed from this perspective to be passionate about their profession, have empathy for their students and be determined for them to be successful. Following on from this practice it was similarly considered that staff needed to develop their online engagement skills if they are to deliver effectively. Yet, as Rovai, (2000) identifies, it is not feasible for the online instructor to be at the centre of the total private and public conversations going on within the online course being taught. Instead the instructor must assume a role that:

"....determines the topic and activities, encourages substantive interactions among students, monitors and shapes the conversation, but refrains from extensive direct interactions." (p.293)
The next key pedagogic practice identified by Bailey & Card (2009) and Keeton, (2004) was that of time management related to speed of feedback and the answering of emails and responses to questions. Given the absence of verbal communications it was also deemed essential to adopt an attentive online communications style in the communications that did take place and undertake a careful use of words to communicate effectively and connect personally with the students.

In terms of the course content itself, a high level of organisation is required for students to be clear about their progression status through the course and what is expected of them on a weekly basis. Furthermore, Bailey & Card, (2009) identify the need for an effective application of technology and a level of flexibility and adaptation to enable the instructor to overcome any technological problems that might arise in implementing the online curriculum. This approach needs to be flexible and able to adapt to overcome any technical issues that may arise.

Lastly, ibid, (2009, p. 154) the communication and promotion of high expectations are used to encourage and deliver a high level of commitment to the course and learning goals and objectives of the programme being studied. Although a limited study in itself, there are many parallels with the types of issues prioritised and recorded by the development of the UHI Millennium Institute's online e-learning courses. In this sense these issues will be worth further exploration in an attempt to identify and define quality factors that lead to enhanced student satisfaction and retention.
Additional perspectives are found aplenty. For instance Fish & Wickersham, (2009) assert that the foundation for developing quality online courses revolves around the careful selection of the course delivery system, the establishment of high standards and careful instructional planning. There can be little doubt that such criteria are important within the overall process. The point they then go on to make is that the effectiveness and quality of the instructor contributes more towards student satisfaction than technology contributes. This is an interesting point to test, but does not appear to be backed-up in this instance by an associated study.

McDonald, (2002) in her aptly titled paper ‘Is “as good as face-to-face” as good as it gets?‘ identifies the quality of the online materials as being a central theme to motivating the student. In her view online materials needs to be user-friendly, relevant, interactive and problem-orientated. She concludes her paper by stating that the sector has to stop trying to achieve the futile task of trying to compare online learning methods with those of traditional learning methods.

Additional insights have also been forthcoming from Schrum & Hong, (2002) in reviewing the literature that identified seven dimensions for online success. These were tested using Likert scale question techniques and open-ended questions. Teo, (2010) also used the Likert scale to base his study and this is discussed further in section 5.1 on methodology. Teo, (2010) developed and tested an E-learning Acceptance Measure (EIAM) that focused on measuring users perceptions on tutor quality, their course’s perceived usefulness and the ‘facilitating conditions’ supporting their e-learning studies. Such a measure, he claims, is of significant consequence to educational stakeholders and given the validity of the measure the specific research elements are worth further consideration, although its ability to be generalised to a larger population is questionable, given that the study only focused on one institution only.
To conclude this section it is worth reflecting on the continued relevance of Chickering and Ehrmann's (1996) seven principles for using technology as a lever within the learning environment. It is included here as its currency is as valid today as it was back in the 1990s and provides key pointers on how one might measure 'quality':

1. Contacts Between Students and Faculty – “Frequent student-faculty contact in and out of class is a most important factor in student motivation and involvement.”

2. Reciprocity and Cooperation Among Students – "Good learning, like good work, is collaborative and social, not competitive and isolated."

3. Active Learning Techniques – “Learning is not a spectator sport. Students do not learn much just sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers.”

4. Prompt Feedback – “Knowing what you know and don’t know focuses your learning. In getting started, students need help in assessing their existing knowledge and competence.”

5. Time of Task – “Time plus energy equals learning. Learning to use one's time well is critical for students and professionals alike.”

6. Communicating High Expectations – “Expect more and you will get it. Expecting students to perform well becomes a self-fulfilling prophecy.”

7. Respecting Diverse Talents and Ways of Learning – “Many roads lead to learning. Different students bring different talents and styles to college.”

Indeed, according to Achtemeier et al, (2003) much of the sector uses these 'seven points' as a reference point for their own evaluation of quality in online learning:

1. Enhanced student-instructor communications; 2. enhanced student-student communications; 3. engaging, interactive, problem-solving content; 4. prompt feedback; 5. time management; 6. student motivation; and 7. a diversified course design and assessment schedule.
In their previous seminal 1987 paper 'Seven Principles for Good Practice in Undergraduate Education' Chickering & Ehrmann (p.3) suggest that their principles if applied will lead to what they term 'six powerful forces in education': activity, expectations, cooperation, interaction, diversity and responsibility.

Further work in the field of quality indicators comes from Chaney et al, (2009) who in an extensive literature review aims to identify common quality indicators. Common areas are identified such as student-teacher interaction and active learning techniques. They also suggest that online courses need to be designed to promote and facilitate such interactions. Other more practical quality factors in the programme design and delivery phases of online learning were highlighted by Wiesenberg & Stacey, (2005) and Dobbs et al, (2009) and relate to the time, training and encouragement given to tutors for online design and delivery.

Lastly, research (n=75) by Garrison & Cleveland-Innes, (2005) suggests that a focus on the quality of student-student and student-tutor interaction must be a specific design goal within e-learning, but should not be an end in itself. The developing of a secure environment to establish relationships and social interaction will not necessarily result in a quality learning experience being established. It simply creates the conditions within which a quality learning experience can occur.

"Social interaction and presence may create the condition for sharing and challenging ideas through critical discourse, but it does not directly create cognitive presence or facilitate a deep learning approach. High levels of learning are dependent less on the quantity of interaction than on the quality, or substance, of interaction. That is, social presence may be a necessary but insufficient precondition for creating a community of inquiry and encouraging deep approaches to learning." Garrison & Cleveland-Innes, (2005, p.142-3)
4.2 Student Attendance and Participation

"Engagement is positively related to a host of desired outcomes, including high
grades, student satisfaction, and persistence. By being engaged, students
develop habits of the mind and heart that promise to stand them in good stead

Many online courses seek to build-in asynchronous and synchronous student
participation via regular debates on reading tasks, assessments/tests and
responses to tutor-set questions (Clark, 2008; Rowh, 2007; Fish & Wickersham,
2009). This is certainly the case with the case study course (Rennie, 2003) at Lews
Castle College UHI where staff identify academic and/or policy papers as reading
and get students to debate their key points asynchronously over several weeks.
Such online participation and engagement is considered an important part of the
course and has marks allocated to it. Nagel & Kotze, (2010) state that
asynchronous discussion postings that provide an opportunity for at least two peer
critiques, can enhance participation in online courses. Instead of the normal
classroom environment being dominated by a few vocal and confident students, the
online environment provides a more reflective opportunity for more measured
students that are less vocal and so can promote wider participation. This particularly
tends to be the case when we have smaller, more intimate groups working together
online (Biesenbach-Lucas, 2003).

In addition, such electronic peer review can improve the quality of courses as
students spend more time on their learning activities thinking, comparing and
contrasting, reflecting and communicating with other students. Ultimately there is
an element of learning by example too (Thorpe & Godwin, 2006; Nagel & Kotze,
2010).
This is backed up by Wu & Hiltz, (2004) who found (n=116) that over 50% of students surveyed indicated that they learned much from their peers in online discussion forums. 78% of students surveyed thought that online discussions were an excellent opportunity to share knowledge and perspectives amongst students and their instructors.

Yet, as Macdonald, (2003, p19) states such participation and engagement is often not a realistic expectation due to time overheads unless it is central to the course's aims and for example allocated specific course marks. Brown et al, (2008) assert that student participation with online content should not be presumed either, even if it is available and clearly signposted. In their research, students failed to engage sufficiently with online content essential to their digital literacy skills and this impacted on their ability to complete course assessments effectively.

Online activities have recently become core in some online course (Rennie, 2003) and student online engagement has become a core element of what students must do to gain module marks and credit. Rovai, (2000), Salmon, (2003), Wickersham & McGee, (2008), Gerber et al, (2008) and Skinner, (2009) all highlight the importance of collective and inclusive participation. This must include all students, as their research indicates that groups of 'lurkers' will diminish the development of a sense of community, jeopardise the experience of the overall group and impact on student learning performance. Active students may mistrust those students lurking, perhaps even getting upset with them and so affect the overall sense of community (Thorpe and Godwin, 2006).

Identifying such lurkers is not always easy if course collaboration is not directly graded. Egan et al, (2006) attempted to identify lurkers, workers and shirkers with only limited success and described the need for the 'fine-graining' (ibid, p.24) of VLE feedback systems to further enhance the identification process.
So the problems of lurkers persist, and it is therefore important in Rovai's (2000) view to grade participation to bring all students into the discussions. Salmon, (2003) instead focuses on timing and getting student's confidence in communicating online developed as soon as possible to enable them to contribute more.

Similarly, Skinner, (2009) highlights the need to provide students with a successful participatory experience as early as possible, as she maintains that motivation will be affected in the absence of such an experience, even if students are aware of the theoretical context of their participation. Ultimately, online participation is considered as a ‘tough nut to crack’ but of crucial importance if students are not going to miss out a clear opportunity for personal development (ibid, p.98).

So, if participation, collaboration and discourse are to be a priority for online courses, then, as Garrison, (2006) points out, students must have the time to engage with their classmates and reflect on their conversations. If heavy workloads are apparent such interaction will fail to take place and students may revert to ‘survival mode’ and focus their studies and interactions at the individual level, at the expense of wider participation.

A rationale for peer-to-peer participation is outlined by Heiman, (2008) who makes the case (subsequent to a literature review) that peer interaction actually generates student learning and is positively linked to student performance and motivation. Thorpe and Godwin, (2006) also found (n=2116) that students strongly valued access to their peer group and its expertise and helpful responses, in addition to those of the tutor.
Baran & Correia's (2009) research (n=16) although limited in sample size, focused on an online model in which peer-to-peer participation was central to the learning model. Each week students were asked to volunteer (depending on the subject and their availability) to moderate and facilitate a week’s discussions. As part of the process students were provided with a list of key responsibilities applicable to online facilitators and this in itself was found to help students understand the process of online interaction.

However in mainstream online discussion forums, filtering out and screening of contributions also takes place and Ross et al, (2004) found that students use language, headings and the length of the posting to base decisions on what they read and what they do not. Short and concise, clearly labelled ‘message subject lines’ complementing short contributions in clear and succinct language appear to be the optimal posting type for participatory purposes. Ho & Swan, (2007) showed that students tended to respond more often to shorter rather than longer discussion board postings. An average posting of 6.4 lines received most responses. This has clear implications for participation levels. Salmon, (2003) explains that students will also be put-off participation within online forums that are dominated by one or two individuals. The names of such ‘over-keen’ students soon get known and the rest of the students can very quickly fall away. However this effect includes domination by an instructor too, which will also lead to students being reluctant to contribute (Cheung & Hew, 2010).

Biesenbach-Lucas, (2003), although their results are largely descriptive and drawn from only a small sample size of (n=36) students which they qualify as being in-line with other papers in the sector, found that students in their Blackboard discussion groups tended to post a maximum of 300-400 words.
In one instance though where one student persistently posted 1000 words, the others in the group soon followed with similar size postings and overall interaction went down. This highlights how important tutor input is in defining the parameters of student participation.

Ultimately, tutors need to be very aware of how students operate and interact within the online learning environment. In some instances the order of participation was in effect designated each week and students drew each other into the conversation (Biesenbach-Lucas, 2003). Maybe there is an active role here for the tutor each week to start off the conversation and direct questions at individual students, who would then in turn ask questions or ask for comments from identified others? At the end of the day, Gerber et al, (2008) argue that given their findings (n=164) the quantity of tutor activity is not directly related to student marks, but it is rather the quality of input and interaction that is important.

Morse, (2003) in research into asynchronous communications (n=24) found that the student group being surveyed were unanimous in calling for the size of postings to be limited to stop individuals posting lengthy abstracts of information. Useful as they might be, it does not lend itself to active discussion. A second unanimous recommendation from Morse’s (2003) study was the printing out and distribution of key articles to be read as part of progressing the asynchronous forums. This saved students money as most preferred reading paper copies rather than screen copies.

Lofstrom & Nevgi, (2007) found (n=144) that feelings of isolation combined with technical problems were the biggest obstacle to online learning for students. However, in terms of addressing such issues, the tutor-student relationship has been examined.
Regular interaction via the sending of emails from tutors to students enquiring about their course progress and satisfaction with their learning, may counter student's feelings of isolation, in the absence of visual signals and disconnectedness, according to Fein & Logan, (2003) and Heiman, (2008).

Heiman's (2008) study (n=180) such emails were always sent to student's private email addresses. One hundred and eighty of them were selected to receive 6 emails from their tutor each term asking about their studies and encouraging their progress and participation. Another group of students (n=180) were selected as the control group and did not receive this email attention through the term. The students who received the emails were found to have higher levels of perceived of social and academic support within their course and were also found to be significantly more satisfied with their course in comparison to those students that received no supporting emails through the term. Even basic tutor-student interaction via email it was concluded is able to generate noticeable benefits in addressing issues relating to isolation and disconnectedness within online learning communities. However, such findings are not universal.

Gerber et al, (2008) argue that given their findings (n=164) the quantity of tutor activities is not directly related to student marks. Certainly in some instances such as marked discussion forums increased tutor activities can actually have a negatively impact on student performance (Cheung & Hew, 2010).

Related to this focus on participation is the agreed ‘contact principles’ by staff teaching on the UHI case study online course which sets out the responsibilities of tutors and timing in contacting students. Although, unlike above, these principles do not prescribe regular email contact through the term, but only identifies when email contact should be generated in response to the missing of classes and contributions by students.
This is very similar to how the Universitas 21 Global (U21G) initiative deals with ensuring on-going participation by online students which it considers central to the student learning experience (Chua & Lam, 2007). Students on U21G receive an email to their private (non-U21G) e-mail address if they have not logged on to the Virtual Learning Environment for 7 days. If they do not login for 14 days they receive a telephone call and if both these are unsuccessful they then receive a final email (to both addresses) after 21 days detailing that they are likely to be shortly withdrawn from the module.

In a similar manner to the UHI case study online course (Rennie, 2003), the U21G initiative manages Discussion Boards as a core means of participation by posting papers and asking questions related to these papers for groups of students to collaborate and provide answers. This group-based collaboration actively constructs knowledge within the group environment. In the U21G instance, such discussions and participation are assessed and significantly weighted as part of the student's final mark. Salmon, (2003), Rovai, (2007) and Groves & O' Donoghue, (2009) all suggest that assessed participation will increase motivation to participate and so lead to improved levels of student interactivity and engagement.

As Brown & Voltz, (2005) point out there needs to be a reason or motivation to undertake learning activity that is memorable and of value. Clearly, gaining assessment marks is one such motivation to undertake learning activities. What the U21G initiative has done is to produce a document with guidelines for staff on how to moderate and mark discussion board participation.

Ultimately, as Biesenbach-Lucas, (2003) and Rovai, (2007) state, students must see the relevance of participation in discussion boards to their overall studies.
As such, there is a suggested role here for instructors to inform students of the goals to be achieved in participating in the course’s discussion boards (i.e. provide sufficient scaffolding), particularly if no final mark is allocated to such participation. Their collaboration needs to be relevant (Haythornwhaite, 2006) and:

“....model the way work unfolds outside classrooms. It can emulate and train for future workplace practices, including learning how to share ideas, voice opinions, work on a team and manage projects. It gives individuals experience in project and group management....learning how to do all this online and gaining skills in online communication and group management.” (ibid, p.10)

Weaning students off traditional expectations from the ‘sage on the stage’ to provide all their answers, instead of discovering answers for themselves through group collaboration and participation is not an easy task. In this latter approach students need to working collaboratively in a group to form common understandings about their task in the first instance and then consider the activities surrounding the task, any key concepts of relevance and what the most efficient communication modes will be to take the exercise forward (ibid, p.3). However, Stubbs et al, (2006, p.166) discuss this very scenario and outline a method of access prioritisation to their ‘tutor as an expert of last resort’ as a means to change the culture of students to become more independent within three weeks: Only students participating and completing set exercises or tests are able to gain a timely response from their tutors.

Yet student participation is not always forthcoming. Cornelius and Gordon (2008) in a review of the flexibly delivered TQ(FE) in-service programme for Scottish Further Education lecturers found that there was clear evidence of participants not engaging with reading materials and activities and not engaging with even the wider course (in the beginning at least). Nevertheless, some tutors on the course stated that they felt student engagement with the course materials was so important that it was a pre-requisite to achieving a successful learning experience on behalf of the learners.
This is somewhat backed up by Wu & Hiltz, (2004) who found (n=116) that 68% of students stated that their online instructor played a critical role in motivating them to communicate effectively online.

There are also cultural issues that need to be considered too, according to Watson, (2010). She found that amongst international students (n=75) there can be fundamental differences in student attitudes, expectations and preferences towards online student participation. If this participation is to be achieved then the role of the tutor in E-moderation becomes very important and tutors need to be switched-on to the tone of the contributions of students. Rovai, (2002) identified that students with authoritative communication styles can dominate discussion boards to the detriment of the learning group’s sense of camaraderie. Those students with a more inclusive style of communication, often females, according to Paulus, (2006) will be switched-off in response to such domination by some students in the group generating a competitive rather than supportive environment.

According to Rovai, (2002) evidence from an extensive literature review suggests that women predominantly favour inclusive and supportive learning environments rather than competitive environments dominated by male individuals. Such findings resonate with the UHI case study degree team and their experience in attempting to generate meaningful and inclusive participation through asynchronous VLE discussion boards. Kling & Courtright, (2003) highlight how important a supportive network can be in students ‘taking risks’ (ibid, p.226) and asking questions of the community that might in another more competitive environment have made them seem incapable. If a true community is to be established where students can take risks and feel they can ask about issues that they are not sure about and get positive support back, then establishing supportive online forums must be essential.
In recognition of this issue, Macdonald (2003, p16) states that to achieve quality in supporting learners a blend of both asynchronous and synchronous communications should be implemented as outlined in sections 3.2 and 3.3 of this thesis.

Yet Macdonald, (2003) also recognises that lack of participation in online group tasks is an area of on-going concern and it impacts on both online tutor and student morale alike and workload. However, Beaudoin, (2002) asserts from his research (n=24) on non-participants that not all non-participation should be of such concern. All but one of the respondents felt that they were learning by processing ideas posted without being visibly involved. The factor cited most often was that non-participants were in the process of acclimatising to a new form of learning and so did not yet feel confident enough to post online. Non-participants were still found to be participating in course activities, not visible to others, for an average of 44.6 hours per fortnight.

Nevertheless, Garrison, (2006) makes the case that it is important that students respond to each other’s points and build upon their ideas, if a community of inquiry is to be established with participation at its heart. Similarly, Brown, (2001) highlights the importance of existing and returning students with more experience responding to and including new-start students in initial discussions, as they will often be feeling overwhelmed with the new technologies and teaching methods and related expectations in the first several weeks of enrolling on their first online course.
McAlister et al, (2001) and Durkee et al, (2009) also highlight the need for new e-learning students to very quickly appreciate their need to participate and use the web and email to engage on their course and attain the level of interaction they will require to meet their needs. Basically, the value of participatory learning needs to be recognised from an early stage.

Ginns & Ellis, (2007) perhaps surprisingly, in a study (n=127) of blended learning students of years 3, 4 and 5 of their degree studies, found that students did not find other student contributions helpful in extending their own ideas and as such did not find other student participation intrinsically motivating to their studies.

Bernard et al, (2004a) also found something similar and found that interactivity was actually not correlated with successful achievement in e-learning. Garrison & Cleveland-Innes, (2005) (above) also reported a similar finding. This particular finding is described as 'puzzling' by Bernard et al (2004a, p.33) who point to its recognised ability (in much of the rest of the literature) to overcome one of the main problems with distance learning online courses – 'feelings of isolation'. Picciano, (2002) also found from his research (n=23) that the link between measures of interaction and student performance is not clear and depends on the measures of interaction being studied.

Such findings will be explored further as part of this research exercise as it has implications for course design and delivery strategies, although one has to understand that the views of blended learning on-campus students (surveyed in at least one of the above instances) will often be quite different than that of remote learners.
In their conclusions Ginns & Ellis, (2007) point to the combination of quality online teaching and the level of course interaction as being key to higher student grades. Yet, as Biesenbach-Lucas, (2003) proposes, making sure that instructors’ expectations of student levels of interaction is realistic is very important:

"While once-a-week postings may seem a reasonable requirement for university courses, instructors with classes of non-traditional students who have full-time work commitments, family obligations, and other responsibilities may need to evaluate carefully how much time they can ask students to devote to out-of-class activities such as discussion board postings, especially if other assignments are not adjusted accordingly." (ibid, p.38)

Rovai, (2007) also highlights that it is important that the ‘ground rules’ for online discussions are managed effectively at the start of each course to ensure that student expectations for participation are understood from the outset. Furthermore, Deka and McMurray, (2006) found (n=99) that instructor-initiated communications did not improve success rates with distance teleclass students, but did find that those students who communicated most with their instructors were more successful in terms of course completion. They then rightly asked whether all students are fully familiar with their communication options with their instructors and also asked whether students realise that by developing communications with their instructor their chance of successful completion in each class increases.

Schutt et al, (2009) discuss what they describe as instructor immediacy (expressions of inquiry, concern, inclusiveness, encouragement and recognition) and its link to perceived social presence. Regardless of the mode of online delivery employed Schutt et al, (2009) suggest that if instructors can display high-immediacy behaviours they can increase student’s perception of social presence and ultimately improve their motivation to participate and enhance satisfaction ratings. In the Information Age, regardless of the technology used, online-based communication still needs to fully understand:
"...the role of ancient forms of human expression that communicate interest, enthusiasm, empathy, concern and recognition." (Schutt et al, 2009, p.146)

Hemphill & Hemphill, (2007) investigated the impact of guest speaker input and postings to online classes and in particular discussion boards. Their findings are of real interest and found that students responses and input included higher levels of critical thinking and such events led to wider communications amongst the student group itself. Furthermore once such an event was initiated in the opening weeks of a module, student participation in discussion boards continued even after week six of term, when traditionally (as in the UHI case too) input often begins to diminish (ibid). Their study concluded that the use of external guest input in the early stages of a module enhanced student levels of critical thinking and enhanced interest. It was a limited study of only (n=16) students on one module, but nevertheless is of real interest if these findings can be replicated more widely.

A further means to generate student participation is to open up a discussion board for students to discuss the course/level marking scheme or rubric that will be applied to their submitted work (Rovai, 2007; Macdonald, 2003). This can help new students, in particular, to understand better how their work is being marked and so help them better understand their feedback when it finally comes, this being essential if meaningful interaction is to be achieved. The allocation of marks to student’s discussion board efforts, which are often quite substantial through the term when amalgamated, needs to be appropriate and commensurate with the effort they have required to put in. This is of particular relevance when one compares student interactive efforts here with often lesser assessments worth more to their final mark (Biesenbach-Lucas, 2003). This sends out the wrong message about discussion board’s value to their overall studies and may even lead to resentment.
Ultimately tutors as well as students need to understand what teaching presence is and the associated expectations on them to generate interaction and how central this is to their course (Baran & Correia, 2009). Questions regarding the non-attendance at tutorials and non-participation in on-going asynchronous activities need to be asked.

Tutors need to be clear about their responsibilities in generating participation and students need to be clear on the expectations on them to participate. Lurkers, in Rovai’s (2002) view, will be to the detriment of online courses and a lack of participation by some students will lead to disappointment and even resentment amongst the student group (Thorpe & Godwin, 2006).

4.3 Social Aspects of Distance Learning: Building Online Communities

Social constructivists argue that learning does not take place in isolation, but instead maintain that people naturally learn together in groups, or communities of learners. It is worth considering briefly the theoretical background to such theory.

The origins of social constructivism are commonly attributed to the work and theories of Lev Vygotsky (1896-1934), a Russian psychologist whose seminal paper ‘Thought and Language’ was first published in 1934. Unfortunately by this stage Vygotsky had died prematurely of tuberculosis at the age of thirty-seven (Bruner, 1985). Modern social constructivist conceptions of a more limited and yet targeted tutor role in ‘scaffolded’ learning come through in his early work. Of equal note was his contention that the passing on of knowledge is similar in nature to the passing on of language, it is a social transaction and this social transaction element is actually a fundamental element of education in his view (ibid, p.25). An efficient learning environment for Vygotsky was one where learners entered a new culture and were assisted and inducted by more advanced learners already present.
Bruner, (1985) makes the following intuitive comment on Vygotsky's learning environment:

"I agree with Vygotsky that there is a deep parallel in all forms of knowledge acquisition – precisely the existence of a crucial match between a support system in the social environment and an acquisition process in the learner, I think it is this match that makes possible the transmission of culture....."

The modern community of practice or community of inquiry (refer to fig. 4.1) endorsed by Garrison, Anderson and Archer, (2000) in the Higher Education sector in the last decade, without doubt has its roots in the many insights provided by Vgotsky.

Fig. 4.1

![Community of Inquiry Diagram](http://communitiesofinquiry.com/model)

In addition, for some writers (Hirtle, 1996; Glassman, 2001) in the education sector, the work of John Dewey, (1859-1952) was just as influential in recognising the influence of the social context within the process of learning (Dewey, 1897). Dewey recognised that education was a social process and states that education fails when it neglects to understand the "...fundamental principle of the school as a form of community life" (ibid, p.78).
Glassman, (2001) in comparing Dewey and Vygotsky's educational perspectives recognises the clear similarities in their promotion of class based problem-solving activities and their emphasis on the social context in learning. Both Dewey (1897) and Vygotsky (1934) highlight the necessity of language and communications within the educational context and foresee learners becoming part of a community. From such perspectives we see the link to and subsequent development of collaboration within the social constructivist context and the changing role for the teacher from the builder and font of knowledge to the scaffoldor/mentor/facilitator and guide stimulating community, culture and collaboration. The process of socialisation and culture formation is explained by Hirtle, (1996):

"In a learning community grounded in constructivism, learners mediate knowledge within a social context...culture is the product of social life and human social activity. Therefore, when learners actively construct knowledge in a social context – mediate through language, situated in a framework of problem posing – it provides not only an optimal learning environment, but has the potential of transforming the learner’s cultural reality." (p.91)

Wertsch and Tulviste, (1992) also commented similarly on how learners develop in Vygotsky’s view. The mental functioning of the individual in Vygotsky’s view (in their opinion) can only be understood by examining the social and cultural context from which it is derived. For them this is a key aspect to understand educational development from the Vygotsky perspective.

Vygotsky, (1934) contended that ultimately learners can improve their learning by providing them help with their problem solving (from teachers or more experienced peers) as they cross over into the Zone of Proximal Development (ZPD). Members of any learning community will have an enhanced level of conceptual abilities to draw upon in comparison to the individual and ultimately learning is a socially or culturally mediated activity.
According to Cole and Wertsch, (1996) within interpretations of Vygotsky’s writings, society provides the cultural heritage that makes development of the mind possible and so the importance of the culture of the learning community in the educational environment must be recognised. The process of collaborated learning within the ZPD enables the learner to progress what he/she learns via collaboration today, independently tomorrow. The ZPD is therefore a cultural zone for learning and building the capacities of learners through language and interaction and as they learn, support is progressively withdrawn. Thereafter, scaffolding only is required as students take on more responsibility for their own learning and become ‘self-regulated and independent’ (Duffy and Cunningham, 1996).

For a number of writers it is important to distinguish the ZPD as a learning environment rather than a teaching environment with scaffolding supporting the growth of the learner, rather than being the structure holding together a more formalised teaching environment (ibid, p. 185). In Vygotsky’s view the social history of the class is important and the tutor acts as a mentor within the group and the ZPD. This differs from Dewey’s perspective who advocates a more distant tutor input to the socialisation of the group. Dewey emphasises the individual as the agent of change within the social environment of the class, whilst Vygotsky advocates that it is the social organisation in a constructivist class experience that is the agent for change, rather than the individual (Glassman, 2001). In this latter case the group, in its construction of knowledge, rather than the individual within the group, is the conduit for knowledge formation and development.

The parallels to the modern day principles of social constructivism in the online learning context are therefore obvious.
By engaging online learners in a socialised ‘community of practice’ encouraging their engagement, mutual peer support systems and reflection, the modern social constructivist approach seeks to establish a culture of scholarship within a community of learners. Ultimately this is remarkably similar to Vygotsky’s perspective as outlined by Wertsch and Tulviste, (1992):

“Vygotsky understood culture as something that comes into concrete existence in social processes, and he viewed these social processes as providing the foundation for the emergence of individual mental processes.” (p.551)

The rest of this section will now go on to review the modern-day literature and examine the evolution of classical theory within the present online education sector.

Drouin, (2008) highlights the key assumptions related to this approach in referring to the ‘social construction’ (ibid, p.268) of knowledge attainable from enhanced social interaction and also highlights how social presence and the development of a ‘sense of community’ (ibid, p.269) relate to both student satisfaction and student retention.

Supporting such analysis, Rovai, (2007) argues that in this context the goal for remote, off-campus online learners must be the creation of online communities in which learners feel connected with each other and so are able to support each other in their learning experience. Garrison & Akyol, (2009) argue that new technologies, providing its use is driven by educators, can potentially take collaborative constructivism to the next level and in doing so establish cohesive communities of learners.
The challenge for online educators is therefore to re-conceptualise how a 'sense of community' can be created across the internet to aid the 'social construction of knowledge and understanding...' (Rovai, 2007, p.78) and ultimately stimulate learning in physically remote student groups. Pelz, (2004) contends that online students actually bond quicker that students in face-to-face classes and so student communities are easier to build online than they are face-to-face. Stacey et al, (2004) suggest benefits from such online learning communities that extend beyond the educational context.

They suggest that adult learners, in work and studying, who are involved in cohesive online communities of learning, will bring 'enhancing effects' to their existing workplace-based communities of practice and so benefit further from engaging in online communities of learning.

As a result online student collaboration is often used to 'construct knowledge' (Haythornwhaite, 2006, p.8) and enhance the learning experience by allowing work to get completed quicker, learning outcomes to be achieved and student satisfaction to be increased both within and outwith the educational context.

Not all students recognise the benefits of developing such online social contacts. The opportunity to learn from each other, network and gain peer support are often only recognised if discussion is encouraged on such issues by course tutors early in online courses (Brown, 2001). The task of developing an atmosphere of 'socially responsive discourse' is an important role for the online tutor in the view of Wiesenber & Stacey, (2005, p.391). A combination of social encouragement along with course content discussion is considered an important dual role for the online tutor. According to Garrison & Kanuka, (2004) students need to explicitly be made aware of the nature of the active roles they will need to fulfil within the online environment.
Identity adjustment towards an online persona will occur within the online context as new entrants compare their role with that of others and begin to 'project their personal characteristics' (ibid, p.24) within the wider community.

Yet such initial course activities are the exception rather than the rule and so the importance of building online communities is often overlooked by both students and tutors alike. From the tutor and student adviser perspective such an additional course-based support system for students can be a welcome means to complement existing provision. On the other hand, some more modern approaches, often tutor-led, targeted at online community building using Second Life (for example) as a social medium have had mixed reviews and the 'fine tuning' of strategies is on-going within the education sector (Edirisingha et al, 2009; Warburton, 2009; Foss, 2009).

Not withstanding such technology-based approaches, Wahlstedt et al, (2008) and Schneider & Evans, (2008) argue that by incorporating social interaction within the design of e-learning environments they become more like places of learning within its conventional meaning. Knowledge is normally gained most effectively in a social environment. They emphasise collectively in their work the difference between places and spaces of learning. Places instil particular forms of behaviour that are appropriate to that space. Places will have a culture that is rooted in the community and its practices and understanding which use the space in question. This will have significant design implications (structure and usability) and practice (respect amongst student learners) for e-learning environments. Yang & Tang, (2003), Penman & Lai, (2003), Rovai, (2007) and Bradley et al, (2008), suggest that constructivism, the increasingly predominant paradigm in online learning, ultimately looks upon learning as a social process that is centred around communication with others in an attempt to construct or create knowledge:
"The learner actively constructs knowledge by formulating ideas into words, and these ideas are built upon reactions and responses of others." (Yang & Tang, 2003, p.94).

"Constructivism is a philosophy of learning based on the notion that individuals construct their own understandings through experience, maturation, and interaction with the environment, especially active interaction with other learners and the instructor." (Rovai, 2007, p.78)

The clear implication here is that the developing of an online learning community and related social links is actually essential to successful learning in the online environment. Ostlund, (2008) contends after an extensive literature review that social and emotional interaction is very important within the development of successful online participatory communities. He further states that the ‘social climate’ has a direct effect on the success or otherwise of the online learning process.

Likewise, Wang, (2008) identifies setting the tone as being an important social responsibility of online instructors, who must set a friendly and interactive atmosphere from the beginning of their discussion forum. An example of such socialisation was found by Ross et al, (2004) who, in a study of several classes of online Masters students (n=66) registered with the OU in the UK, found that their tutors had all set up virtual cafes, pubs and canteens within their discussion forums to provide just such a social atmosphere within the learning context. Activity within these spaces was significant within the early stages of modules in particular.

Wahlstedt et al, (2008) also suggest that existing e-learning environments are often designed almost solely for learning functionality and so lack the key social interaction elements identified as being central to group learning.
Britain & Liber, (1999) also recognised this very same issue and advocated that students in their Virtual Learning Environments (VLEs) should have sufficient rights to be able to organise themselves into groups and collaborations, independent of their instructor. To enable such social collaborations Britain & Liber, (1999) suggest that detailed student information should be available on students so that they can locate others with common interests and goals. The modern equivalent might be direct links to classmate’s personal social networking sites being made available to each other through their VLE.

This lack of integration with existing social networking software, used widely by students, is recognised as a problem by the University of Nottingham, (2008) in their report on the ‘Big Issues in VLEs for Higher Education’. This is an important point, as Brown, (2001) found that students agreed that the first step in online community building should be about getting to know each other. Although not part of formal coursework social interaction was nevertheless considered of high importance – e.g. where do you live?, what do you do for a living?, what interesting experiences have you had?, what are your hobbies?, do you have a family? (ibid, p.30).

However, as Rennie & Mason, (2010) ask, do students actually wish to blur the boundaries between online tools and software used for their leisure and those used for their education? The benefits of such integration, they claim, assume that there will be a seamless transition between leisure and entertainment functions and those of education. In their view (ibid, p.95) this has not in the past usually been a straightforward transition.

Students that are not engaged in their course may feel remote or isolated in their learning space (McCombs & Vakili, 2005) are unlikely to spark up the type of social relationships with their peers that one might argue is necessary to aid successful and sustainable online learning experience in an online place.
It is therefore this element of social interaction that is often overlooked and yet arguably central to a successful e-learning experience. A learning space without any meaning or context for the user will often fail to fulfil an effective e-learning experience. In such instances technologies should be utilised to develop networked learning communities (ibid, p. 1586). Furthermore, a space like this needs to be personified to become a place of interactive learning (Wahlstedt et al, 2008). To fulfil such a role, Britain & Liber, (1999) in a report for JISC maintain it is important that learners have sufficient permissions within their VLE to allow them to set up their own study groups and collaborations. This is particularly important given that the next generation of student will be ‘digital natives’ and will come into education increasingly expecting to learn as part of an online community (Weller, 2007).

Aspects of this community will also be reliant on technologies out with the realms of formal education, yet will be important drivers of community.

In the UHI course case study the most obvious representation of this is the usage of Skype amongst the teaching and student groups to provide an element of synchronous potential that Weller, (2007) considers potentially important components in the creation of online communities.

Rovai, (2002) in a review of the literature suggests that a number of inter-related factors influence the quality of student interaction and so the development of online learning communities. This in turn should be an influence on subsequent course design and teaching strategies. The following inter-related factors were identified as being important in ‘community building’ (p.12):

(a) transactional distance, (b) social presence, (c) social equality, (d) small group activities, (e) group facilitation, (f) teaching style and learning stage, and (g) community size.
Providing several opportunities per term for students to reflect on their own contribution to the student community and what others have done to help them and make them feel connected to the online community, is a recommended strategy in online community building (Brown, 2001). Otherwise, off-campus online students will feel isolated and it is this feeling that has historically led to demotivation and dropout (Cowham & Duggleby, 2005). Working alone at home can be very isolating and it can be difficult to stay focused on assessments without some form of social contact. As a learning style, this isolated form of study will attract many students who will require and seek additional social contact (Schrum & Hong, 2002).

However, according to Shea et al, (2005) social interaction although necessary, is not enough to create a 'productive learning community'. For example communications technology needs to be appropriate, the students themselves will need to have aspects of their lives in-common, have appropriate time to forge social links and some perceived course-related benefit may need to be apparent to facilitate such student socialisation.

Rovai, (2000 and 2002), Garrison & Kanuka, (2004), Shea et al, (2005), Shea, (2006) and Garrison, (2006) further emphasise the role of the tutor and their 'teaching presence' in facilitating and developing such communities of online students. Their collective findings suggest a direct link between student perceptions of a stronger teaching presence with that of a stronger development of an online learning community and sense of connectedness and learning. In instances where the 'sense of community' is fragile the role of the tutor becomes ever more important in dealing with group tensions, maintaining cohesion and generating on-going collaboration. These findings further highlight the importance of the instructor's role as outlined by Anderson et al, (2001).
Holsapple & Lee-Post, (2006) in a study of traditional (n=369) and online students (n=39) over two semesters found that feedback (from online students, specifically) sought enhanced access to view other students comments, enhanced opportunities to chat with other students, increased opportunities to interact with other students and to have optional class time. There is likely to be as much a social element to such expressed enhancements as there are learning elements. Brown, (2001) also highlights the factors that lead to the development of online student-student social links. The basis of these links were often found to be similarities such as common student location; academic background; commitment; motivation; circumstances (ibid, p.24). Her study showed that it was students who sought out others with similarities to themselves that began interacting and communicating on a regular basis.

This suggests that a much more proactive beginning to modules with regard to introductions and the background of individual learners could help develop the online interaction considered so essential by so many in the sector (Bird, 2007; Ferdig, 2006; Cook & Dupras, 2004). This was only one factor according to Brown, (2001) that contributed to the development of an online community of learners.

If such connections could be built upon via the participation in a threaded discussion on a key issue, then at the conclusion of the discussions an element of 'kinship' (ibid, p.24) would be generated and this could solidify into preliminary social linkages . Confidence in their own knowledge and their ability to communicate effectively would be big contributors in this instance.

The ultimate goal for the online community is the development of 'camaraderie' (ibid, p.25) after an extended period working together online, often in multiple classes.
Feeling less isolated by being included in such online collaboration was reported as being a positive value in its own right (Thorpe & Godwin, 2006). In addition, if this social development was solidified through meeting in-person at junctures through the term then the potential for a sustainable community of online learners was/is possible. Representing this process Brown, (2001, p.25) has presented an insightful ‘conditional matrix’ representing the multiple stages of engagement that will be required to develop a sustainable community of online learners.

Increasingly personalised learning spaces in Virtual Learning Environments (such as Moodle or Blackboard) are being encouraged to meet social and learning needs (Rovai, 2007). This is the difference between a depersonalised learning space and a student-centred personalised learning place (Sampson & Karagiannidis, 2002). Lack of even basic personalisation options for student users in such environments such as names/labels and colours can limit the transition from space to place. As individual’s preferences for the e-learning environment are different then it is the most adaptable and customisable environment that will be most appropriate. The focus on designing e-learning environments should be as much concentrated on social interaction opportunities as technological possibilities to enhance learner confidence (Wahlstedt et al, 2008; Carroll et al, 2009).

The Community of Inquiry model (Garrison et al, 2000) is a means to understand and contextualise the social aspects of groups of online learners in Higher Education. As Garrison, (2006) summarises, it is about social presence (students’ abilities to connect with other students in their community of learners on a personal level), cognitive presence (the construction of meaning through collaborative inquiry) and teaching presence (the structuring and leading of educational activities in a collaborative and sustained manner).
The ultimate goal is to develop a ‘sense of community’ (Drouin, 2008, p.271) within an online student group. Nagel & Kotze, (2010, p.46) and Redecker, (2008) suggest that the overlapping elements of a ‘Community of Inquiry’ such as social, teaching and cognitive presences will contribute together to form a learning community. Garrison et al, (2010, p.32) explain that such a Community of Inquiry approach has its origins in ‘collaborative constructivism’ and the premise for the theoretical construct is:

“...that higher-order learning is best supported in a community of learners engaged in critical reflection and discourse.” (p.32)

Developing a sense of community is clearly important, but for some sub-groups perhaps even more of a priority. Garrison, (2006), Paulus, (2006) and Shea (2006) found a gender effect whereby females were more likely to participate and become active members of an online community. However, Paulus, (2006) found this was only the case in supportive environments. More work may therefore need to be done to draw male students into the participative roles. In addition, Shea, (2006) based on previous research, also hypothesised that age may be a factor and the older a student was, the less likely they were to participate within communities of inquiry. However, his findings did not establish any strong link to this effect.

Rovai, (2002) found from an extensive literature review that the development of an online community was essential to counteract feelings of isolation and potential alienation. Students that possessed a strong sense of community he found were more likely to be retained and feel connected and supported by others students and their tutors.
Finally, Brown, (2001) suggests that students provide external emails and phone numbers in the online ‘cybercafe’ and let other students know when they are attending external events (maybe through work) and even coming to campus, so that students who are going to be in the same place at the same time have maximum opportunities to meet up face-to-face and develop their social interactions.

Ostlund, (2008) also found that students opportunities to meet up in person served an important social function that re-invigorated learners and boosted their motivation. A student quote highlighted in Ostlund’s paper pertaining to the advantages of students meeting up in real life is very much similar to the experience of the UHI case study course. Students that have met up find it more ‘comfortable’ (ibid, p.48) to contribute to online discussion with their peers after having met them previously. This element of community building cannot be overlooked as it generates confidence and a willingness to provide peer-to-peer support, arguably the very definition of community.

4.4 Student satisfaction with online education

Student satisfaction can be the result of multiple factors of the online experience. Differing studies have highlighted different factors as being important. Successful attainment of quality student satisfaction feedback has often been highlighted as an issue. For most higher education courses, detailed student satisfaction feedback is recognised as being a vital component of the course evaluation process (Brew, 2008). Attaining quality student satisfaction feedback from online learning students has not been as straightforward as it should be.
As Jara & Mellar, (2010) state, remoteness impacts on student response rates (outlined in section 2.4), yet this does not seem to be understood by most institutions where little modification to their traditional modes of capturing student feedback has occurred. Many students in this study did feel though that they were close enough to their online tutors for them to be able to channel feedback on their behalf (ibid, p.713). Whether this happens to a great extent or not is open to question. Jara & Mellar, (2010) state that if we are to take student satisfaction survey challenges seriously then course teams and course leaders need to be more active in addressing this challenge and then acting on the feedback.

According to Pillay et al, (2007) students express satisfaction with the online learning environment when technical and pedagogical factors are methodologically sound and when this is combined with both effective tutor and peer support. Walker & Kelly, (2007) found a very high level of student satisfaction (n=304) amongst online learners (92% very positive or positive). Area of importance related to feelings of satisfaction were remarkably similar to those identified by Pillay et al, (2007) such design, assessment, time on task...etc.

Research for the Higher Education Academy in the UK by Sharpe et al, (2006) found that students particularly value flexible access to course materials from home as well as on-campus. Chen et al, (2008) also found that 96% of students (n=3894) taking online courses identified flexibility and convenience as a key reason for enrolling. Such flexibility according to Sun et al, (2008) is a core element of e-learner student satisfaction. If student anxiety is to be avoided, student understanding of the technologies being employed in their learning is important. Students need to understand its role and impact on their study and engagement strategies within their courses (Sharpe et al, 2006; Sun et al, 2008).
Likewise, Ellis & Calvo, (2006) highlight the similar upfront need to make students understand the value of discussions in online learning. It is wrong to assume, in their view, that students know how to extract the value from such discussions without their initial understanding being enhanced. Making such information explicit for students has been a very important recurring issue amongst UHI students too, on the case study programme and anecdotally on others too. Students are increasingly immersed in their private use of technology, as well as that provided for them by the institution.

In terms of 'preparedness', Piskurich (2006) provides a list outlining what a successful online learner should do in preparation to become an effect student in their online environment. Although very interesting, this list has been drawn-up based on personal experience rather than actual research and so needs to be considered in context and so will not be examined further here. Many other authors in the field such as Bernard et al, (2004a); Shea et al, (2003); Salmon, (2003); Holder, (2007) and Macpherson & Nunes, (2008) are also convinced of the key role that preparedness plays in satisfaction within e-learning and suggest strategies for dealing with the issue.

For example another researcher, Brown, (2001, p.26) attempts to illustrate with ‘Time Triangles’ the impact that a lack of preparedness has on the development of online communities. Whilst returning students need to devote minimal time to ‘technology’ and ‘teaching methods’, new unprepared students must devote much of their (often limited) time to these aspects rather than on ‘course content’ and ‘community-building’ which the more-prepared, returning students, are able to focus on. To this end Shea et al, (2003) propose the importance of informing new students of issues surrounding ‘netiquette’ in preparing new online students for their online learning environments.
The problem in these instances is that the very students most needing to engage with community building, by establishing the parameters of effective online communication and developing an associated in-course support system, are actually the least able to spend such time on these activities.

Garrison & Kanuka, (2004) also emphasise the need for new students to the online environment to have sufficient time at the beginning of their studies to come to terms with the greater responsibility and control they will have in their new course. If they have been previously used to a relatively passive classroom experience then it may be challenging for them to make the transition to a more active online community of inquiry.

The requirements of online learning are often not immediately apparent to new entrants onto online learning courses and so if they are to have a satisfactory experience then they must be given sufficient time to adjust to their new means of study. In saying that Shea et al, (2003, p.76) found that 69% of students did recognise that their peers in their groups were providing a ‘teaching presence’ (rather than a teacher presence), helping their learning and supporting their studies. Nevertheless, they still considered that the tutor (teacher presence) should play the central role in the teaching effort.

The observation was made that as students far outweigh tutors (ibid, p.76), their interactive behaviour and so ‘teaching' presence activities were bound to be more in evidence. Indeed the results from their research (n=6088) showed that they considered that fellow students were able to participate in teaching presence at high levels. This same study (ibid, p.74) found that teaching presence was correlated with student satisfaction.
Youn & Vachon, (2005) found in an extensive review of the literature (from six major academic research databases) that the level of satisfaction and/or dissatisfaction with e-learning may contribute to a learner's on-going enrolment on e-learning programmes. This is a finding that supports one of the key hypotheses in this thesis. Interestingly, Youn & Vachon, (2005) found in their study of undergraduate students (n=249) that the most common 'satisfaction' factors centred around: interesting and relevant course content; effective teaching methods; instructor expertise; and effective learning activities.

Factors that resulted in most dissatisfaction were a lack of instructional directions and lack of knowledge of instructor expectations and a poor instructor participation level. These themes are all elements of satisfaction that clearly required to be explored further within the main research study of this thesis.

Lee et al, (2009a, p1322) state the case, based on the literature, that the quality of teaching materials on e-learning courses has a direct influence on the motivation of learners and ultimately their satisfaction with their e-learning environment. They summarise, drawing again from their literature review, that greater personalisation of learning and an enhanced learner-centred approach will help deliver the quality content sought after by students.

Similarly, Wickersham & McGee, (2008) are of the opinion, based on their research (n=30) that satisfaction can be influenced most, by appropriate instructional design techniques and tutor-student and student-student feedback and interaction. Paechter et al, (2010) in their study (n=2196) found that tutor support strongly correlates to the achievement of student learning outcomes and so student satisfaction.
On the other hand, Drouin, (2008) in his study (n=71) of student satisfaction found that student's perceived sense of community is best achieved by promoting student-student interaction rather than student-instruction interaction and that there is a significant link between satisfaction and a sense of community.

Bernard et al, (2004a), subsequent to a Meta-Analysis of distance education literature published between 1985 and 2002, identified a number of directions for future research in the distance learning sector. These included student motivational factors and also preparedness of students on entry and any possible link to their course satisfaction. In addition, the establishment of desirable skill-sets for tutors of synchronous and asynchronous courses and differing methods in developing these skill-sets and also issues surrounding inclusivity and accessibility were also identified as being factors linked to student satisfaction.

Bernard et al, (2004a, p.33) also highlight the 'feelings of isolation' felt by distance learning, off-campus, online learners and make a link (from a literature review) with enhanced levels of student/tutor interaction as being a direct means to overcome this particular issue of student dissatisfaction.

Yet, their own findings were not able to confirm this effect after providing 'puzzling' findings in this particular area.

4.5 Adult learners and online education

Increasing evidence shows that online learning is being sought after as much by adult returners as it is by young adults. Indeed, 40% of students now entering higher education in the US are aged 25 years old or over (ANTSHE, 2010).
With such high percentages the Association of Non-Traditional Students in Higher Education (ANTSHE) questions whether mature students can for much longer be considered non-traditional students. It seems that flexibility of educational opportunities and the autonomy that online study presents in rapidly changing economic circumstances is of key importance to older adults in particular and a driver of this new student phenomenon (Dobbs et al, 2009).

Further fuelling this growth is the practice of some businesses to increasingly seek new recruits from more experienced adults within the workforce. A number of recent customer feedback preference exercises highlight dealings with older members of the workforce as being preferable (Githens, 2007). Such changes in themselves have increased demand for flexible educational products from adult returners to education. In many ways this is not surprising. For example, Dutton et al, (2002) found that older students with greater work and childcare responsibilities were increasingly taking up online learning opportunities. Even more surprising is that these older students tended to often have more experience with using computers. According to Ke and Xie, (2009) adult learners are becoming the majority cohort in many online classes. Although some of the literature points to the problems faced by adult learners’ insecurities with using technology and a potential mismatch with their learning style, the research by Ke & Xie, (2009) found that there was no significant correlation between age and confidence levels in using technology. In addition, online learning provides the flexibility required for adult learners with family and work responsibilities.

Blackmore et al, (2008) in a study of adult e-Learners (n=167) across Europe found that ICT skills did not appear to be a significant factor in completion rates. There was no apparent difference in the level of ICT skills between those students who completed the course and those who dropped out.
No students leaving the course cited a lack of ICT skills as being a factor in them dropping off the course. Although a limited study (n=10), Kirkwood, (2008) found that most adult learners do use the internet already for social, domestic, personal, employment and academic purposes. ICT is therefore already often part of the adult learners' knowledge-base on entering their academic studies.

Yet, Chu, (2010) looked further into the types of internet skills possessed by adult learners and found in a study of mature adult learners (n=290), who were already engaged in internet-based e-learning (and so must be a limitation on the extent of any generalisations from such findings) that their communication skills over the internet appeared lacking (3.04 on a 5-point Likert scale).

Communication skills, as opposed to general internet skills, are more complicated and require more than clicking, browsing and surfing websites. This clearly has implications for their successful participation and involvement not only in online lesson interactions but also in developing a social online presence with their peer group of learners.

However, there is a clear skills set that is going to be valuable to the adult e-learner. The key skills of critical thinking, research and evaluation are of increasing importance as students must navigate their way through terabytes of electronic data from multiple sources and extract only that which is relevant in a time-efficient manner (Wagner et al, 2008). They must be able to filter out not non-relevant, but also non-robust sources of information which do not meet academic standards. This is a key skill for adult independent learners and is termed 'information literacy' also described by Kirkwood, (2008, p.373) and Durkee et al, (2009, p.299).
Aviram & Alkalai, (2006) question digital literacy skills for online learning and suggest that a focus on individual learning styles may instead be equally important and contend that different learners may very well require differing skillsets to be effective learners. They also contend, somewhat more controversially, that there may be more of a fundamental clash occurring between traditional education and online education practices which as yet shows little sign of being resolved.

Stein et al, (2009) identifies three primary means for new adult online learners to reduce their transactional distance: *creating a voice for learning, connecting in a space for learning, and creating a time for learning* (p.307). Adult learners must be able to learn (quickly) how and when to communicate in the online networked world. Adult learners must be able to learn how to learn from each other and value the contributions of their peers. Adult learners must realise that it is their responsibility to develop a balance between their life commitments (family and work) to accommodate time to complete and engage with their online tasks.

Githens’, (2007) literature review also concludes that adult returners also value aesthetics in e-learning as much as usability and so this has implications for course design within e-learning. In addition, course design that includes educational games was found to not always meet adult returners’ learning styles.

Furthermore, as identified by Gruenbaum, (2010) and Macpherson & Nunes, (2008) motivation is a key requirement for the modern-day adult e-learner and so must be addressed. There are clear advantages in being ‘autonomous self-regulated’ (Gruenbaum, 2010, p.1) learners, and adults, arguably, more often fit this description in their determination to complete their studies and progress their self advancement.
Motivated learners will grasp opportunities to learn. However, according to Gruenbaum, (2010) to maintain motivation, instructors need change and evolve the management and delivery of their courses in response to student feedback and technology change. Macpherson & Nunes, (2008) argue for collaboration, good communication, trust and creativity as being central to tackling the motivational issues of students. In addition, as Chu, (2010) reports, emotional family support also has a significant impact in directly predicting the effects that e-learning will have on the learner.

The growth in adult returner numbers associated with the lifelong learner phenomenon of the last decade was identified by Britain & Liber (1999) and explained by them as a response to the increasingly diverse demands of staying competitive in a globalised economy. Business and indeed community demand for updating skills and knowledge translates into the need for enhanced flexible training and education provision for individuals and businesses. This became increasingly possible (Biesenbach-Lucas, 2003) as modern VLEs such as Blackboard, WebCT and Moodle became commonplace within the education sector and managed flexible provision increasingly satisfied the needs of lifelong learners.

Nevertheless, the challenges faced by many adult learners are significant. The economic circumstances that adult learners can find themselves in when returning to education are significant and can be a threat to their continuance on their chosen programme. Gerrard & Roberts, (2006) interviewed adult returners (n=12) who have children as part of their research into the impacts of financial hardship of adult returners. Five key themes came to the fore to help illustrate the impacts of financial hardship on adult returners with children (ibid, p.396).
These themes were: direct financial pressures; impacts on mood and mental health; impact on physical health; effects on family; and self-doubt over whether the sacrifices experienced were worthwhile.

These themes give us a genuine insight into the issues facing adult returners who have children; however, the sample group is too small to be able to draw any wider conclusions. The flexibility helps those in financial difficulties up to a point, but ultimately students leave courses as depression and feelings of stress and anxiety increase in response to accumulating debt, according to Gerrard & Roberts' (2006) research. A number of students in the study struggled to feed themselves and their children. Unlike younger students, mature students did not tend to have parents to fall-back on should finances be severely limited.

Other challenges faced by adult returners are to some extent modified by flexible e-learning approaches. Many such adults will be providers of care to elderly parents which may limit their time to participate in traditional campus-based courses. In other instances mature returners may be the subject of caring themselves due to health issues and so require the flexibility of e-learning as attendance at traditional on-campus lectures in not practical. E-learning allows such adult returners to engage in higher education and also to socially interact with others in instances where other social opportunities are limited (i.e. for the housebound) (Githens, 2007). Indeed, as Ke & Xie, (2009) found in a study of undergraduate and postgraduate adult learners (n=51), student satisfaction rates for online courses were generally high amongst adult learners.
4.6 Student Characteristics – Digital Natives?

The recent convergence of multiple technologies of relevance to education has coincided with an increasing number of young adults entering higher education that have been familiar with and immersed in technology from an early age. These young adults have been labelled readily in the literature as ‘digital natives’ (Prensky, 2001, 2001a) or described as the ‘new millennium learners’ (Pedro, 2006), or referred to as ‘millenials’ (Howe & Strauss, 2003). The latter group of young adults are described as ‘optimistic, team-orientated achievers who are talented with technology’ according to Bennett, et al, (2008, p.776).

The current generation of children going through school are using Information and Communication Technologies (ICT) in pre-school (Moloney & Oakley, 2006) and are mostly fluent in computer use increasingly by the start of school at the age of 5 years old. According to Pedro, (2006) this is the first generation of children brought up immersed in digital technologies and whose peer-to-peer communications and knowledge management can effectively be organised by such digital technologies. Such new millennium learners are multi-taskers, always connected and available to their peer group or social network, they require personalised control and are used to immediacy of response across a range of media (Pedro, 2006). Such characteristics clearly present significant challenges to traditional forms of education and indeed distance learning up until now.

The implications for Higher Education in particular in the near future will be profound as demand and expectations of the technology-mix offered will be hugely increased. Online distributed education can expect current annual growth rates to possibly exceed their current level. By the middle of the first decade of the 21st century growth rates for online enrolments were over 20% per annum (Moloney & Oakley, 2006).
This is not a totally new phenomenon, by 2001 the EU was close to having all its schools connected to the Internet and although 80% were giving pupils real access by this stage, studies found that primary school access was considerably higher (Debande, 2004). In Canada, the countrywide SchoolNet Project originated in 1999, has long since established the goal of linking all schools and libraries to the Internet (Muirhead, 2005).

The result is that in the UK, 45% of teenage children now have online profiles (Redecker, 2008) and according to the Committee of Inquiry into the Changing Learner Experience (CICLE), (2009) the use of Web 2.0 technologies are pervasive across all age groups in the UK from 11-15 years old upwards. Digital literacy and its associated multi-tasking skills are common attributes of today’s youth and this too has implications for education. Young people on entering Higher Education are proficient in using a mobile phone at the same time as using a netbook for instant messaging and browsing the web to seek out information, whilst also listening to their MP3 player (Oblinger et al, 2001; Kirkwood, 2008).

Online educators are currently seeking means to how best engage with such mobile technologies and improve their own digital literacy (Kukulska-Hulme & Pettit, 2008). Such characteristics and initiatives are of importance, as according to Brown, (2001) students who preferred written communications had less of an ordeal transitioning to online learning, unlike those students who preferred oral communications and had been used to face-to-face classes. This has clear implications for the preparedness of students on application for online courses and the level of induction required.
'Net Geners' (Barnes et al, 2007) are education orientated with career ambition goals in their sights and so often want to do well at college. From their literature review (ibid, p. 2) it appears though that this generation still require digital literacy skills and critical thinking skills to be improved.

Bennett, Maton & Kervin, (2008) concur and also suggest the fostering this generation’s digital literacy skills to support their learning as being important. Nevertheless, to Net Geners multi-tasking is a way of life and so they will often discriminate between lesson tasks they see are relevant to their learning goals and those that are not. In some ways therefore they are more discerning in the use of their time on coursework than mainstream students, although to ‘digital immigrants’ (Prensky, 2001) they may just seem often distracted.

A number of institutions across the globe have being positioning themselves to respond to the developing needs and demands of these young adults and the anticipated technology orientated graduates required to meet the needs of the 21st century ‘knowledge economy’ (QAA, Scotland, 2007). Several of these new technology-orientated institutions have been identified in Canada (Acadia University and University of Ontario Institute of Technology, UOIT) by Muirhead, (2005).

More widely, all universities in the western world have had to change their usage of ICT to reflect wider changes in society (Kirkwood, 2008). But part of the challenge in catering for the ‘net generation’ (Shephard et al, 2007) is that they are increasingly using technology in ways that make little sense to older learners in their group and often their tutors too. As an online practitioner then it is essential that one fully understands the needs of this cohort and the resulting pedagogy is balanced against the wider needs of older learners. However, widespread revision of the curricula is not required according to the findings (n=2120) of Kennedy et al, (2008).
It needs to be remembered that one of the major growth areas in online learning is occurring within lifelong learners (predominantly adult returners) as employees in an increasingly globalised world needing to update their skills as and when required by their employers (Britain & Liber, 1999). Both this lifelong learning component of the online learning market and those students more easily defined as 'digital natives' or 'new millennium learners' will require to work effectively together on the modern online course.

Furthermore, one of the overriding findings by Kennedy et al, (2008) was that even within Prensky's 'Digital Native' generation there were many different levels of abilities and experience and so they were said to "...so obviously speak with a variety of tongues." (ibid, p.117).

Bennett, et al, (2008) concur and find little evidence (from the literature) to support a homogeneous generation of 'digital natives' but instead point to the differences being more of a challenge to educators than the similarities. Although technology is embedded in their lifestyles their levels of skills and experience differ from individual to individual.

Recent research has actually suggested that 'technical knowledge' (Schrum & Hong, 2002, p.9) and 'information literacy' (Kirkwood, 2008, p.373) are distinct advantages in progressing online education courses, as students will face a 'significant challenge' if they have to learn about the technology at the same time as trying to learn the content. Digital natives, it seems, will have distinct advantages in registering on e-learning courses in the coming years.

They will of course bring their own challenges and may come with an expectancy to discuss issues in detail, by text, online. The 'net generation' are used to seeking out alternative views and also challenging the status quo and authority (Weller, 2007).
This is a cultural issue influenced by net culture and its values and notions of innovation, as well as open source content (ibid, p.155). Further complicating the future of e-learning according to Weller, (2007) is the over-riding theme within the net culture of decentralisation and the implications that this must have for centralised models of education. McLoughlin & Lee, (2010) and Redecker, (2008) concur and emphasise the need for a move towards personal learning spaces where the learner plays more of a central role in the learning experience.

In personal learning spaces a social network may be built around common learning interests. This raises the question whether centralised management systems can be controlled from the centre (such as VLEs) and survive the digital native or indeed the new millennium learner. Kennedy et al, (2008) raise an important point for the digital age and the digital natives. In their study (n=2120) the majority of students wished to embrace podcasting as part of their studies, however, 40% were uncertain or opposed to using such technology within their learning environment. The important point is one of equity, if a course develops rapidly using new technologies it may leave many of its learners behind, who do not feel that that their learning needs are actually being met in the form that suits their individual learning needs. Ultimately the challenge is how to best cater for this diversity of needs in the 'Information Society' where multiple technologies prevail (ibid, p.118).

Prensky, (2008) describes a scenario where teachers, whom he refers to as digital immigrants (Prensky, 2001) instead of preparing students for their future careers are instead providing them with 'back-up' education (of relevance to the past) using methods that today's kids would only need to know about in emergencies (i.e. when their technology is down).
In short, Prensky, (2008) is of the opinion that traditional methods in education (back-up education) should be phased out as soon as possible for the future benefit of the ‘digital native’ generation.

In summary, the literature universally points to a vast influx of new young learners who are immersed in technology. There are differing views on their demands and need for change in the education sector in response to this new growth client group. It seems that this new group of learners are not a homogeneous group and have differing levels of skills and so inclusive (using lesser levels of new technology) approaches should be the ones that are taken forward.

That said, most notably, Prensky, (2001) the originator of the ‘digital natives’ term that has become increasingly a mainstream label, is adamant that the education sector needs to begin its high-technology transition now, rather than later.

4.7 Student retention

Writing on the subject of student retention, Carr, (2000, p.1) asked, in her view, the ‘critical question’ regarding student withdrawals from online courses – i.e. whether students leave because of busy schedules or because of inexperienced online tutors?

According to Levy, (2007) there is a clear consensus in the literature on the dropping-out of students from distance learning courses. This consensus is that it is ‘...a difficult and perplexing phenomenon’ (ibid, p.187). Such dropouts are documented according to Levy, (2007) as being 25-40% for e-learning courses and 10-20% for on-campus courses.
In some instances where online courses have been provided by training centres, loss rates have been more than 50%, whilst only around 10% for standard onsite equivalent courses (ibid, p.186). Carr, (2000) in speaking to several ‘administrators’ reported that the dropout rate from distance learning courses was 10-20% higher than that of traditional face-to-face courses.

The dropout rate is also reported to be higher from online courses than it is from interactive video-conferencing courses (Robyler et al, 2007). This was also illustrated by Carr, (2000) who highlighted a completion rate for video-conferencing courses of 77% as opposed to internet courses of 58% during the ‘Fall’ 1999-2000 term at Tyler Community College, Texas.

Sun et al, (2008) contribute to the debate by making an important point stating that actually little is known on why some users dropout from their online courses after often only a brief initial experience.

It is the knock-on effects of this student drop-out that we will consider specifically in this section. Yet it needs to be remembered that those that do dropout may not be lost for good. Harrison, (2006) undertook research on first-year undergraduate withdrawal (n=151) and found that 67% of those surveyed intended to come back into Higher Education in the following academic year and only 10% indicated they would not return to Higher Education in the future. The point was also made (ibid, p.388) that non-traditional students were just as likely to return as those from more traditional first-year student backgrounds.

Increasingly it appears that in dealing with student retention, course teams and faculty must engage with students from the moment of enquiry onwards.
Throughout this document there are pointers to the importance of preparedness, ICT & study skills and induction that can impact on whether new entrants 'stay the course' or not. For example Motteram and Forrester, (2005) in reporting their research findings (n= 27) related to induction for online learners, emphasise the importance of online induction in successfully introducing students to their new learning environment, preparing them for the level of self-motivation and discipline required and also introducing them to online groupwork activities (e.g. each student's introduction to their peers). The clarification of ground rules, social norms and protocols are also identified as areas requiring clarification during induction (ibid, p.291).

Chyung et al, (1998) in examining data from the US Department of Education found that student satisfaction in the first and second week of the Higher Education experience was a critical indicator in the persistence of students and so a predictor of student resilience. Similarly, Salmon, (2003) suggests that timing is very important for new online students. Late starters tend to be much more passive learners and likely to 'lurk' on their courses which changes the nature of their experience and that of others.

Ultimately, the amount of time needed to get used to communicating online is an important factor for students, according to Salmon, (2003) and should not be underestimated. In addition, digital illiteracy must be addresses at a very early stage. It commonly takes the form of the following deficiencies in the context of new-entrant e-learners: a lack of ability to search effectively on the internet; a lack of ability in being able to authenticate and critically evaluate what information is found and how appropriate it is for use in the academic context; a lack of understanding of what constitutes plagiarism; and a lack of ability to manage effectively the vast amount of information available on the internet (CICLE, 2009).
As Swan et al, (2000, p.380) points out ‘community building’ cannot even hope to take place until the student feels comfortable with online environment and associated technologies.

Schmidt & Werner, (2007) point to readiness, academic discipline and motivation as being essential for students in preparing for the demands of e-learning. In particular (ibid, p.75) techniques that foster and encourage student motivation (e.g. the encouragement of recognised experts in the field to partake in course content) are considered to be essential within e-learning courses. Carr, (2000) on the other hand points squarely to the level of engagement achieved by online tutors with their cohort as being of key importance to a low level of attrition. A faculty member being interviewed relayed a jump in completion from 62% to 90% simply by utilising more interactive software and so engaging his student group more extensively than previously.

Mayes, (2001) makes the point (although not referring to direct evidence) that many e-learning courses are failing to meet the raised expectations of students and so are suffering from unacceptably high dropout rates.

Hara & Kling, (2000) point to need for students and staff to manage their expectations better, to avoid anxiety and confusion leading to student dissatisfaction. Chaney et al, (2009, p.229) also highlight the issue of student expectations and the need to manage these expectations effectively, recommending that this should originate from the faculty level if high quality is to be achieved. Procedures must be put in place by faculty to help failing students as highlighted by Sax, (2003) who makes the point that students may find it very difficult to ask for help and will often view the very process of asking for help as admitting to failure.
Wiesenber & Stacey, (2005) point to new entrants on online courses being anxious about their ability to learn online and so may need additional upfront support from tutors in the first several weeks. In addition, technical difficulties and initial feelings of isolation could compound initial doubts. Ultimately the creation of an online class/community that feels safe, interconnected and navigable in which students could grow to become an effective online communicator was seen as being crucial to the retention of new students and their eventual resilience and success on their chosen course. Richardson & Swan, (2003) and Drouin, (2008) concur and highlight the need for social presence and interaction, based on their respective research, to be built into the design and instruction of online e-learning courses.

Harrison, (2006) takes this thinking even further and asserts that faculty must understand that students are tied to institutions by a network of connections of differing strengths that relate to academic, social and personal links.

Students only persist within a Higher Education environment if these links have the necessary depth and breadth (ibid. p.389). Drouin, (2008) intuitively represents this change by discussing the transition from a learning community to a community of learners. Skinner, (2009) likens the learning community to that of a local community and highlights just how important inclusion is in both instances. Confidence is developed out of participation in communities and so remaining outside such communities of practice can lead to students missing out on developing key skills and knowledge.

Within the e-learning context, findings by Schrum & Hong, (2002) established that the more difficulty that students had in accessing the required technology for the course the more likely they were to find reasons to drop out of their course. Access to appropriate technology at home or work was found to be a crucial element in the success of online learners.
Levy, (2007) points to the need for course designers and instructors to be fully conversant with the factors that lead to dropouts in order to enable a better support regime for such students to be implemented. For example, findings by Chyung et al's (1998) research showed that 42% of the students that dropped out of the 'IPT distance programme' did so due to 'dissatisfaction with the learning environment' (ibid, p.98).

Further research by Dahl, (2005) found that most of those students who drop out of online learning appeared not be prepared for it in the first instance and he suggests an online readiness quiz would be a very useful tool to enhance retention. Such a tool is also suggested by Cowan and Duggleby (2005), Meyer, (2003), Pillay et al, (2007) and Holsapple & Lee-Post (2006).

Ostlund, (2008) similarly states that it is essential that course teams must be informed of students needs and preferences and understand their level of experience with online learning, as they join the course for the first time. Appropriate design is dependent on such knowledge. Yet when quizzing online tutors (albeit only eight of them) Keeton, (2004) found that tutors considered that the assessment of student readiness was not something that tutors considered to be part of their job description.

As mentioned above, dropout rates appear significantly higher for students attending online courses than for those studying on-campus and there is a link between this higher dropout rate and levels of student satisfaction according to Levy, (2007). However, this link is by no means universally established. Fillion et al, (2009) and Karatas & Simsek, (2009) both found for example that online students actually had enhanced satisfaction rates in comparison with on-campus students.
Student satisfaction rates in turn have been associated with the level of instructional interaction present, the organisation and presentation of the course, student motivation, effective use of a Course Management System (CMS), activities and levels of interactivity, the design and the support systems in place and the relevance of the e-learning course. (Shea et al, 2003; JMU, 2003; 2007; Park & Choi, 2009; Fillion et al, 2009; Fabry, 2009).

Levy, (2007) undertook a study in this area when he surveyed students from 18 different e-learning courses and gained a total of (n=372) responses. The dropout rate of 18% was found to be significantly higher than the 8% of students studying on-campus dropping out.

Another study of note at James Madison University (JMU) in Virginia (2003) found that of the e-learning students (n=375) surveyed that responded, 26% dropped out compared with only 3% of the campus-based students. In addition, Blackmore et al (2008) identified a similar dropout rate of 24% in the European SEPTIMUS e-learning psychotherapy course. This was considered to be at the 'lower end of the normal range' (ibid, p191).

Park & Choi, (2009) report a higher online dropout rate of 54.2% from 'a large Midwestern university' who enrol non-traditional adult returners in job-related subjects. This rate of dropout was considered to be an area of concern by the institution involved. Only 107 out of 234 enrolled participants completed their courses between 2005-07.

Bishop et al, (2007) report an on Economics course withdrawal rate of 37% from the online sections in comparison to only 3% from the face-to-face sections. Of particular concern was an increasing withdrawal rate of 45% in year 2 and 53% in year 3. Xenos, (2004) reports a dropout rate of 28% over a period of three years (2001-04) in an online 'Informatics' course.
Finally, Carr, (2000) reports on a comparison of internet-based courses with traditional courses offered from a community college in Texas:

"...at Tyler, one of Texas' largest community colleges, the course-completion rate for the 35 Internet courses offered last fall was 58 percent, while for traditional courses the rate was 71 percent." (p.3)

In short, the surveys mentioned above, provide evidence of the higher dropout rate experienced by e-learners compared to on-campus students, yet Carr, (2000) does urge caution in making comparisons between differing institutions as measures of student retention often differ between differing institutions. This very point was made by UHI's Executive Office in providing the following statistics. Within the UHI context the dropout rate for the three main undergraduate online e-learning degree courses averaged 37.5% over the three years 2007-2010. In comparison three face-to-face courses at UHI were found to have an average dropout rate of 22.6% over the same three years. The completion rate in the UHI instance for face-to-face learners is 14.9% greater.

In the UHI instance, its mission in widening access to Higher Education opportunities for those people in remote/rural areas and its resulting high rate of adult returners (with non-traditional entry qualifications) tend to skew its retention rates downwards for both face-to-face and online courses alike. Such students seek primarily flexibility and convenience in attendance to fit their studies around due to work and family responsibilities (Dobbs et al, 2009; Wickersham & McGee, 2008) and so are prone to changes in circumstances impacting on their studies. Yet, in the view of Carr, (2000) 'gifted instructors' can always find a means to address such potential dropout issues. Central to this is their building of a social presence with their student group and clearly letting students know what is expected of them.
With this increasing recognition of high dropout rates and links between satisfaction and dropout being established, then it seems more important than ever for the sector to investigate further what exactly makes a quality experience to enhance student satisfaction and so help reduce dropout rates in e-Learning. Only by fully understanding the issues can faculty and institutions fully address the 'waste' resulting from such dropouts. Bernard et al, (2004) highlight the differences in learning style between online students and face-to-face students, their personality characteristics, the isolation felt by home-based learners, their lack of self management skills and independent learning skills, as being factors that account for their higher attrition rate than those students based on-campus.

However, Park & Choi, (2009) in their study of participants (n=147) on a failing online course found that the individual characteristics of those students dropping out (in terms of the dropout percentage) did not differ from those persisting. Factors such as age, gender and educational level did not appear to affect the resilience of students. Yet factors found to be significantly different were the levels of family and organisational support provide from external sources. Park & Choi, (2009) suggest that given their findings, course administrators and instructors need in the first instance to consider these external factors that may impact on student's abilities to participate and persist. To counter these significant external effects the additional provisioning of learner support was recommended. It is up to course teams to provide extra attention, use appropriate motivational strategies and provide additional internal support as required.

Within the adult online learning market where such effects are widespread and previously documented, Park & Choi, (2009) and Ostlund, (2008) suggest that instructional designers must take into account these external factors in order to initiate a form of online e-learning appropriate to such a student group’s needs.
That said, Diaz, (2002) provides an alternative explanation of the high dropout rate of online adult returners. He suggests that their higher dropout rates are not necessarily due to a failure of the learner or indeed of the education provider, but more to do with the experience of the students in question and their more realistic assessment of the work-life balance. As pressure mounts they make a well informed choice associated with their past life (and/ or academic) experience and dropout rather than attain a poor grade or fail. On the other hand, Holder, (2007) reports on three skills that relate to persistence in online learning (derived from the literature):

1. being able to make the most of bad situations,
2. the ability to make things better,
3. the ability to persist and work through difficulties.

Ultimately, in his own research (n= 259) Holder, (2007) found that the presence of a supportive group of friends and family was a significant function of student persistence. It is a means to address the potential isolation of the online learner. Students persisting on online courses displayed better time management and better study habits than those who dropped out.

His research did not find a significant difference between those students that persisted and those that dropped out. Of particular interest was the finding that more independent students, who had good skills and preferred to work alone, were in actual fact more likely to drop out from online courses. Such students on online courses where interaction is a central feature, could perceive a loss of freedom and independence and so be disappointed and therefore be more likely to dropout (ibid, p.257).
Meanwhile, Youn & Vachon, (2005) in a study of graduate level students (n=249) on an e-learning course at a US University found that there were 5 dropouts during the term, 3 dropouts were due to increased family/work demands, 1 dropped out due to financial problems and 1 dropped out due to a change in focus of career. Yet, this is a 98% completion rate and arguably not typical for e-learning courses in general.

Of particular interest in the context of this research study is that Youn & Vachon, (2005) advise institutions and programme managers to separate unhealthy attrition (withdrawals that could have been prevented) with healthy attrition (expected withdrawals). A subsequent focus could then concentrate on the dissatisfying factors of unhealthy attrition and aims to negate their dissatisfying factors. The two most critical dissatisfying factors identified by the Youn & Vachon, (2005) study into e-learning are lack of online instructor participation and a lack of structure, direction and so expectation which has failed to be provided by instructors. The importance of the role of the online instructor will be investigated as part of this current study to gauge the universality of these findings.

Lu & Chiou, (2010) studied associations between course criteria and student satisfaction levels and suggests that both part-time and female online students require more student attention from their tutors due to their lower perceptions of 'predictors' (ibid, p.321) that may lead to student satisfaction. On the other hand, Yukselturk & Bulut, (2009) found no evidence to suggest that females should be treated different from males within online environments.

With regard to critical factors that influence the persistence of learners, Park & Choi, (2009) highlight the issue of course relevance and the impact that this can have on the motivation of learners.
If enrolled adult learners do not find that the course that they have enrolled on is what they expected, and is relevant to their needs, they will tend to drop-off quite quickly. Younger undergraduate students tend to have a different motivation and are in the business of getting a degree and even if it is not exactly what they expected they tend to persist and then go on to specialise at post graduate level.

Rovai & Jordan, (2007) suggest something very similar as being at the heart of online Higher Education dropouts. They suggest that courses suffering high dropouts should look at their online design and the often ambiguous instructions posted for students coming on to modules or indeed during their modules. This can be traced, in their view, to the pedagogy (or lack of it) being employed by members of online course teams who do not have the skills or commitment to facilitate effective e-learning or indeed build an online community of learners. This latter issue in their view leads to the persistence of a low sense of community in which students tend to feel isolated and so at-risk of becoming dropouts.

Park & Choi, (2009) sum up their research by indicating that the two crucial factors impacting on retention are 1) student satisfaction with their course, which arguably is enhanced through increasing quality, and 2) relevance of the course content to their perceived learning needs. Improving design and pedagogy and undertaking research and activities with students that links or contextualises their studies with real situations and real people, is of benefit to student motivation and so persistence.

However, as Xenos, (2004) points out, in situations where academic leaders are overseeing groups of online tutors on networked courses who each in turn have multiple classes of up to 30 students and more, the logistics and ability to make appropriate decisions can be very difficult as the student cohort is large and diverse.
In such a scenario the most appropriate educational approaches may be difficult and so lead to ultimately a higher level of dropouts. In this model the individual module tutor must assess their cohort's needs and abilities and guide them towards the right choices and decisions and the academic leader requires to engage in predictive modelling to effectively identify and manage dropout risk amongst individuals and groups. This early identification of risk (in this case by predictive modelling) is also considered a key element in online student retention by Lykourentzou et al, (2009) who emphasises both the prompt and early identification of students at risk of dropout as being essential to improving retention.

Of most importance in the dropout context according to the specific research findings (n=1230) of Lykourentzou et al, (2009) is the age of the students, their prior academic performance and the level of previous experience with computers. These are all attributes that will be investigated further as part of this current research study.

In summary, the literature identifies a high level of student attrition from online courses across the world and collectively the literature does identify a series of priorities that can be implemented to make an impact on dropout rates from online courses.

4.8 Staff, faculties and best practice

Throughout the literature a recurring theme is the role of staff and faculties in supplying a quality product to the end user / student / client. With the constant advance of technology this 'quality product' is arguably a moving target, as clearly one might argue that pedagogy must also change with technology.
"Challenges such as the 'massification' of higher education, rising class sizes, the growth of the quality agenda and pressure to maintain a research profile are having an impact on academics' perceptions of their teaching role." (Hanson, 2009, p.554)

To gain a notion of what 'best practice' might be, some well known authors came together in 2001 to consider just what the 'competencies for online teaching' actually include. Goodyear et al, (2001, p.69) identified the main roles of the online tutor as follows:

Roles involved in online teaching (Goodyear et al, (2001):

- **Manager/Administrator**
- **Technologist**
- **Assessor**
- **Designer**
- **Reducer/Assessor**
- **Content Facilitator**
- **Process Facilitator**

Figure 4.2

It is clear that the level of non-teaching involvement of the online tutor displayed in figure 4.1 is varied and far reaching and so may appear to be a significant influence on the ability to deliver online learning effectively.

When combined with the interactive constructivist teaching strategies pursued by many online tutors, that can create a higher workload for online tutors (Thompson, 2004), the extent of the challenge for faculty becomes clear. The role of the tutor as a teaching presence in online education is currently a further challenge facing tutors themselves as they seek to better define their role (Hult et al, 2005).
Indeed given the move towards networked collaborative teaching and the implementation of many new forms of ICT into teaching, one would need to presuppose the re-education of teachers within such a context (Levinsen, 2007). O’Quinn & Corry, (2002) suggest that faculty should provide extra time or a stipend for staff engaged in online teaching to ensure that a valid and current learning experience is provided to students.

However, according to the findings of France and Fletcher (2007) the main obstacles to developing and delivering a quality e-learning experience in the UK are associated with the time required to learn new software skills, develop new materials and become familiar with the appropriate pedagogies for e-Learning.

In many instances these findings found that staff felt that this time commitment for learning and training was not fully understood by their institution and that as a result they felt undervalued. Such complexities of the online tutor have the potential to lead to tutor burnout according to Hogan & McKnight, (2007).

“Burnout is a syndrome of emotional exhaustion, depersonalisation, and reduced personal accomplishment that can occur among individuals who work with people in some capacity. A key aspect of the burnout syndrome is increased feelings of emotional exhaustion - as emotional resources are depleted, workers feel they are no longer able to give of themselves at a psychological level. Another aspect of the burnout syndrome is the development of depersonalization, that is, negative, cynical attitudes and feelings about one’s clients. This callous or even dehumanized perception of others can lead staff members to view their clients as somehow deserving of their troubles.....” (Maslach Burnout Inventory, 2010)

And yet, as Macpherson & Nunes, (2008) point out, specific staff skills and experience are critically associated with the success of e-learning which is more time-consuming than its face to face counterpart.
Gibbs & Gosper, (2006) specifically discuss the 'time consuming nature of learning and teaching online' (p.47) and the 'much higher staff workload than face-to-face' (p.50) that online teaching involves. They recognise that even making small changes to written content can be 'excessively time consuming' (p.50).

Preparation time for face-to-face has been found to take 6.5-7.5 hours per week, whilst some estimates of preparation time for online teaching take roughly three times as long and requires 18-19 hours per week (Palloff & Pratt, 2001). Similarly, to try and quantify the time overhead for online tutors, Lazarus, (2003) measured tutor involvement on a weekly basis with individual online courses. She found that the required time to teach individual online courses ranged from 206–414 minutes per week. Her research (n=75) concluded that the actual 'teaching' of online courses took between 3.5 and 7 hours per week. Factors such as content, type and level of course, course design and the student cohort all influenced the level of tutor engagement required according to the research (ibid, p.53).

In another study, that combined some of the multiple roles of the online tutor, by Connolly et al, (2007) it was found that in some instances the other 'non-teaching' elements such providing guidance and support to students, when combined with moderating and marking was taking 'at least 30 hours per week'. Most tutors found online modules more time consuming with additional demands for pastoral care and encouragement being key time-consuming overheads (ibid, p.51). Buchanan, (2000) points to a series of support functions that can be put in place to assist reduce staff overheads. These include the setting up of free-phone telephone numbers specifically for distance learning students, specific help email addresses, named contacts for particular service questions, photographic ID cards for students who do not get inducted on-campus, accessibility to core books for each module online (or through delivery-free suppliers).
According to Fein & Logan, (2003), Fish & Wickersham (2009) and McAlister et al (2001) staff engaging with online learning need to think very differently, they need to learn a range of technical skills and engage with faculty in the on-going design and development efforts of the online content.

They need to be both teacher and learner whilst also providing technical support to their clients and receive technical support themselves from in-house ICT specialists, where and when required. For some members of faculty this may be an overwhelming challenge. Ultimately, online environments are a very different medium from the traditional classroom that required a very different approach to be successful.

"...it is vital that institutions of higher learning change their traditional practices rather than continue operating as "normal" while adding the huge responsibility of online teaching to an already heavy workload." (Fish & Wickersham, 2009, p.283)

Similarly, Paechter et al, (2010) outline what they consider to be the 'additional tasks' (p.228) required by online tutors. The development of new material, its design, its structuring and fit, the development of self-tests for students, online collaboration with students and the stimulation of peer collaboration amongst students are specifically identified. The requirement for such tutors to be provided with the expertise in these areas is also emphasised from findings from their study. As Rennie, (2005) indicates the modern day online tutor must be extremely organised to fulfil his/her multiple roles and facilitate online learners to learn within the online learning environment. Given the extent of the challenge for traditional teaching staff, Fein & Logan, (2003), emphasise that it is important that staff that are engaged with online learning are doing do because they want to work in this field, and are supported to do so.
Even the time that is available is changed for online tutors according to Thompson, (2004). The chunking or format of tasks related to online learning (such as checking and responding to emails throughout the day and week) brings problems of their own for those staff with other professional responsibilities. Uninterrupted time available to online tutors tends to be much less and so available time is chopped-up into shorter less-productive periods. This impacts, for example, on professional or academic possibilities for writing and content production.

However, the issue of just how content-driven online courses should be is a continually contested area. In her Canadian-based study (n=5), Conrad, (2004) found that online tutors remained focused on content delivery and concerned about transmitting content to learners. Tutors remained content-driven, even although now working in online environments.

How this content development and delivery focus can be balanced with the construction of a suitably strong social environment incorporating a community of learners was a concern (ibid, p.42). Hodgson & Watland, (2004) also refer to UK courses in this context as remaining focussed on the transmission of content and knowledge and not on networked management learning strategies.

Furthermore, according to Peltier et al (2003) the online tutor delivering e-learning content will have a quite different role from the traditional face-to-face educator.

"...the need for guidance, warmth, rapport and motivational skills are a high priority for online educators." Peltier et al (2003, p.265)

Within the e-learning context the tutor should develop an engaged relationship with the off-campus student group. Yet, students themselves are often not sure of the tutor's role in online learning and not sure what level and type of support to expect from them, according to the findings (n=19) of Gilbert et al, (2007).
Gu, (2006) makes the very valid point that although most online programmes are simply a transference of materials that work in the classroom, this is not necessarily an appropriate design philosophy. What works in the classroom face-to-face with a tutor will not necessarily work at home face-to-face with a computer.

In terms of managing and guiding the staff approach one of the key questions asked in the literature from a staff best-practice perspective is articulated by Jameson et al, (2006) who question the best way to manage and lead networked inter-institutional e-learning teams. In answering the question (ibid, p.959-960) they point to the need for a leader to have a grasp of strategy, project management skills and the vision to take e-learning forward, which often involves sometimes radical innovations in short time periods. In terms of overall responsibilities a devolved, proactive team working approach combined with a team-based collaborative leadership model is suggested as the most effective approach. However, distributed leadership is not always easy to achieve in the academic context as recognising ‘expert authority’ is often difficult across geographic boundaries in particular (Lorenzetti, 2006).

In terms of managing student feedback, which is surely part of the quality monitoring process, a study on four UK Higher Education institutions by Jara & Mellor, (2010) found that online courses received a low number of feedback responses and that there was often the lack of a clear strategy for collecting and processing results. Staff, often located at multiple campuses and possibly employed part-time or less, reported that they were not fully aware of the procedures for attaining appropriate course/module feedback for quality purposes. The consequence of such low feedback has been a lack of analysis and loss of findings due to a lack of clear analysis procedures and a lack of responsibility amongst staff.
In instances where a single course team member was in charge of the whole process from the design of the questionnaire to its collection and analysis, levels of feedback reporting was noticeably enhanced (ibid, p.712).

Finally, with regard to the optimum class size for e-learning to encourage best practice, Rovai, (2002) suggests that a minimum online class size of 10 students is required to generate a meaningful community of learners. At the other end of the scale he recommends maximum class size 20-30 students. Rovai, (2002) points out that there are means to manage larger class sizes that faculty could consider and one such means is to use ‘teaching assistants’ (ibid, p.11) to facilitate and monitor discussion board debate. Goodyear et al, (2001) report the UK Open University works to an average of 25 students per online teaching group. In the US the (for-profit) University of Phoenix works to an average of 8-15 students per online class.

It is clear that when reviewing the literature revolving around staff experiences with online learning, faculty and the sharing of best practice, much of the discussion is dominated by the time consuming nature of online teaching and the need for more time from faculty to avoid burnout. Time for sharing best practice is largely considered an additional overhead except for those able to be provided with the ‘headspace’ to write academic papers for publishing to relay their experiences.

Nichols, (2008) suggests that it is only when online education has been properly embedded at the institutional level, that a move away from change management and lobbying can be converted into a focus on innovation. Online education needs to become viewed as a core and sustainable institutional service rather than a peripheral function (ibid, p.607) and successful cultural change is part of the integration of online education into mainstream institutional activities (Mitchell, 2009).
Chapter 5 – Methodology & Theoretical Approach

5.1 Purpose and design

The framework for this research has been formed from that recommended as being best practice in the conduct of 'hypothetico-deductive' scientific research in the organisational sciences by Fillion, (2004, p.49-50). This approach lends itself to undertaking a meta analysis of the literature and clearly articulating the most suitable methodological approaches to underlie the research process being undertaken. In terms of the theoretical background, a number of common problems have been identified in distance education research which are considered to have impacted on its value (Bernard et al, 2004b, p.175-76). Primary amongst these problems are issues of quality and its impact on the student experience and ultimately student retention.

An examination of the retention figures in the UHI instance points to one of the primary motivations for this research and many other such studies in the literature.

A lower completion rate amongst e-learning students, in comparison to those on face-to-face based courses at the undergraduate level, is widely apparent. Refer to Table 5.1 below:

Table 5.1:

<table>
<thead>
<tr>
<th>ONLINE DEGREES</th>
<th>STUDENT NUMBERS</th>
<th>WITHDRAWAL &amp; NON-RETURNER RATES (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007-08</td>
<td>2008-09</td>
</tr>
<tr>
<td>Degree Course X BA (Hons)</td>
<td>315</td>
<td>333</td>
</tr>
<tr>
<td>Degree Course Y BA</td>
<td>134</td>
<td>103</td>
</tr>
<tr>
<td>Degree Course Z BSc (Hons)</td>
<td>46</td>
<td>58</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FACE TO FACE DEGREES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Course X1 BA (Hons)</td>
</tr>
<tr>
<td>Degree Course Y1 BA (Hons)</td>
</tr>
<tr>
<td>*Degree Course Z1 BA (Hons) /</td>
</tr>
<tr>
<td>67*</td>
</tr>
<tr>
<td>*Degree Course Z2 BSc</td>
</tr>
<tr>
<td>26.45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BLENDED LEARNING DEGREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Course X2 BSc (Hons)</td>
</tr>
</tbody>
</table>
This is a common phenomenon in the literature (JMU, 2003; Levy, 2007; Blackmore et al, 2008, Park & Choi, 2009). This could be related to the quality of online courses and teaching, in comparison to those taught face-to-face on campus and this may be a question for a follow-up study. The focus of this study will be to try to establish, in the first instance, if there are recognisable quality factors that influence the online learning experience across three institutions in Scotland, England and Ireland.

Quality teaching approaches in the classroom-based environment in Higher Education are already well established through, for example, the Quality Assurance Agency’s ‘Quality Management’ (Hodgkinson & Brown, 2003, p.339) initiatives across UK institutions aiming to both aid the achieving of institutional Higher Education goals whilst providing guidance on the quality of the processes required to achieve articulated goals. On the other hand, quality management and enhancement strategies for off-campus, online e-learners, is still very much in the pilot stage in the UK through primarily, JISC, in the Higher Education sector.

The purpose of this research is therefore to add to the debate on how best to achieve quality online e-learning and explore key factors which may contribute to this, based on findings across three separate educational institutions in the UK and Ireland.
5.2 The Sample

The subjects in the sample population for this research are Higher Education students studying online, or having had experience of studying online at selected institutions in Scotland, England and Ireland. A target response of between 200-300 individual questionnaire responses was sought. The actual sample total (N) was 509 although two of the questionnaires submitted were blank, leaving a usable population of n=507 upon which to draw generalisations from this study.

The mean age of participants in this study was 36 years old with a SD of 12.72. This statistic clearly points to the predominance of adult returners in this sample population. The Standard Deviation informs us that 68% of all participants in the survey were in the age range between 23 and 49 years old and suggests a similar finding to that found in interpreting the mean of this sample population. The range of the sample was from the age groups 15 years old through to 74 years old. The range in this sample population suggests a good cross-section of higher education students. Traditional (school-leaver) cohorts at UK universities predominately range in the 17 to 21 years old age group.

Participants in this research were from a range of different levels of study and also from different study groups in terms of mode of attendance. With regard to levels of study, 46% of students identified that they had been studying for a year or less, 25.9% had been studying between one and two years, 18.9% had been studying between two and three years, 6.5% had been studying between three and four years, and 2.4% had been studying for four years or more. The sample population was from a reasonable cross-section of levels of experience with higher education.
In total, 50.3% of students surveyed were full-time students and 43.4% were part-time students and/or those studying individual modules. A further 4.7% of students considered their study status to be neither of the above modes. A good representation of both full-time and part-time students was included in this sample population.

There were 112 males (33%) and 374 females (77%) in this sample population that disclosed their gender. 21 respondents declined to disclose their gender. This is a skewed result but this female bias is common to many other studies in the literature where female participants have been in a more than 60:40 (and often 70:30) majority (Chu, 2010; Ke & Xie, 2009; Rovai et al, 2009; Bradley et al, 2008; Ginns & Ellis, 2007; Garrison et al, 2010; Richardson & Ice, 2010, Weems et al, 2006; Hodge & Gillespie, 2007; Krause et al, 2009; Rabe-Hemp et al, 2009; Stodel et al, 2006 and Kuboni and Martin, 2004; McGill & Hobbs, 2007; Vaughan, 2010).

A study of online students at 226 separate institutions in North America by the US Department of Education during 2008-09, reported in the Chronicle of Higher Education, (2010), found that online courses were populated by a 63% women - 37% men split. Given this context the current skew in the sample population is not that surprising. According to Cassidy & Eachus, (2002) there is an increasing enrolment profile worldwide of more females in comparison to males. In short, given these findings it should, with some cautions, be possible to generalise the findings of this research to the wider university population.

Three distinct learning groups are represented in the sample population and the rationale for this approach is based around generating external validity for the data.
By sampling students in different countries it was anticipated that any cultural, infrastructural or institutional bias could be compensated for and the potential for the results to be generalised could be increased. That said, it was apparent from focus group sessions with students in each area and in discussions with course leaders in each area that what passed for online education (e-learning) in one country was not necessarily what was considered online e-learning in another country.

Refer back to section 1.2 for the definition(s) of online e-learners who are being targeted as being the focus of this study. However, the fact that these 'checks and balances' were apparent helps to balance the data and makes it more generally applicable to a wider population of 'online' e-learners.

In terms of overall numbers the return rate from the University of Gloucestershire (n=12) and University College, Dublin (n=16) was significantly less than that from UHI (n=444) and so any balancing effect to the data is likely to be minimal. A further 30 students who completed the survey were from other institutions and 5 students declined to provide any location/institutional data. The distribution to e-learners at each institution did vary and so such variance in completed questionnaire returns was not unexpected.

From the University of Gloucestershire 12 students out of a class of 25 online e-learners who were contacted by email, responded to the questionnaire. This is a 48% response rate. From University College, Dublin 16 students out of a class of 70 online e-learners who were contacted by email, responded to the questionnaire. At UCD the response rate was 23%. From the University of the Highlands & Islands (UHI), 444 students responded out of a potential cohort of online e-learners of 4787. This is a 9% response rate.
In the UHI instance, students were targeted to complete the questionnaire directly through the institution’s Virtual Learning Environment (VLE), ensuring that all respondents were regular and active online learners. The covering announcement and general information on the questionnaire clearly stated that this questionnaire was targeted only at these UHI students who have experience of participating in online modules.

Response rates to such similar Likert-scales vary in the literature. For example, Dennen, (2005) reports survey response rates between 5% and 60% in her survey of student’s comfort and experience with the online environment and its associated technologies. Lofstrom & Nevgi, (2007) report a student feedback level of 10% to a survey (partly Likert-scale questions) on learning in Virtual Learning Environments. In addition, Kanuka et al, (2008) consider a response rate of 31% to be a high response rate to a similar 5-point Likert-scale on e-learning.

The sample population for this study is drawn primarily from geographically remote, off-campus students. Only 7.5% of students in the survey reported that they attended any on-campus classes. In addition, all students that participated in the focus groups were off-campus adult-returner students.

Although the demographics of the sample population does fit with expectations presented in previous studies on online e-learners in the literature (Cassidy & Eachus, 2002; Spiceland & Hawkins, 2002; Sun et al, 2008; Park & Choi, 2009) it must be remembered that the population of learners who completed this questionnaire were self-selecting and so appropriate caution needs to be taken with any subsequent generalisations.
5.3 Data Capture Procedure

The focus (outlined above) on off-campus e-learners can be considered to be an addition to the existing research on online education, published in the literature. For example, Shih et al, (2008) reviewed 444 selected papers in the field of research and trends in e-learning between 2001-05 and found that a large number of existing studies within the field were still focusing on on-campus students and that more focus needed to be placed on off-campus adult learners in future studies.

Shih et al, (2008) also focused-in on the 16 most cited studies to examine the prevalent research methodology in the field. The majority (10/16) of studies were classified as descriptive research which they claimed was better able to accommodate a research design appropriate to both qualitative and quantitative research methods.

The authors (ibid) also claimed that such descriptive research methods should provide a valuable reference for researchers in this field looking to do further study. Notably, 10 out of the 16 most cited studies used questionnaires as their primary data collection method, often combined with a secondary method (interviews, testing, observation... etc). The current study uses a similar methodological focus as the majority of those top 16 most cited research exercises identified by Shih et al, (2008).

This study requires participants to complete a questionnaire tool as the primary data collection technique, complemented by a secondary data collection method, in the form of focus group interviews. Overall, the design applied was to ensure that this study is in accordance with established practice in the sector.
The focus group sessions consisted of semi-formal/informal discussions initially led by the researcher and subsequently opened up to wider less structured discussions. Notes were taken during these meetings and were written-up in the aftermath of the meetings. As suggested by Kitzinger (1995) and Gibbs (1997) this research approach sought to gain data from a series of focus group events where interaction between participants was stimulated, based on their shared experiences on the topics of interest. Focus groups can derive enhanced meaning and context in comparison to standardised surveys by engaging with participants in a social gathering where participant's social and cultural identity is strong (Gibbs, 1997; Rodriguez et al, 2011). This secondary data capture method was therefore considered highly relevant and complementary.

Such focus groups aim to attain information on attitudes, feelings, beliefs and direct experiences that other more conventional data collection methods (Likert questionnaires) are not able to tap into. As Kitzinger (1995, p.299) suggests, it is important to access information in a format ".....that people use in day to day interaction, including jokes, anecdotes, teasing, and arguing. Gaining access to such a variety of communication is useful because people’s knowledge and attitudes are not entirely encapsulated in reasoned responses to direct questions.”

This approach in using focus groups in combination with other methods is one increasingly found in the literature (Morgan, 1996). Section 5.5 reviews specifically the methodology of these Focus Groups as the secondary contributor to the research data being captured in this research project.

The methodology of the 16 most cited research studies (Shih et al, 2008) also highlighted that at least 5/16 studies used online logs or online messages as data sources for analysis. Thus, at the data-capture stage a further opportunity for student feedback in the form of qualitative data was identified.
As a result, the writer opened up an institutional Blog-feed on student experiences with online learning and encouraged students to feed-in additional qualitative data. Students did not however respond to this third opportunity to provide additional data and no further qualitative data was captured from this exercise. Students clearly did not respond to a more public forum in which to air their views on their online learning experiences. It may be partly due to 'survey fatigue' (Ramsden, 2008) as at the time of this blog feedback opportunity students had just been asked for their individual feedback on their modules from their first term of study during 2010-11.

This opportunity for qualitative data capture was in addition to opportunities given at the end of the main questionnaire to which students did respond and a significant amount of qualitative data was captured via an open-ended final question. This additional qualitative element added to Likert-scale surveys is a common research practice in the sector and found in studies by Stewart et al, (2004); Wu & Hiltz, (2004); Pearson & Trinidad, (2005); Evans, (2008); Farmer et al, (2008); Dermo, (2009); and Richardson & Ice, (2010).

This third method (open-ended online responses) allowed for a potential triangulation of the data gathered (Childs et al, 2005; Baran & Correia, 2009). JISC (2007d) in their paper on 'Methods for evaluating the learner experience of e-learning' point to the process of triangulation as a means to provide more trustworthy and persuasive results in comparison to those that rely on a single data-source. In this instance due to the lack of response to the blog feedback instrument a focus on the qualitative comments provided at the end of the main survey is being used as a third source of data.

As part of the refining of the data capture procedure, a review of the broad themes used to investigate e-learning was undertaken and note was made of a number of studies in the field.
One such study was of Scotland's schools and colleges by Davidson and Elliot, (2007) and their broad themes of investigation included: 'You and your institution; Usage of online resources; Improvements to the resources; Overall satisfaction with the resources'.

These themes are typical of a recent number of enquiries in the field, focusing on quality and satisfaction in online education. For example, Rovai et al, (2009) produced an 80-item instrument (reduced to 9 items in the final analysis) to measure learning in online (and face-to-face) courses. Ozkan & Koseler, (2009) produced a 47-item, six-measure instrument developed from existing literature to evaluate e-learning systems. Of similar note are the papers by Cassidy & Eachus, (2002) and also Bernard et al, (2004a) which outlined the development of a research instrument focused on computing self-efficacy and tested a subsequent research instrument as a means to assess achievement in online learning.

In addition, Stewart et al, (2004) detailed a process for taking forward and developing a research instrument in the e-learning field of study and their paper has been used as a checklist to detail the procedures undertaken in developing the questionnaire instrument which was used in this current study. The research questionnaire that was the main survey instrument used in the current study is of a similar nature, but subtly different, in the specific information it sought to acquire from participants in the questionnaire and draws upon previous research studies by Peltier et al (2002), Schrum & Hong, (2002), Pearson & Trinidad (2005), Sun et al, (2008), Lee et al, (2009a), Ginns & Ellis (2009) Richardson (2009) and Garrison et al, (2010), Teo, (2010) and Paechter et al, (2010).

For example, Teo, (2010) also recently completed a very interesting study testing 21 items on the acceptance of e-learning among university students using a newly developed 'E-Learning Acceptance Measure' (EIAM).
Ultimately, the main questionnaire research instrument used in this study attempted to gain new knowledge and establish a new more sophisticated measure of the influences on 'quality' in online education than is currently available. This quantitative data is to be complemented by two separate sources of qualitative data gained from focus group studies and data collected from an open-ended question at the end of the survey. The benefits of this triangulating effect are discussed above.

The main survey related to this research, as with the predominant survey instruments used in all these other studies that have focused upon questionnaire instruments, has done so using a number of Likert-scale measures. A completion rate of 80.3% for all elements of the survey questionnaire was achieved.

5.4 The Likert-scale & Analytical Methodologies

Likert-scales are one of the most commonly used methodologies in social science research and are widely used for measuring attitudes within a population sample (Carifio & Perla, 2008; Gob et al, 2007; Hodge & Gillespie, 2007). Not only are such scales commonly used, but their incidence of use appears to be increasing (Gob et al, 2007).

So, as per the sector norm, the questionnaire used for this research study will focus on the most popular five-to-seven Likert-scale item responses (Gob et al, 2007). In this research instance, a balanced ‘seesaw’ five-grade Likert-scale (McCall, 2001; Martens et al, 2007; Roblyer et al, 2007) item response approach was preferred (i.e. Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree). In several instances a complementary scale, also identified by McCall, (2001), has also been used (e.g. Very Poor, Poor, Fair, Good, Very Good). Questions are then often collated into 3-10-item measures in the literature (Stewart et al, 2004).
In this research, six 5-item measures were collated using the Likert response items to make a 30-point scale and additional demographic student information was gained using a 'circumstance and situational factors' section in the questionnaire. The use of such measures or linked collections of Likert-scale questions is fundamental to the analytical process of Likert-scales (Carifio & Perla, 2007). An additional opportunity for qualitative data capture was also provided at the end of the questionnaire in the form of a general comments section.

An initial set of seven 10-item Likert-scale measures was piloted. This was reduced to six, 6-item measures after testing and feedback by both eight students and five e-learning tutors and an educational technologist. To ensure a design approach that would also produce results applicable to recognised statistical techniques advice was also sought from a statistics specialist. The result of such consultations was a set of five, 5-item Likert measures and one 4-item measure. Following advice, a non-Likert question was modified and was added to complete the 30-item scale of six, 5-item, Likert measures. The individual Likert question items that make up each measure were formatted to predominantly seek student experience on the basis that '...self-reported behaviour is more useful as data than opinions that have an unknown basis in behaviour.' (Morgan, 1997, p.20). Further detail of this process is outlined in section 5.7.

An initial version of the questionnaire had a mix of both positively and negatively based questions to address issues of affirmation bias. Such a mix of positive and negatively formed (reversed) questions is common practice in the literature (Cassidy & Eachas, 2002; Stewart et al, 2004; Ginns & Ellis, 2007; Sun et al, 2008; Ginns & Ellis, 2009).
Although this practice is recommended by Carifio & Perla, (2007) it is questioned by Weems et al, (2006) in a study of undergraduate students (n=153) whose evidence casts doubts on the practice and suggests that such a mixing of question formats does not ‘represent best practice’. Hodge & Gillespie, (2007) also find evidence from the literature that suggests that the reliability and validity of Likert-scales is reduced in instances where complexity is added to questions through negative wording being added to scale-items.

After pilot testing, many of the questions in the survey at the centre of this research were considered to be of a complex format and feedback indicated that anything other than neutrally-worded questions appeared ‘leading’, ‘confusing’ and ‘time consuming’ according to students and experienced e-learning staff. The questions were therefore re-drafted to be neutral in presentation and consistently positive in articulation, all apart from one question which was derived from a non-Likert question. This latter case was the only ‘reversed’ question within the 35-item Likert questions presented to participants.

To attempt to counteract any potential affirmation bias that might result from this change, opinions were rated from left-to-right beginning with the ‘strongly disagree’ option as being the first category to be offered. According to Nicholls et al, (2006) a (countering) attentional bias may be found within Likert-scales due to reading habits and ‘right-hemisphere specialisation for spatial attention’ (p.1027) and so result in a stimulus for categories on the left of the page rather than on the right. In a study of undergraduate students (n=362) it was found that ‘strongly agree’ categories were inflated by 27% when placed on the left side of the response scale (ibid, p.1028).
"When people respond to Likert-scales, pseudo neglect may increase the salience of categories on the left relative to those on the right...If researchers want to paint a rosy picture, they should place the favourable categories on the left." (ibid, 2006, p.1027-8)

Hartley and Betts, (2009) found a similar effect in a study of survey participants (n=465) using the Likert-scale. Findings in this instance showed that Likert-scales starting with positive labels (e.g. Strongly Agree) on the left, produced significantly higher ratings than those that started with negative labels (e.g. Strongly Disagree). The Likert-item survey at the centre of this research has therefore attempted to balance any affirmation bias resulting from changes made in response to the pilot survey by counterbalancing such effects using attentional bias strategies.

This approach was targeted at increasing the construct validity of the main research survey. Validity informs the research and reviewer whether an item or scale measures or describes what it is supposed to (Bell, 1999). The overall content and construct validity (the extent to which the scales measure what the theory suggests it should) of the current questionnaire and the measures developed within, were formulated form an extensive literature review of over 570 largely peer-reviewed papers in online education and e-learning and further consideration along with direct consultations with e-learning students and practising online tutors and researchers.

Ecological validity (the degree to which the research results can be applied to the real life context) was undertaken by means of a presentation and discussion of the preliminary findings with a further six e-learning specialists and education technologists. Such approaches to validating Likert-scales are in-common, with many other researchers in the field (Stewart et al, 2004; Ginns & Ellis, 2007; Park & Choi, 2009; Teo, 2010).
To further test the robustness of such questionnaires it is normal practice in the e-learning researcher field to also apply parametric tests (e.g. exploratory or confirmatory factor analysis) to ‘confirm’ their validity. However, such a practice is not statistically valid if it is being applied to ordinal data originating from Likert-scales. A further discussion on this follows.

As Likert-scales produce ordinal data (Denscombe, 1998) it has been this former test and re-test method that has been employed to check for reliability in this study, rather than the more commonly used parametric alternative – Cronbach Alpha. As is accepted in the literature (Pell, 2005), some caution needs to be taken with this non-parametric approach, which is less powerful than parametric alternatives.

Reliability is the extent to which a test instrument or exercise can be replicated on separate occasions and produce the same results in all instances under the same conditions, applied to the same persons (Bell, 1999; George & Mallery, 2005). McCall, (2001) points out, it is essential that all Likert-scale exercises are tested for reliability to check internal consistency and repeatability. This can be done through test and re-testing or through the use of parametric testing using Cronbach’s alpha (Gliem & Gliem, 2003).

“Essentially, any research tool should provide the same information if used by different people (inter-rater reliability), or if it is used a different times, for example, on Friday morning and again on Sunday afternoon (test-retest reliability).” (Roberts et al, 2006, p.42)

To test the reliability of the summated Likert-scale measures (designed as part of this research) based on Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree, an ‘eyeball test’ on the nature of the errors found in the associated test-retest exercise was undertaken in the first instance.
Many of the errors appeared to be related to the strength of the opinion expressed and not largely due to differing interpretations of the questions leading to differing answers between the negative, neutral and positive options on the item scale.

Therefore in attempting to attain an accurate measure of the reliability of this questionnaire instrument, the Likert response scale was grouped into three cumulative measures (and percentages examined): Negative, Neutral and Positive. This is a commonly used and appropriate method to analyse such data (McCall, 2001; Ellis et al, 2009). This was applied across the six independent variable measures and the dependent variable measure and the cumulative reliability of the 6 measures used in this research study was measured at 94% (range 90% to 97%) and the reliability of the dependent variable was 97%.

The dependent variable measure was also made up of 5 individual Likert items, to maintain consistency with the six measures representing the independent variables. That is, after completing the research questionnaire once, the eight student subjects on re-testing the Likert measures the second time around (after a break), answered between 90-97% of Likert-scale choices the same as they chose the first time. This suggests a high level of reliability of the study questionnaire. These results are summarised in table 5.2.

An average reliability score of 78% was achieved from the original six non-collapsed scales (of grouped 5-question measures) representing the independent variables used within this research study. The range in reliability within the six non-collapsed scales varied from 70% (Measure 3) to 87% (Measure 4). A reliability score of 90% was achieved for the dependent variable measure.
Table 5.2 – Reliability Test-Retest Results – Percentage of Identical Responses

<table>
<thead>
<tr>
<th>Measure</th>
<th>Summarised Likert Groupings: Negative/Neutral/Positive (% similar)</th>
<th>5-Point Likert-scale Groupings: % identical in each of 5 summated items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure 1</td>
<td>95</td>
<td>80</td>
</tr>
<tr>
<td>Measure 2</td>
<td>92</td>
<td>80</td>
</tr>
<tr>
<td>Measure 3</td>
<td>90</td>
<td>70</td>
</tr>
<tr>
<td>Measure 4</td>
<td>97</td>
<td>87</td>
</tr>
<tr>
<td>Measure 5</td>
<td>100</td>
<td>82</td>
</tr>
<tr>
<td>Measure 6</td>
<td>90</td>
<td>72</td>
</tr>
<tr>
<td>Cumulative Reliability: All Measures</td>
<td>94</td>
<td>78</td>
</tr>
<tr>
<td>Dependent Variable – Quality &amp; Effectiveness</td>
<td>97</td>
<td>90</td>
</tr>
</tbody>
</table>

To further confirm these results a set of Spearman rho correlations were calculated from the test-retest results of each candidate. This is a common method of confirming the significance of such test-retest results in the social sciences:

“The correlation coefficient between repeated measurements is often called the reliability of the measurement method. It is widely used in the validation of psychological measures such as scales of anxiety and depression, where it is known as the test-retest reliability.” (Bland and Altman, 1996)

In all the eight test–retest results show the significance of the correlation between the first and second run through the questionnaire was significant at the level p<0.01. The strength of the associations are as follows:

Table 5.3 – Test-Retest: Level of Correlation

<table>
<thead>
<tr>
<th>Test Subject</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test-Retest Result (rho)</td>
<td>0.76</td>
<td>0.83</td>
<td>0.76</td>
<td>0.73</td>
<td>0.82</td>
<td>0.65</td>
<td>0.81</td>
<td>0.91</td>
</tr>
<tr>
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The full Spearman rho result tables for these statistics are included in appendix 4. These results indicate a strong level of reliability of the main survey’s Likert questions.
According to Cohen, (1988) whose guidelines on $r$ are widely adopted in the behavioural sciences the strength of relationship is considered large if $r$ (or rho) is equal to or between 0.5 and 1 and indeed will rarely go above 0.5. However, as Kraemer et al, (2003) argue, these standards would expect to be increased in the test-retest situation where ‘two variables measure the same construct’ (p.1525). These increased standards in the correlation coefficient are represented in table 5.3. These high levels of internal consistency in both instances suggest that the measures, (represented by summed Likert-scale items) used in this research study to represent the independent variables are reliable. Likewise, the high level of internal consistency measured for the dependent variable which measured ‘overall quality and effectiveness’ was deemed high and so reliable.

The reliability of the two additional triangulating qualitative data elements, in the form of focus group feedback and qualitative survey comments, were addressed by sending the raw data to an independent academic to verify how much agreement there is about the findings and analysis. This method (inter-rater reliability) is recommended by Roberts et al, (2006) and Cohen et al (2000) as a means to overcome research bias in the interpretation of qualitative data. The reliability of the coding and analysis were confirmed by an independent academic and comments and additions incorporated in the final analysis.

An additional method of adding reliability to qualitative data analysis, favoured by most online education authors (Fillion et al, 2009; Harrison, 2006; Wu & Hiltz, 2004), is the use of verbatim examples of participants’ comments with the caveat that these comments are not ‘cherry-picked’ (Roberts et al, 2006, p.44). This method will also be applied in this research study in reporting the qualitative elements of this data gathering exercise. Additional analysis on the reliability and validity of focus groups is outlined in section 5.5.1.
5.4.1 Ordinal data and Likert scales

In seeking to address the hypotheses posed, a brief overview of the methodological issues relating to the ordinal nature of Likert-scale data and its suitability for parametric testing is of central importance, to the application of subsequent statistical analysis techniques to the current research data collected. It is the correct application of these statistical techniques that will lead to the proving or disproving of the null-hypotheses correctly and so the avoidance of type I and type II errors.

It is stated by Gob et al, (2007) that there is no commonly accepted approach within the scientific community for analysis of Likert-scale responses. For over 50 years, there has been an on-going confusion on how Likert-scales should be used and analysed.

One part of the debate insists that Likert-scales produce ordinal data and so only non-parametric statistics should be used in analysing such data (Kuzon et al, 1996). Denscombe, (1998) explains that the only inference that can be legitimately measured from data obtained from Likert-scales is rank order. Ultimately, we do not know how much two separate points on the scale differ. On the other hand, there are also researchers that insist that collections of Likert items are interval in nature and so parametric statistical tests can be applied (Pell, 2005; Carifio & Perla, 2008).

The variation in approaches was highlighted in a study of the Journal of Agricultural Education by Clason & Dormody, (1994). A study of 95 articles using Likert-scale data showed that only 13% used non-parametric tests on the ordinal data resulting from Likert-scale research. In addition, 54% of research articles reported their findings using only descriptive statistics. No singular statistical test or approach was universally used to test Likert-scale data.
According to Kuzon et al, (1996) the first of the 'seven deadly sins of statistical analysis' is the use of parametric statistical tests to analyse ordinal data. As Jamieson, (2004) points out, correctly understanding the nature of Likert-scale data is important, as descriptive and inferential statistics differ for both ordinal and interval data. The response categories in Likert item scales have a rank order, but the intervals between these categories cannot be presumed to be equal, in Jamieson's view.

Likert-scales can lend themselves to straightforward analysis yet do not claim anything about the intervals between the categories assessed on each item. Yet possessing consistent, discernable and measurable intervals between each item option making up a scale (e.g. the interval between 'agree and neutral' and 'disagree and neutral' is not necessarily to be presumed equal) would be a necessity if such attitude assessments were to be viewed as producing 'interval data', according to Munn & Drever, (1996). Yet, it has become common practice for Likert-scale data to be considered to be interval data and so able to be subjected to parametric testing.

"Generally, it is not made clear by authors whether they are aware that some would regard this as illegitimate; no statement is made about an assumption of interval status for Likert data, and no argument made in support." (ibid, p.1212)

On the other hand, Carifio & Perla, (2008) are more relaxed about the need for such explanation on methods, as they are of the opinion that the evidence clearly supports the view that Likert-scale data is interval data. So if one is measuring more than one Likert-scale item, then one should be using the 'richer...more powerful' parametric statistics to analyse one's data. The use of multi-item scales are the norm and considered essential because:

"...single item reliabilities are generally very low, and without reliable items the validity of the item is poor at best and at worst unknown." (Gliem & Gliem, 2007, p. 84)
The enhanced power of parametric statistics was also focused upon by Pell, (2005) who recommends caution in drawing any inferences from any non-parametric test statistics that are close to the 'critical value' because of the lesser 'power' of non-parametric statistics. His view is that it is acceptable to use parametric data on Likert-scale data, but he does qualify this by saying this is true only if key criteria are met in advance (such as the size and shape of the data). However as both Jamieson, (2004) and Clason & Dormody, (1994) point out, it is difficult to envisage when Likert-scale data could be normally distributed, as it will frequently tend to be skewed and the extent of this skew may not even be fully captured by the Likert-scale. In further disagreement with the above stances of Carifio & Perla, (2008) and Pell, (2005) are Gob et al, (2007, p.603, p.609):

"Admissible statistics for ordinal data are frequencies, histograms and order statistics. Methods involving arithmetic or weighted means are appropriate for cardinal data, but they make no sense for the analysis of ordinal data...The problem of attitude measuring clearly suggests an ordinal interpretation of Likert-scales."

However, the extent and strength of the opposing opinions is characterised by previous writings on the subject by Carifio & Perla, (2007, p.115):

"If one is using a 5 to 7 Likert response format, and particularly so for items that resemble a Likert-like scale and factorially hold together as a scale or subscale reasonably well, then it is perfectly acceptable and correct to analyze the results at the (measurement) scale level using parametric analysis techniques.....Claims, assertions and arguments to the contrary are simply conceptually, logically, theoretically and empirically inaccurate and untrue and are current measurement and research myths and urban legends."

In some accepted and published scales in the medical profession such as the Hamilton Depression Scale, accepted practice sums the totals of responses to Likert 5-point scales to measure against recognised levels of depression (McCall, 2001). This clearly treats such data as being interval rather than being ordinal. This certainly does give some credence to the arguments based around Likert data being able to be used as interval scale data.
Nevertheless, McCall, (2001) concludes that researchers should ‘think twice’ before analysing summed or scaled Likert scores. In some instances he recommends instead the examination of descriptive statistics only in the form of percentages. Siegel & Castellan, (1988) concur and state that using means and standard deviations on ordinal data is in error and does not lead to ‘substantiate meaning’ (p.33). When parametric tests are used to infer relationships within ordinal data, hypothesis testing becomes problematic:

“Probability statements derived from the applications of parametric statistical tests to ordinal data may be in error when the variables do not satisfy the parametric assumptions. In as much as most of the measurements made by behavioural scientists culminate in nominal or ordinal scales, this point deserves strong emphasis.” (ibid, p.33).

As a novice researcher faced with two opposing perspectives argued passionately from both sides, the decision has had to be decided on logic and caution, based on the arguments set out in the literature. I believe Likert-scales are rank-ordered scales and so must produce ordinal data. However, to confirm my decision, I have consulted the statistics literature, where the balance of advice from experienced statisticians seems to be that novice researchers should err on the side of caution and consider Likert data to be ordinal. The implication is that such results are only to be analysed using non-parametric tests. This is therefore the position taken in the current research.

In terms of their power and relative efficiency, non-parametric tests are often considered to be approximately 90% as efficient as parametric tests (Siegel & Castellan, 1988), should all the assumptions underlying such tests be met (e.g. a normal distribution, interval data...etc). For example the Spearman rank-order correlation (used in this research analysis) is said to be about 91% as efficient as its parametric alternative, the Pearson product-moment correlation coefficient (ibid, p.244).
So providing the power of the tests being carried out are related to a large enough total sample population (n=507 in this instance) to an appropriate significance level and taking cognisance of effect size, the use of non-parametric tests in this research can be considered appropriate for hypothesis testing. In so far as non-parametric tests make fewer assumptions about the data, they may provide meaningful insights when dealing with the majority of ordinal data derived from the use of the Likert scale questionnaires in this research study.

5.4.2 Control variables

Similar to the study by Williams et al, (2006) data on a series of background variables was collected as part of this study and examined as potential covariates in this research. This group of individual potential covariates was grouped together as 'Situation and Circumstances' factors in the questionnaire. This data was collected, given its potential to be important covariates that need to be tested with regard to their influence on the perceptions on the quality and effectiveness of the online learning experience.

5.5 Focus Groups

"...studies that bring together focus groups and surveys are one of the leading ways of combining qualitative and quantitative methods..." (Morgan, 1996, p.134)

Early in the research process it was identified that three courses in Scotland, Ireland and England that were distance learning courses held regular face-to-face residential events where distance learning students came together to share their experience and develop their sense of camaraderie.
At this early stage, although it was decided that a survey be undertaken to gain quantitative data as the primary means of data gathering, it was recognised that there was a clear opportunity to supplement and enrich this data with key qualitative data from direct interaction from students in focus group situations at the three geographically distinct survey sites.

Varying the focus groups by geographic location is an approach that is able to increase confidence in focus group findings (Kidd and Parshall, 2000). This approach to hold each focus group at a separate location has further advantages in so far as it builds a comparative dimension into the focus group research and so enriches the data (Morgan, 1996). The scheduled residential events therefore provided the research opportunity to gather additional qualitative data from a social setting in which participants were encouraged to interact and participate. The insights from such interaction in a social gathering are a distinguishing feature of focus groups (Gibbs, 1997).

To stimulate this initial participant interaction the researcher provided a short overview of the research being undertaken, clarified the research questions being investigated (Chioncel et al, 2003) and how participant’s views were to be used was articulated to all present as recommended by Kitzinger (1995) and Gibbs (1997). To put participants at ease the researcher opened up with some personal anecdotal experiences which would be familiar to the participants present.

By this means participants were nudged towards providing comments based on their personal experiences rather providing views and opinions from an 'unknown basis' in behaviour (Morgan, 1997).
As part of this process the researcher sought to use his own circumstances as an adult learner with work and family pressures to empathise with the groups and particularly in the instances in Ireland and England where he was not known to the student groups. This method of approach is suggested by Krueger, (1997). This 'warming-up' of participants is recommended by Kitzinger, (1994) or putting them at ease (Gibbs, 1997) by relating to their circumstances and experience is recommended in much of the literature.

The three focus groups were undertaken with a maximum of 15 participants and indeed two of the focus groups were comprised of 12 participants. Although Scott, (2011) suggests that focus groups be comprised of between 6-15 subjects, other researchers suggest fewer numbers between 4 -10 subjects are the norm or are most optimal (Vogt et al 2004; Kitzinger, 1995; Chionel et al, 2003, Myers, 1998).

With the main researcher being immersed in the online sector, it was decided to hold organic-type events that were largely non-formal and a conscious effort to use open-ended questions and let the students interact amongst themselves to discuss and develop consensus (and debate issues of conflict) was undertaken. This approach is further recommended by Kitzinger, (1994). The focus group sessions were scheduled for between 60-90 minutes. This time frame is within the suggested limits by Myers, (1998), Kitzinger, (1995), Morgan, (1996).

Although being considered very useful for developing exact transcripts (Kidd and Parshall, 2000), it was decided not to record the focus groups to provide a less intimidating and less formal atmosphere for the student group so as to draw-out more enriched comment. This decision was based on the researcher's experience of over 10 years working with such distance learning groups.
Although Chioncel et al. (2003) suggest that anything less than an audio tape that can be transcribed is required to ensure interpretive validity, they found that their research data on researchers 'in the field' did not back-up this in practice.

In each main session the researcher moderated by engaging minimally, but prompting where necessary, providing clarification on topics and questions and paraphrasing answers to ensure the data capture was accurate. The identified issues and themes extracted from the group discussions were also paraphrased to participants at the end of each topic to help the data collection process (Gibbs, 1997; Kidd and Parshall, 2000; Chioncel et al, 2003).

"When focus group moderating is done well, it looks very easy. The moderator is relaxed, in control, friendly, having fun, and getting participants to tell all about themselves (p.1).....the focus group affords the opportunity for multiple interactions, not only between the interviewer and the respondent but among all participants in the group. The focus group is not a collection of simultaneous individual interviews but rather a group discussion where the conversation flows easily with the nurturing of the moderator." (Krueger, 1997, p.2)

5.5.1 Focus Groups: Validity and Reliability

Focus groups have often been questioned in the past with regard to quality standards and their validity and reliability (Rodriguez et al, 2011; Morgan, 1996). Issues of validity and reliability in the focus group context require a solid methodological approach that informs participants of the rationale of the research. It also needs to inform them of the background of the researcher and be about topics of relevance (informed by an extensive literature review and pilot survey) whilst encouraging discussion in a relaxed atmosphere of mutual trust, that stimulates 'everyday talk' (Myers, 1998) so achieving the realism for academic researchers' seeking validity (ibid, p. 87).
According to Kidd and Parshall, (2000) the emergence of similar viewpoints in multiple focus groups at multiple geographic locations points to significant levels of content validity. Such linked themes coming through in perspectives are considered in detail in section 6.8 of this dissertation. Furthermore, as Rodrigeuz et al, (2011) points out, with some focus group researchers the view is that "...trustworthy data can be elicited in relational, community settings" (p.411) and so validity of focus groups will be high.

A crucial element of construct validation requires the content validity of the focus group sessions are valid for their intended purpose. Only then can we make the case the focus group data adequately represents the research construct for which the focus group session were held and that their conclusions can advance theory and practice (Vogt et al, 2004).

In this instance the researcher was highly experienced in the area of questioning (both teaching distance learning adults for over 10 years and participating in distance learning for the previous 7 years), was informed by a pilot study (from over 100 distance learning students) and had undertaken an extensive literature review in the field. Confidence in content validity can therefore be assessed as being high.

So, as student responses to the themes posed for discussion demonstrated widespread comment and debate within the groups and significant threads of the minutes from these events resonate directly with the data gathered from the primary research tool in this dissertation, then the construct validity for the focus group sessions undertaken as part of this research can considered to be high. These focus group events effectively created data that is relevant to measuring the construct at the core of this research related to the quality factors that influence the online learning experience.
Finally, controlling bias and confirming accuracy of reporting are important to reliability within the context of focus groups. To address these issues the researcher coded the raw data captured (as suggested by Kitzinger, 2005 and Chioncel et al, 2003) to avoid bias and sent them to a fellow academic who was present for one of the events. He confirmed the coding was a fair representation of the minutes recorded. This process is called 'inter-rater reliability' in the literature. To further ensure the robustness of the qualitative data reporting the researcher used direct quotations at every appropriate opportunity to help accurately represent the data. This use of direct quotations was also checked by another academic to ensure that those being used were not being 'cherry-picked' to support a pre-existing bias (Roberts et al, 2006, p.44). An appropriate usage was confirmed.

It is argued in the literature that although questionnaires/surveys can point to differences in knowledge and behaviour, it is focus groups that can go some way to provide the explanation. As Kitzinger, (1995) states:

"...focus groups are particularly suited to the study of attitudes and experiences.....while surveys repeatedly identify gaps between...knowledge and...behaviour, only qualitative methods, such as focus groups, can actually fill these gaps and explain why these occur." (p.302)

5.6 The Literature Review

The Literature Review has comprised a comprehensive search of journals and online databases to seek out papers published primarily after 1999 (although not exclusively so). This is a similar approach taken by the UK HE Academy in a literature and practice review of blended e-learning in 2006 as it sought to review studies that 'drew on recent data'. This search was complemented by use of Google Scholar which provided additional texts not found on previous trawls of the literature. It was limited to articles written in English.
The date-based cut-off point seeks to ensure a relevance of literature to the modern concept of online education as defined in section 2.2 of this dissertation. In addition, in recognition of Moore’s law (Intel Corporation, 2010) and its impact on technological change then this study on e-Learning, in seeking to be of most relevance to the contemporary context, has been largely limited to literature from the last 10 years. It has focused on peer-reviewed e-journals due to the need to seek the latest information in a fast moving sector. The advantage of e-journals is the short lead-in time from completed manuscript to print and this enables the most up-to-date thinking in the sector to reach print form whilst still being of optimal relevance. The search strategy used in the literature search included ‘online education’; ‘e-learning’; ‘online learning’; ‘distance learning’; ‘distributed learning’ and various combinations between these terms along with the central theme term ‘quality’.

Out of a total of 497 references used and included in producing this dissertation, 68 of these references can be considered ‘grey literature’ being: industry reports (34); conference reports (8); magazine articles (4); a hearing (1); and websites (21). A further range of references (21) are from sections of books examined during the literature research stage. The subject topic search terms were the main selection criteria used during all initial literature trawls and after sifting the literature, a further, more detailed scrutiny, discounted 123 journal articles due to their lack of direct links to the central theme of quality in this dissertation. A further 78 items of literature were added as a result of further background reading.

A number of common problems failed to be given sufficient explanation in the majority of the texts examined. The randomness of students sampled was rarely discussed yet the type of student replying to surveys of this nature has the potential to skew any findings.
In numerous instances papers were written around results from very small samples which meant again one had to question the general validity of the points being made. In addition, as pointed out by Kelly et al, (2007) one also has to consider non-response bias and its impact on the data set. Also, in many instances it was not clear whether the online students surveyed were on-campus or off-campus distance learners. In almost all instance in the literature students were only studies at one location or within one institution.

It was also not clear in a number of instances whether the online experience included asynchronous or synchronous or a mixture of both modes of communication. In instances where comparisons were being drawn with face-to-face, this was of particular importance. In short, although in many instances the survey instruments were well defined, the survey subjects were often much less defined. For example numerous surveys relied on data from postgraduate students whose experience in the education sector may bring a bias. Lastly, as indicated above, very few papers discussed in any detail the rationale for their statistical approach and subsequent analysis and interpretation. Explanations to justify the application of parametric tests to ordinal data derived from Likert-scales were noticeable by their almost complete absence.

Persistent problems in educational literature are identified by Gorard, (2001) and these include the over-use of statistical tests, the inappropriate use of statistical tests, poorly designed questionnaires and confused approaches to analysis.

The approach taken in this literature review sorted all bibliographic references that were identified, into key categories of interest prior to more detailed examination and assessment with regards to the core content and concepts of relevance to this study. These categories were as follows:
Adult Learners and Distance Learning; Assessment Issues; Asynchronous Discussions / Debate; e-Portfolios; Face-to-Face Vs E-learning; Gender issues; General – online learning; (Online) Course Design; Peer Review & Peer Assessment; Quality Issues – E-learning; Social Aspects of Distance Learning; Staff, Faculties and Best Practice; Student Attendance and Participation; Student Characteristics – Digital Natives?; Student Satisfaction with Online Learning; Synchronous Discussions / Debate; Technology – General; Web 2.0

All bibliographic references from all sources were managed using Refworks. The initial focus of the literature review was guided by the findings of the pilot study. The findings of the literature review provided the basis upon which the main research questions for the main study were formulated. The literature consisted of papers reporting back on empirical studies with detailed methods of data collection and sampling strategies of direct interest to the main theme, whilst others were more about adding to the debate on e-learning drawing largely on the findings of others. The vast majority of studies that did include primary research did so basing their data collection around the Likert-scale.

5.7 The pilot study

The results of the pilot study questionnaire which ran between January and March 2007 dramatically changed the whole dynamic of this PhD study. It was acknowledged initially by the writer, that technology could move quickly, but changes in technology rollout (e.g. broadband) at the pace they happened were not anticipated during the formulation stage of this study. In the first half of the 2000-2010 decade, broadband availability was limited and was only being rolled-out to commercially viable areas by BT, the main telecoms provider in the UK. In areas where the ‘business case was weaker’ (BIS, 2010, p.8) broadband rollout lagged behind.
As a result, e-learning students who did have access to broadband were reporting clear advantages (Mason & Rennie, 2004) in comparison to those who remained on dial-up. As a factor impacting on the quality of experience of online education, it appeared significant, given on-going student feedback within UHI e-learning degree courses in terms of ease of access, speed of access, enhanced opportunities for engagement, both formal and informal and access to additional online multi-media learning resources.

This study therefore initially set out to investigate just what were the specific benefits that broadband might bring to online education and how it might enhance the quality of the online education experience. However, as broadband rollout across Scotland and the rest of the UK spread with political and financial backing, then broadband no longer remained such a unique quality factor in the e-learning experience and this was confirmed by the pilot study.

Within the pilot study 103 students were surveyed in total, all registered on UHI degrees that included some element of online education, if not wholly online delivered. The findings, for which only a brief descriptive analysis was considered necessary (McCall, 2001), re-focused this current research on the wider range of quality factors that may influence the quality of the online experience. The graphs and charts from this study are available in appendix 1.

A brief descriptive analysis of the main findings is as follows:

The majority of the responses (79/103 -77%) to this study (graphed in Chart 1.1), were self-selecting students on primarily UHI’s wholly online e-learning based undergraduate degree programmes (Child & Youth Studies, Health Studies and Sustainable Rural Development). The bias in such a self-selecting group needs to be recognised.
The results clearly cannot be generalised without much caution in attempting to characterise the wider population but could potentially be generalised to university e-learning students, although the sample number is limited.

Chart 1.2 represents a snapshot of student broadband experience (or possibly knowledge) at the time of the survey. 59/99 (60%) of the respondents to this question demonstrated some knowledge and experience of broadband whilst 37/99 (37%) were unsure. Follow-up investigation found that some students using broadband were unsure of what it actually was and what differing speeds meant/indicated. This question failed to anticipate the effect of new technology and its slow penetration in terms of user technical knowledge of variants available. No further analysis was undertaken.

Chart 1.3 represents feedback from 83/103 (81%) users who responded to a question on how their time online had changed since upgrading to broadband. The modal response for students who reported an increase in 50% or more hours online since upgrading to broadband was 2-5 hours online per day. 27% of students reported not changing their time online per day with the modal time online remaining 2-5 hours per day too. This chart shows that 73% of students that have upgraded to broadband reported spending 50%+ more time online than they did previously using dial-up. What is really significant about this question is that it shows that 83/103 (81%) e-learning students by January 2007 had upgraded to broadband and such students were now in the vast majority rather than in the significant minority, which was the case when the original PhD proposal was formulated.

Chart 1.4 represents the changes in student activities online since upgrading to broadband. It charts the enhanced range of activities that e-learning students reported that they were able to undertake since upgrading to broadband.
Of most significance to students, with a 90% agreement rate was the ability of broadband to allow students to 'undertake a wider range of research related to their studies in a shorter period of time'.

Chart 1.5 represents the accrual of the above responses and the student feedback clearly articulates that broadband was/is no longer considered to be the primary influence on the quality of the student's e-learning experience. Only 31% of students indicated that it was the most important factor which influenced the quality of their online experience. 37% indicated it was not even one of the top three factors influencing their quality of online studies, with the remainder pointing to other more important determinants of their online study experience.

Chart 1.6 represents some of the main factors which influence the quality of e-learning experience. A simplified Likert-scale with the following coding was used: Strongly Agree (4); Agree (3); Disagree (2); and Strongly Disagree (1). With a code score of 2.94 out of 4 the category 'changing family circumstances/commitments' was found to have the highest agreement rating in being the most important factor in influencing the quality of the e-learning experience. Encouragingly for the approval rating of the institution's e-learning courses, with a coded score of 3.19 out of 4 the response 'studying at a distance with UHI is a largely positive experience' topped the agreement ratings on the Likert-scale. Lastly, worth a mention with the only modal figure (of 32%) in the 'strongly agree' category, is student recognition that dial-up telecoms are a clear constraint on the distance learning experience. Students clearly appreciate the role that broadband now plays in their e-learning experience.
Chart 1.7 further investigates the impact of numerous factors that influence the quality of the e-learning experience by asking students how they relate to a number of specific factors commonly found in previous UHI feedback. A simplified Likert-scale (as above) was used to ascertain attitudes.

With a coded score of 3.46 out of 4 the category ‘the tutor and their level of communications’ topped the agreement ratings underlining how important instructor input remains within the online e-learning context. Marginally behind in terms of importance to students with a coded agreement score of 3.32 was the ‘flexibility of online content and tutorials’. Also attaining agreement ratings of over ‘3’, pointing to their importance too, were ‘digitised content and supporting online information’ (3.18); ‘support from UH library service’ (3.03); ‘good content and an interesting module’ (3.02). These results provided a clear steer to where subsequent investigations of ‘quality’ in the e-learning should focus.

Chart 1.8 represents potential constraints to delivering a quality experience in the e-learning context. This charts looks at the nature of problems encountered, their frequency and their perceived level of impact on studies. Of most impact with the only modal score (24%) in the ‘significant problem, high impact category’ is the ‘too many assessments resulting in stress and loss of time for weekly course study’. Of additional significant interest is the importance placed on student feedback, with 74% of students reporting that ‘lack of feedback and so uncertainty on progress’ when it occurred was a problem. The nature of this problem was reported to have a ‘high impact’ on studies in 51% of the student sample, although the modal value considered this problem to be of ‘low impact’. Again, there are some clear indicators here on where a study examining ‘quality’ in e-learning should focus.
Chart 1.9 displays what students thought the institution could do better to improve the quality of their e-learning experience. The top priority choice of students (on how to improve the quality of experience) with a significant modal value of 40% was the item ‘provide additional digitised content and enhanced access to online journals and e-books’.

The second priority modal value was the desire to reduce the two VLEs within UHI to just one and this has since been completed. The use of WebCT and Blackboard by different degree teams led to a lack of consistency in VLE use within online networked degree courses. In response to student feedback on this issue, Blackboard was chosen as the most suitable VLE for universal use. Thirdly, in terms of priority was the item ‘enhanced access to tutors’.

Clearly the range of other (non-broadband) factors identified in this pilot study that impact on the quality of the e-learning experience provided the main rationale for the re-focussing of this research thesis. The subsequent literature review has confirmed the validity of this shift in emphasis of the study and has provided further insights to the quality factors that impact on the e-learning experience.

5.8 Research Design: The Main Study Questionnaire

To ascertain the validity of the research instrument, the main study questionnaire was initially piloted with four e-learning students from across the different years of undergraduate study. Their feedback was used to enable the identification of any confusing, complex or unclear questions and also to identify important areas which might have been overlooked. The wording of five questions was modified as a result of this feedback.
The content validity (Stewart, 2004) and construct validity of the survey was further checked by comments fed back by three experienced e-learning tutors with many years experience in teaching in the sector and two experienced researchers who are also experienced e-learning tutors. Feedback was also received from an educational technologist. In response to this feedback, 33% of the questionnaire content (86 items) was deleted and the remaining questions (58 items) re-focused. Stewart et al, (2004) suggest that instructors might be able to determine the quality of their courses based on their seven measures and 59 items.

This gave confidence that the robustness of the questionnaire was adhering to industry practice in terms of content and length. Subsequent to minor modifications being made to clarify the wording of a number of questions, a further pilot with four more e-learning students was completed to ensure the content validity of this research instrument was further investigated from the student perspective. Student feedback led to the deletion of one question on VLEs and the addition of a question on the role of the student adviser. This was added to Measure 3 on ‘tutor-student interactions’. Further student comment led to the re-ordering of three other questions associated with the socio-demographic information in the questionnaire and associated provision of personal details.

To partly address the problem of feedback bias due to the issue of non-randomisation and self-selection, specific data was gathered on all students relating to the variables of age, gender, location and previous experience with online learning. This method of gathering key data to test for covariates (interacting or confounding in definition), within a self-selecting group (e.g. those students with current or previous experience with online learning) was utilised in a similar manner by Iverson et al (2005) and Paechter et al, (2010).
Confirmation or Affirmation bias within the Likert-scale was controlled by modifications to the questionnaire by using the consistent opening term “To what extent do you agree or disagree.” This consistent approach was used to reduce the complexity of the questions on often multifaceted aspects of e-learning and was suggested by test subjects reviewing the questionnaire. The reaffirmation that the responder must consider both their level of agreement and disagreement should help to minimise affirmation bias. As outlined in section 5.4, a compensating approach to counter the effect from ‘attention bias’ was also employed to further improve the reliability of the questionnaire.

Lastly, it also needs to be recognised that the level of ‘quality’ and satisfaction, retention and motivation being experienced by the target student groups in this survey sample may be potentially higher than that gained from non-completing students. This was a self-selecting study population. However, such an effect has not been quantified here or elsewhere in the literature, to enable adjustments for this effect to be made.

Ultimately, the fundamental aims of the questionnaire were to determine that there are particular factors that are important to students seeking a quality online learning experience and to determine the strength and significance of any correlations established. The questionnaire sought to identify the factors that are most important in contributing to a ‘quality’ experience. The purpose of the research instruments will be to test the hypotheses set out on page 17 of this dissertation.

The critical factors that might influence the quality of the e-learning experience have been determined (and grouped) from the literature review and pilot study and have been used to be the basis for the main survey questionnaire.
A comprehensive literature review and three focus group sessions (appendix 2) with groups of online distance learning students from the three different institutions have been completed. A further online feedback forum exercise was also undertaken without successfully gaining any further data. To add more confidence in the qualitative findings, data was examined from an additional source in the form of an open-ended question at the end of the main survey questionnaire. This added a total of 106 qualitative comments on online education to those gained from focus groups sessions. Unlike the pilot survey a range of demographic data including gender, age and location, mode of study...etc was collected as part of the primary data collection exercise. This is common practice within such studies in the sector to test for the presence (and rule out) covariate effects (Chang & Tung, 2008).

As stated above, the aim was to determine any forms of feedback bias and rule out any specific link (i.e. confounding or interacting variables) between age, gender, mode of study...etc in influencing the perceived quality factors contributing to a quality e-learning experience. These secondary factors will also be tested to determine any levels of influence that they may have on the quality of the online learning experience. Definitions of the key variables in this study are outlined below:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Operational Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT Access, Skills &amp; Knowledge</td>
<td>The extent to which student ICT study skills are appropriate to their mode of study</td>
</tr>
<tr>
<td>Preparedness &amp; Readiness</td>
<td>The extent to which students are ready and prepared for online education at enrolment</td>
</tr>
<tr>
<td>Tutor-Student Interactions</td>
<td>The extent to which online instructors engage effectively with students</td>
</tr>
<tr>
<td>Student-Student Interactions</td>
<td>The extent to which students are able to develop a supportive community of e-learners</td>
</tr>
<tr>
<td>Course Design &amp; Pedagogy</td>
<td>The extent to which learning content and activities are appropriate to online education</td>
</tr>
<tr>
<td>Delivery Technologies</td>
<td>The extent to which delivery technology provision meets online education needs</td>
</tr>
<tr>
<td>Circumstances &amp; Situational Covariates</td>
<td>The extent to which external influences impact on perceived quality</td>
</tr>
<tr>
<td>Quality and Effectiveness (dependent variable)</td>
<td>The extent to which the student's online education course satisfies his/her needs</td>
</tr>
</tbody>
</table>
A summary of the research model being employed in this study is represented in figure 5.1. This chart was modelled on work by Wu & Hiltz, (2004).
Figure 5.1 - RESEARCH MODEL (Wu & Hiltz, 2004)

**Independent Variables**

1. Potential Covariates - e.g. age, gender, mode of study... etc
2. ICT Usability & Knowledge
3. Preparedness for Study
4. Student-Tutor Interactions
5. Student-Student Interactions
6. Course Design
7. Delivery Technologies

**Intervening Variables**

- Student Motivation
- Student Satisfaction
- Student Resilience

**Dependent Variables**

Measure
5.9 Formation of Research Parameters

The dependent variable to be tested within this study originated from the measure first tested by Peltier et al, (2003):

**Measure of overall effectiveness**

1. I would recommend this course to friends or colleagues
2. I have learned a lot in this course
3. I have enjoyed taking this course

A further three items are also being tested as measures of quality and effectiveness. It is anticipated if they score well as item measures, the top two items will be added to the above scale to provide a new five-item Likert-scale for effectiveness and quality. The coefficient alpha measure of the original three-item measure was found to be 0.93 and this indicates a high level of reliability. This measure of 'effectiveness' was found to be the most representative and cohesive representation of a quality experience from within the extensive range of literature reviewed in progressing this dissertation. The measure's original reliability has been determined by parametric methods of a type not being employed in this study due to methodological rationale.

As part of the current research several new and potentially more targeted Likert items measuring 'quality' in online education are being tested to add to the specific online learning significance of the measure used by Peltier et al, (2003), which will be modified further, depending on data received.

The independent variables (i.e. the six ‘measures or dimensions’ of quality in online learning), tested within this study were as follows:

1. ICT skills and knowledge
2. Preparedness for e-learning
3. Instructor-student communications
4. Student-student communications
5. Course design
6. Delivery technologies

The association of these independent variables with the dependent variable ‘quality’ are being measured and the three measures most strongly associated with ‘quality’ are being investigated further and potential confounding and interacting variables examined to determine the exact nature and extent of any association found. These independent measures have many particular commonalities with the previous work of Chickering and Ehrmann (1996), Schrum & Hong, (2002), Stewart et al, (2004), Pearson & Trinidad (2005), Youn & Vachon, (2005), Sun et al, (2008), Ginns & Ellis (2009) and Lee et al, (2009a).

In line with best practice, scatter plot diagrams (appendix 3) which map the relationships between the variables will be used to check for their general association with the dependent variable and for outliers. Outliers that may occur from an error with input, error or carelessness from a subject in entering their answer, or indeed just ‘off-the-scale’ responses from an individual (Pallant, 2001). A case-by-case approach was taken and all changes were outlined in Chapter 7 within the analysis of results.
Chapter 6 – Quality Issues & the Student Experience

6.1 Study Background

Between 1999 and 2003 the case study UHI undergraduate programme (BSc (Hons) Sustainable Rural Development) evolved (Rennie, 2003) from classroom face-to-face delivery to fully online delivery. Since 2003, this evolution in pedagogy has continued within the online learning environment. It is anticipated that the outcomes of this study will further inform the evolution of this online undergraduate programme and other online programmes across the globe.

This study has been fashioned to test the six hypotheses outlined on page 17 of this report. The purpose of collecting data from a sample population of students on their experiences and attitudes is aimed at establishing a new measure of what constitutes a 'quality' online e-learning experience and establishing the main influences on student perceptions of quality. The quality factors investigated were established from an extensive literature review and grouped into distinctive attitude assessment scales comprising multiple Likert-scale survey items.

An initial three-item Likert scale measure of 'effectiveness' (Peltier et al, 2003) was modified with two further 'quality' test items to make a new modified Likert scale measure of 'quality' for testing within this study. This new five-item scale has become the 'dependent variable' upon which other identified independent variables will be measured. This chapter will seek to establish that there are linkages between the identified student attitude scales and the 'quality' attitude scale formed. The three most strongly correlated measures will then be investigated further to establish the significance of their linkages to a perceived quality experience within the online e-learning environment.
6.2 Data sources

A multiple Likert scale questionnaire (appendix 5) was distributed to students across three separate institutions on Monday 29\textsuperscript{th} November 2010. This research study has been designed to gather differing perspectives from three different institutions in an attempt to add to the depth of knowledge and debate on quality indicators in online education. Each of the three institutions surveyed was chosen on the basis that they were known to have active, off-campus based, online learners. The student populations were known to be predominantly adult returners with a high percentage of part-time students. It was also identified that each institution held regular face-to-face residential-type events which could be utilised to access focus group qualitative data to add to the insights provided by the quantitative methods being implemented. The online survey was left open for a period of 2 months to collect student attitudes to quality issues in e-learning. In total 509 survey returns were recorded. Both the 17\textsuperscript{th} and 500\textsuperscript{th} survey returns were left entirely blank and so were deleted from the data source. This left a total of 507 valid questionnaire returns. Of this total, 80.4\% were completed in full and 19.6\% were partly completed.

A series of three focus group sessions were held with random groups of distance learning students attending pre-planned course-related, face-to-face weekend sessions. The first event in February, 2007 was attended in Carnew, County Wicklow, Ireland with a group of online distance learning students from University College, Dublin. The second event was attended in April, 2010 in Knoydart on the West Coast of Scotland and was with a group of UHI online distance learning students. The third event was attended in January, 2011 in Cheltenham, Gloucestershire, England with a group of online distance learning students from the University of Gloucestershire.
In all three instances students were coming together from a geographically wide
region to attend face-to-face course events with members of staff from their
teaching institution. Further qualitative data was examined from that provided by
students in response to the final open question in the main Likert survey.

6.3 Data Analysis Procedures

The most obvious example of a questionnaire scale that produces Ordinal data is a
Likert scale (Denscombe, 1998). As discussed in section 5.4 there has been some
dispute about this in academic literature and it appears the norm in the educational
research sector is to treat this data as Interval data. This approach is taken so as to
allow arithmetical operations (Clegg, 1990) of a parametric nature. This approach is
accepted to be 'more powerful' than non-parametric equivalents.

Non-parametric tests are less sensitive than parametric tests and can potentially fail
to identify differences between groups that actually exist (Pallant, 2001). However,
for the reasons set out in section 5.4 it is appropriate to treat Likert Scale data as
Ordinal data and so this research will only apply non-parametric tests in seeking to
apply inferential statistics to the data gathered. As further stated in section 6.4,
providing the sample population studied is sufficient, non-parametric tests will pick
up over 90% of the associations that parametric alternatives would (Siegel &
Castellan, 1988), but with less assumptions (e.g. normality) having to be placed on
the data. For similar reasons the descriptive statistics presented in section 6.5 will
focus on the median values rather than on the mean and standard deviation. A
'between-groups' (Pallant, 2001) analysis of variance will be undertaken to attempt
to ascertain the consistency or otherwise of perceptions of the research measures
across the three study locations. These findings will be presented in section 6.6.
These descriptive statistics will outline the baseline results (n=507) of this research study and will provide the background and context for a series of subsequent inferential statistics (section 6.8) that will investigate further the validity of the hypotheses presented relating to the quality factors that influence the e-learning experience.

Median scores (out of 5) will be included relating to individual Likert items, along with percentages, in the descriptive statistics. A series of scatter plots and box plots are presented in appendix 3 which summarise and represent in simple chart form, many of the main statistical findings related to this study.

Data captured as part of the Focus Group exercises was coded and the results are outlined in a discussion on the qualitative findings associated with this research study in section 6.9 'Focus Group Findings'. Section 6.9 communicates the findings from the qualitative comments left by students at the end of the main survey.

Lastly, all statistical tests were undertaken using the Statistical Package for the Social Sciences (SPSS) for Windows V19.0.0. A series of single-tailed tests to establish the level of association between the dependent variable and the independent variables were undertaken. A probability level of $p \leq 0.05$, single-tailed, is considered statistically significant and allows us to reject the null hypothesis in each of the six instances a research hypothesis was articulated.
Single-tailed hypotheses are directional in nature (e.g. with an anticipated positive or negative correlation made explicit) whilst two-tailed hypotheses simply state there will be an effect, but do not state an anticipated direction of this effect. The rationale for using single-tailed hypotheses is worth brief consideration.

Firstly, this study is primarily interested in investigating independent variables that are positively correlated with quality and effectiveness in online education. This is because this research study is specifically about finding factors that positively influence the quality of the online education experience. That is not to say negative correlations are not of interest, but just not within the scope of this research study.

Secondly, negative correlations must be treated similar to non-significant correlations not strong enough in the positive direction. Both would represent findings not strong enough in the stated direction to reject the null hypothesis. The incidence of such results, providing they were not universal, would not adversely impact on the findings of this research study as it is examining multiple measures hypothesised to impact on quality and effectiveness in online education. Hypothesised findings non-significant (in the right direction) or in the wrong direction to the single-tailed hypothesis, would point towards areas of further research and a gap in the knowledge of the current research study.

The usage of single-tailed hypotheses requires such a statement (Ruxton and Neuhauser, 2010) to be expressed and clarified to an appropriate probability level. The advantage is an increase in power efficiency – i.e. the ability and strength of the test results to reject the null hypothesis when it is indeed incorrect. "The advantage of adopting the one-tailed test is an improvement in power to reject the null hypothesis if the null hypothesis is truly false" (ibid, p.115).
6.4 Statistical Approach

The descriptive statistics presented as part of this study in section 6.5 ‘Baseline Results’ help illustrate many of the core statistical facts which have been gathered from the sample population of e-learners who responded to this study. These results are presented in a series of graphs and charts. Individual Likert scale item responses which make up each of the measures in the questionnaire are presented in table 6.12, illustrating their median scores (out of 5) and the percentages of each response.

To complement this approach a series of inferential statistics are applied to the results of this research. These are applied, in the first instance, to determine the strength of association (correlation) between a number of potential confounding covariates and their significance on the sample population's likelihood to provide a high quality rating for their e-learning experience. This analysis is presented in section 6.6 'An Analysis of the Significance of Covariates'.

The most common potential (demographic) confounding covariates in the educational research relate to age, gender and level of education. In this instance given this research has been undertaken at three separate sites, location is also examined. Two further potential confounding covariates relating to hours worked per week and the study mode of the student are also tested.

This level of analysis devoted to potential compounding variables is aimed at avoiding Type 1 errors (rejecting the null hypothesis when it is actually true) and so the drawing of incorrect conclusions in analysing the links between the individual scale measures (independent variables) and the overall measure of quality in e-learning (dependent variable).
### Table 6.1: Statistical Approach: Covariates

<table>
<thead>
<tr>
<th>Potential Confounding Covariate</th>
<th>Dependent Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic Facto</td>
<td>Likert-scale Measure of Quality</td>
<td>Non-Parametric Tests: Analysis of Variance</td>
</tr>
<tr>
<td>Age</td>
<td>Quality</td>
<td>Kruskal-Wallis (KW) Test</td>
</tr>
<tr>
<td>Gender</td>
<td>Quality</td>
<td>Mann-Whitney U Test</td>
</tr>
<tr>
<td>Level of Education</td>
<td>Quality</td>
<td>Kruskal-Wallis (KW) Test</td>
</tr>
<tr>
<td>Location</td>
<td>Quality</td>
<td>Kruskal-Wallis (KW) Test</td>
</tr>
<tr>
<td>Hours Worked Per Week</td>
<td>Quality</td>
<td>Kruskal-Wallis (KW) Test</td>
</tr>
<tr>
<td>Study Mode</td>
<td>Quality</td>
<td>Kruskal-Wallis (KW) Test</td>
</tr>
</tbody>
</table>

In section 6.7, a series of inferential statistics is presented that investigate the significance of the correlation between the independent variables (Likert-scale measures 1-6) and the overall measure of quality, the dependent variable, modified from Peltier et al (2003) research and investigations in this field of study. Following to this initial correlation (outlined below) which will prove or disprove the six hypotheses outlined, the three most associated independent variables are investigated further in section 6.7 with regard to the level of their association with the dependent variable.

Subsequent to completing the Spearman Rank Order Correlations (refer to table 6.2) the three most significant ($p<0.05$) independent variables go on to have their 'coefficient of determination' (Pallant, 2001), sometimes referred to as $r^2$, calculated. This provides the information required to calculate a figure for the level of variance in student scores on the quality and effectiveness scale attributable to the three individual independent variables most closely associated with the dependent measure.
Table 6.2: Spearman Correlations

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale Measures</td>
<td>Likert-scale Measure of Quality</td>
<td>Non-Parametric Test: Correlation</td>
</tr>
</tbody>
</table>

- Measure 1 – ICT Access, Skills & Knowledge
- Measure 2 – Preparedness & Readiness
- Measure 3 – Student-Tutor Interaction
- Measure 4 – Student-Student Interaction
- Measure 5 – Course Design & Pedagogy
- Measure 6 – Delivery Technologies

Quality
Spearman's Rho

Following this focus, the remaining measures are examined and their variance calculated from their coefficients of determination. To complete the calculations, further levels of variance are determined from the socio-demographic data gathered in the main questionnaire exercise. This data is combined to determine how much of the research model measures and socio-demographic factors can be attributable to the variance in student scores on the quality and effectiveness scale. This testing methodology investigating correlation and levels of variance in test scores, points to the predictive capabilities of this particular research model. It is also a test of the 'goodness of fit' of the statistical model used in the research. Yet it needs to be understood that these tests do not identify causation, but instead, levels of association from which inferences can be made.
6.5 Baseline Results

The sample population was drawn from three separate student groups in three separate countries. A number of students completing the survey were also from outside either of the institutions within which online questionnaires were sent out:

Table 6.3: Location: University of the Highlands & Islands

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>65</td>
<td>12.8</td>
<td>12.8</td>
<td>12.8</td>
</tr>
<tr>
<td>UHI</td>
<td>444</td>
<td>87.2</td>
<td>87.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>509</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.4: Location: University of Gloucestershire

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>497</td>
<td>97.6</td>
<td>97.6</td>
<td>97.6</td>
</tr>
<tr>
<td>Univ. of Gloucestershire</td>
<td>12</td>
<td>2.4</td>
<td>2.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>509</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
From the output shown above (tables 6.3-6.6) we know that the sample population was comprised of 444 UHI students (87.6%), 16 UCD students (3.1%), 12 UoG students (2.4%) and a further 35 'other' students (6.9%), from outside of these three institutions.

Most students in the latter category left their location blank, although there were a few exceptions and a number of students entered De Montford University (Leicester) and NHS as their ‘other’ institutions. Because of the skewed returns in favour of UHI respondents, caution needs to be taken in coming to wider-population generalisations from this sample.
Further characteristics from the sample population can be determined from the output above (figure 6.1 and table 6.7). Of 501 respondents to this question, the range of ages in the sample varied from 15 to 74 years old. The average age in the sample is 35.95 years old, whilst the standard deviation statistic (12.72) tells us that 68.2% of all students are in the age range 23.23 to 48.67 years old. This predominance of adult learners in the sample online e-learning population has been found by numerous other researchers (Klisic, 2009; Gerrard & Roberts, 2006; Kelly et al, 2007; Richardson, 2010; Iverson et al, 2005).
Table 6.8: Sex: Male or Female

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Response</td>
<td>23</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Male</td>
<td>112</td>
<td>22.0</td>
<td>22.0</td>
<td>26.5</td>
</tr>
<tr>
<td>Female</td>
<td>374</td>
<td>73.5</td>
<td>73.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>509</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The output above (table 6.8) records a total of 486 respondents, with 23 persons undertaking the survey failing to disclose their gender. Of those that did, 112 are Males (23%) and 374 are females (77%). This skewed grouping towards female online e-learners is one that is commonly found in similar research exercises in the literature (Garrison et al, 2010; Richardson & Ice, 2010, Chu, 2010; Ke & Xie, 2009; Rovai et al, 2009; Krause et al, 2009; Rabe-Hemp et al, 2009; Guiller et al, 2008).

Table 6.9: Study Status: Full or Part or Individual Modules

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Response</td>
<td>8</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Full-time</td>
<td>256</td>
<td>50.3</td>
<td>50.3</td>
<td>51.9</td>
</tr>
<tr>
<td>Part-Time</td>
<td>176</td>
<td>34.6</td>
<td>34.6</td>
<td>86.4</td>
</tr>
<tr>
<td>Studying Individual Modules</td>
<td>45</td>
<td>8.8</td>
<td>8.8</td>
<td>95.3</td>
</tr>
<tr>
<td>Other</td>
<td>24</td>
<td>4.7</td>
<td>4.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>509</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

From the output above (table 6.9) it can be seen that 256 (50.3%) of students full-time students and 221 (43.4%) were part-time students and/or those studying individual modules.
A further total of 24 (4.7%) students considered themselves to be something other than full-time or part-time or studying individual modules. A further 8 (1.6%) students did not disclose their study status. This high percentage of part-time students, almost on a par with full-time students, is typical of online distance learning courses where adult returner numbers are high. In increasing instances this ratio of full-time to part-time students is often over 50% in favour of part-time students, particularly when comparing ratios within online student groups (Ausburn, 2004).

Table 6.10: Experience: Years Studying

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>2</td>
<td>.4</td>
<td>.4</td>
<td>.4</td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>234</td>
<td>46.0</td>
<td>46.0</td>
<td>46.4</td>
</tr>
<tr>
<td>Between 1 and 2 years</td>
<td>132</td>
<td>25.9</td>
<td>25.9</td>
<td>72.3</td>
</tr>
<tr>
<td>Between 2 and 3 years</td>
<td>96</td>
<td>18.9</td>
<td>18.9</td>
<td>91.2</td>
</tr>
<tr>
<td>Between 3 and 4 years</td>
<td>33</td>
<td>6.5</td>
<td>6.5</td>
<td>97.6</td>
</tr>
<tr>
<td>4 years or more</td>
<td>12</td>
<td>2.4</td>
<td>2.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>509</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The above output (table 6.10) highlights the level of student experience of online e-learning given their length of time studying on the course. The drop-off from 234 (46%) studying for a year or less, 132 (25.9%) studying between one and two years, 96 (18.9%) studying between two and three years, 33 (6.5%) studying between three and four years and 12 (2.4%) studying for four years or more, is representative of the expected lesser proportions of students at each level. This is associated with the higher dropout rate experienced for online e-learners and outlined in section 5.7 of this study.
### Table 6.11: Highest Level of Education Achieved

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>3</td>
<td>.6</td>
<td>.6</td>
<td>.6</td>
</tr>
<tr>
<td>Primary school completed</td>
<td>1</td>
<td>.2</td>
<td>.2</td>
<td>.8</td>
</tr>
<tr>
<td>Secondary school completed</td>
<td>103</td>
<td>20.2</td>
<td>20.2</td>
<td>21.0</td>
</tr>
<tr>
<td>Workplace or trade training</td>
<td>18</td>
<td>3.5</td>
<td>3.5</td>
<td>24.6</td>
</tr>
<tr>
<td>FE College Course</td>
<td>184</td>
<td>36.1</td>
<td>36.1</td>
<td>60.7</td>
</tr>
<tr>
<td>University (Undergrad.)</td>
<td>123</td>
<td>24.2</td>
<td>24.2</td>
<td>84.9</td>
</tr>
<tr>
<td>University (Postgrad.)</td>
<td>77</td>
<td>15.1</td>
<td>15.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>509</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

In traditional institutions the numbers of students entering with ‘secondary school’ level qualifications (school leavers) would be expected to be high (refer to table 6.11). In Scotland between 2007/08 and 2008/09 the number of school leavers entering Higher Education increased by 3.8%, to 34.9% (Scottish Government, 2009). In this study instance (table 6.11) only 103 (20.2%) of survey respondents were school leavers, whilst 200 (39.3%) of the respondents had an existing University degree(s); a further 184 (36.1%) had FE college qualifications and 18 (3.5%) a workplace/trade qualification. Clearly, these latter groupings of respondents’ educational levels on entry are typical of adult returner groups who tend to predominate on online e-learning courses. It is interesting to note that almost four in ten students in this study sample (39.3%) already possessed Higher Education qualifications on entering their online Higher Education e-learning course.
Finally, it is common practice (Klisc et al, 2009; Sun et al, 2008; Robyler et al, 2007; Paechter et al, 2010) in terms of displaying the baseline results to display a table (6.12) showing the individual scores of each of the individual Likert items in the main study questionnaire. This format is able to provide the reader with a quick overview of the individual Likert items and their relative scores from the student cohort.

Table 6.12 – Overview of Questionnaire Results

<table>
<thead>
<tr>
<th>Items</th>
<th>Median (Mean*) Score</th>
<th>SD(%)</th>
<th>D(%)</th>
<th>N(%)</th>
<th>A(%)</th>
<th>SA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure 1 – ICT Access, Skills &amp; Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of resources through University Library Service</td>
<td>4.0 (3.75)</td>
<td>2.1</td>
<td>12.4</td>
<td>13.2</td>
<td>53.5</td>
<td>18.8</td>
</tr>
<tr>
<td>Location of resources through WWW and Search Engines</td>
<td>4.0 (3.99)</td>
<td>1.2</td>
<td>7.4</td>
<td>10.3</td>
<td>53.1</td>
<td>27.9</td>
</tr>
<tr>
<td>Level of Technical Support</td>
<td>4.0 (3.74)</td>
<td>1.0</td>
<td>7.7</td>
<td>27.7</td>
<td>43.8</td>
<td>19.8</td>
</tr>
<tr>
<td>ICT &amp; Internet Skills on Entry</td>
<td>4.0 (3.83)</td>
<td>2.1</td>
<td>7.4</td>
<td>15.7</td>
<td>54.8</td>
<td>20.0</td>
</tr>
<tr>
<td>Flexibility of online format</td>
<td>4.0 (4.00)</td>
<td>3.6</td>
<td>6.1</td>
<td>17.4</td>
<td>32.9</td>
<td>40.0</td>
</tr>
<tr>
<td>Measure 2 – Preparedness &amp; Readiness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding of course on entry</td>
<td>3.0 (3.26)</td>
<td>3.4</td>
<td>19.0</td>
<td>31.1</td>
<td>41.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Understanding of privacy and security threats on entry</td>
<td>4.0 (3.75)</td>
<td>2.5</td>
<td>7.6</td>
<td>24.1</td>
<td>44.4</td>
<td>21.2</td>
</tr>
<tr>
<td>Understanding of time commitment required</td>
<td>4.0 (3.22)</td>
<td>5.6</td>
<td>28.0</td>
<td>13.4</td>
<td>44.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Effectiveness of Study Skills on entry</td>
<td>3.0 (3.19)</td>
<td>4.5</td>
<td>23.0</td>
<td>27.9</td>
<td>37.9</td>
<td>6.7</td>
</tr>
<tr>
<td>Rating of value of student handbook</td>
<td>3.0 (3.23)</td>
<td>3.1</td>
<td>17.6</td>
<td>37.7</td>
<td>35.7</td>
<td>5.8</td>
</tr>
<tr>
<td>Measure 3 – Tutor – Student Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of dialogue with tutor</td>
<td>4.0 (3.67)</td>
<td>2.3</td>
<td>8.2</td>
<td>26.3</td>
<td>46.0</td>
<td>17.1</td>
</tr>
<tr>
<td>Link between weekly tutor role and success</td>
<td>4.0 (3.89)</td>
<td>3.0</td>
<td>7.7</td>
<td>16.4</td>
<td>42.5</td>
<td>30.4</td>
</tr>
<tr>
<td>Timely tutor feedback and responses to questions</td>
<td>4.0 (4.09)</td>
<td>1.7</td>
<td>3.8</td>
<td>16.1</td>
<td>41.4</td>
<td>37.1</td>
</tr>
<tr>
<td>Importance of contact with student adviser</td>
<td>4.0 (3.83)</td>
<td>1.6</td>
<td>9.2</td>
<td>21.9</td>
<td>39.3</td>
<td>28.0</td>
</tr>
<tr>
<td>Ongoing rapport/social interaction with student group</td>
<td>4.0 (4.12)</td>
<td>0.2</td>
<td>3.3</td>
<td>14.1</td>
<td>49.4</td>
<td>32.9</td>
</tr>
<tr>
<td>Measure 4 – Student-Student Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of dialogue with classmates</td>
<td>3.0 (3.16)</td>
<td>8.0</td>
<td>20.3</td>
<td>28.8</td>
<td>33.6</td>
<td>9.3</td>
</tr>
<tr>
<td>Imp. of student interactions to overcome isolation*</td>
<td>4.0 (3.83)</td>
<td>2.4</td>
<td>5.0</td>
<td>24.4</td>
<td>43.4</td>
<td>24.9</td>
</tr>
<tr>
<td>Imp. of responding to peers within learning experience</td>
<td>4.0 (3.62)</td>
<td>2.5</td>
<td>9.0</td>
<td>28.5</td>
<td>43.6</td>
<td>16.3</td>
</tr>
<tr>
<td>Group assessment and importance of interactivity role</td>
<td>4.0 (4.33)</td>
<td>2.5</td>
<td>10.2</td>
<td>35.6</td>
<td>41.6</td>
<td>9.3</td>
</tr>
<tr>
<td>Importance of ‘meeting-up’ in creating online community</td>
<td>4.0 (4.32)</td>
<td>2.5</td>
<td>12.6</td>
<td>20.0</td>
<td>39.9</td>
<td>24.9</td>
</tr>
</tbody>
</table>

| Measure 5 – Course Design & Pedagogy | | | | | | |
| Importance of design, structure & presentation | 4.0 (4.33) | 0.0 | 1.2 | 5.5 | 51.9 | 41.3 |
| Tutor management & effectiveness | 4.0 (3.61) | 1.7 | 10.9 | 24.5 | 50.6 | 12.4 |
| Importance of Web 2.0 technologies | 3.0 (3.39) | 3.6 | 15.3 | 32.9 | 35.0 | 13.2 |
| Importance of online participation and final mark | 3.0 (4.10) | 10.1 | 23.3 | 23.0 | 34.1 | 9.6 |
| Importance of similar design and style templates | 4.0 (3.88) | 1.2 | 5.1 | 19.5 | 53.0 | 21.2 |

| Measure 6 – Delivery Technologies | | | | | | |
| Demand and effectiveness of podcasts | 4.0 (3.23) | 14.6 | 10.0 | 23.2 | 42.0 | 10.2 |
| Demand and effectiveness of e-library | 3.0 (3.26) | 5.8 | 18.9 | 30.1 | 33.3 | 11.9 |
| Transferability of e-skills | 4.0 (3.57) | 1.7 | 9.5 | 31.7 | 43.9 | 13.2 |
| Depth of e-learning | 3.0 (3.12) | 8.1 | 22.3 | 29.9 | 29.2 | 10.5 |
| e-tutoring skills | 4.0 (4.02) | 1.0 | 3.7 | 14.9 | 63.3 | 27.1 |

| Measure 7 – DV: Measure of Quality & Effectiveness | | | | | | |
| Would recommend the course | 4.0 (3.99) | 1.5 | 5.8 | 13.6 | 50.4 | 28.7 |
| Have learned a lot | 4.0 (4.24) | 0.7 | 1.9 | 8.7 | 49.5 | 39.1 |
| Enjoyed taking the course | 4.0 (4.11) | 1.0 | 4.4 | 14.1 | 43.9 | 36.7 |
| Interactive & supportive tutors | 4.0 (4.24) | 0.2 | 0.7 | 8.8 | 55.1 | 35.1 |
| Thought-provoking design | 4.0 (4.26) | 0.0 | 0.7 | 9.2 | 53.5 | 36.5 |

* Mean scores have been provided in brackets for illustrative purposes as these figures are the common method in the literature in providing the reader with an overview of the results from the questionnaire. Individual Likert items (above) are not considered reliable (Gliem & Gliem, 2007) and so it is the cumulative measure scores that will provide the analytical data for this research study.

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6.6 An Analysis of the Significance of Covariates

A series of tests have been run on this study data to ensure that the sample population is not subject to potential confounding or interacting variables which may reduce the internal validity of the sample data. The result might be a Type 1 error originating from covariates that bring about a change to the dependent variable (quality and effectiveness) that is wrongly attributed to one or more independent variables (Clegg, 1990). In this instance the null hypothesis may be rejected when in actual fact the independent variable is not responsible for the level of variance in the sample identified. A confounding covariate may instead have been responsible and so has the potential to skew the results from the sample population. Potential covariates are examined in this section and their effects on quality are analysed to rule them out as potentially significant interacting or confound variables. Age, gender, level of education, location, hours worked per week and study mode are examined and their potential effects on the dependent variable determined.

In all but one instance, the Kruskal-Wallis one-way analysis of variance was applied. This test is used to determine whether the ranks from groups of respondents in the Likert Scale are similar enough for one to assert that they are likely to have come from samples drawn from the same population '...or from identical populations with the same median' (Siegel & Castellan, 1988, p.206). Although Kruskal-Wallis H tests, if significant, allow one to conclude that there are differences or similarities among the groups sampled, it does not tell us what the differences are. In the other instance, which does not use the Kruskal-Wallis H test, the Mann-Whitney U test is instead the most appropriate test applied to the two categorical variables (male/female) and their significance is measured against the dependent variable: the 'perceived quality and effectiveness' measure, to determine differences between both categories.
Figure 6.2 – The Influence of Age on Total Perceived Quality & Effectiveness

Table 6.13 – Age: Ranks

<table>
<thead>
<tr>
<th>Age on Last Birthday</th>
<th>N</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-20</td>
<td>46</td>
<td>163.07</td>
</tr>
<tr>
<td>21-29</td>
<td>65</td>
<td>186.10</td>
</tr>
<tr>
<td>30-39</td>
<td>101</td>
<td>222.30</td>
</tr>
<tr>
<td>40-49</td>
<td>122</td>
<td>215.27</td>
</tr>
<tr>
<td>50+</td>
<td>68</td>
<td>186.63</td>
</tr>
<tr>
<td>Total</td>
<td>402</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.14 - Test Statistics\textsuperscript{a,b}

<table>
<thead>
<tr>
<th>Total Perceived Quality and Effectiveness</th>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12.434</td>
<td>4</td>
<td>.014</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Kruskal Wallis Test
\textsuperscript{b} Grouping Variable: Age Groups
The above output (figure 6.2) based on an initial 'eyeball test' seems to indicate that age is not a potential covariate of significance to the measurement of quality and effectiveness in online learning. However, to establish the extent of any relationships, a Kruskal-Wallis H Test was undertaken to determine the level of variance between the age groups (table 6.13) in their perceived level of quality and effectiveness (table 6.14), to ascertain if a significant level of influence from 'age group' is apparent within this population sample.

Despite an initial 'eyeball test' that seemed to indicate only minor variations in perceived quality and effectiveness ratings amongst the differing age groups, the null hypothesis in this instance 'The distribution of Total Perceived Quality and Effectiveness is the same across categories of Age Groups' must be rejected (Kruskal-Wallis H=0.14, df=4, p<0.05). The significance level is 0.05 (two-tailed). These results suggest there is a statistically significant difference in perceptions of quality and effectiveness across the five age groups identified.

An inspection of the mean ranks suggests that those students in the age group 30-39 provide the highest level of ratings for quality and effectiveness within online education and traditional students (under 21) provide the lowest rating levels. As this difference in ratings is significant between age groups, then this explains some of the variance in student perceptions of quality and effectiveness (the dependent variable). As a confirmed covariate appropriate caution needs to be taken in explaining the findings linking the identified independent variables with the variance of ratings of the dependent variable, unless further testing is applied. This further testing is outlined on pages 273-4 where the potential effects of this variable on the main study results are investigated.
Figure 6.3 – The Influence of Gender on Total Perceived Quality & Effectiveness

Table 6.15 – Sex: Ranks

<table>
<thead>
<tr>
<th>Sex: Male or Female</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and Effectiveness</td>
<td>Male</td>
<td>81</td>
<td>188.87</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>307</td>
<td>195.99</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>388</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.16 - Test Statistics

<table>
<thead>
<tr>
<th>Total Perceived Quality and Effectiveness</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>11977.500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>15298.500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>-.512</td>
<td></td>
<td></td>
<td>.609</td>
</tr>
</tbody>
</table>

a. Grouping Variable: Sex: Male or Female
The above output (figure 6.3) based on an initial 'eyeball test' seems to indicate that gender is not a potential covariate of significance to the measurement of quality and effectiveness in online learning.

However, to establish the extent of any relationships, a Mann Whitney U Test was undertaken to determine the level of variance between both genders (table 6.15) in their perceived level of quality and effectiveness (table 6.16), to ascertain if a significant level of influence from 'gender' was apparent within this population sample. The null hypothesis in this instance 'The distribution of Total Perceived Quality and Effectiveness is the same across categories of sex: Male or Female must be retained (Mann Whitney U=11977.5, z=-.512, p>0.05). The significance level is 0.05 (two-tailed).

These results suggest there is no statistically significant difference in perceptions of quality and effectiveness between males and females in this sample population. These results therefore suggest that 'gender' can be ruled out as a potential covariate.

Figure 6.4 – The Influence of Education levels on Total Perceived Quality & Effectiveness
Table 6.17 – Education: Ranks

<table>
<thead>
<tr>
<th>Highest Level of Education Achieved</th>
<th>N</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school completed</td>
<td>1</td>
<td>379.00</td>
</tr>
<tr>
<td>Secondary school completed</td>
<td>71</td>
<td>193.77</td>
</tr>
<tr>
<td>Workplace or trade training</td>
<td>13</td>
<td>275.81</td>
</tr>
<tr>
<td>FE College Course</td>
<td>143</td>
<td>206.66</td>
</tr>
<tr>
<td>University (Undergrad.)</td>
<td>106</td>
<td>206.58</td>
</tr>
<tr>
<td>University (Postgrad.)</td>
<td>72</td>
<td>186.78</td>
</tr>
<tr>
<td>Total</td>
<td>406</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.18 - Test Statistics\(^{a,b}\)

<table>
<thead>
<tr>
<th></th>
<th>Total Perceived Quality and Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>9.447</td>
</tr>
<tr>
<td>Df</td>
<td>5</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.093</td>
</tr>
</tbody>
</table>

a. Kruskal Wallis Test  
b. Grouping Variable: Highest Level of Education Achieved

The above output (figure 6.4) based on an initial 'eyeball test' seems to indicate that education level could be a potential covariate of significance to the measurement of quality and effectiveness in online learning. However, to establish the extent of any relationships, a Kruskal-Wallis H Test was undertaken to determine the level of variance between the education levels (table 6.17) and their perceived level of quality and effectiveness (table 6.18), to ascertain if a significant level of influence from 'educational level' is apparent within this population sample.
The null hypothesis in this instance ‘The distribution of Total Perceived Quality and Effectiveness is the same across category levels of education achieved’ must be retained (Kruskal-Wallis H=0.093, df=5, p>0.05). The significance level is 0.05 (two-tailed). **These results suggest there is no statistically significant difference in perceptions of quality and effectiveness between students with differing levels of education in this sample population.** These results therefore suggest that ‘educational level’ can be ruled out as a potential covariate.

Figure 6.5 – The Influence of Study Status on Total Perceived Quality & Effectiveness

![Bar chart showing the influence of study status on total perceived quality and effectiveness.]

Table 6.19 – Study Status: Ranks

<table>
<thead>
<tr>
<th>Study Status: Full or Part or Individual Modules</th>
<th>N</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and Effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>181</td>
<td>204.33</td>
</tr>
<tr>
<td>Part-Time</td>
<td>160</td>
<td>202.60</td>
</tr>
<tr>
<td>Studying Individual Modules</td>
<td>39</td>
<td>179.01</td>
</tr>
<tr>
<td>Other</td>
<td>21</td>
<td>200.95</td>
</tr>
<tr>
<td>Total</td>
<td>401</td>
<td></td>
</tr>
</tbody>
</table>
The above output (figure 6.5) based on an initial ‘eyeball test’ seems to indicate that study status is not a potential covariate of significance to the measurement of quality and effectiveness in online learning. However, to establish the extent of any relationships, a Kruskal-Wallis H Test was undertaken to determine the level of variance between the study status (table 6.19) and their perceived level of quality and effectiveness (table 6.20), to ascertain if a significant level of influence from ‘study status’ is apparent within this population sample.

The null hypothesis in this instance ‘The distribution of Total Perceived Quality and Effectiveness is the same across differing categories of study status must be retained (Kruskal-Wallis H=0.657, df=3, p>0.05). The significance level is 0.05 (two-tailed). These results suggest there is no statistically significant difference in perceptions of quality and effectiveness between students with differing levels of study status in this sample population. These results therefore suggest that ‘study status’ can be ruled out as a potential covariate.
Figure 6.6 – The Influence of Work Commitments on Total Perceived Quality & Effectiveness

Table 6.21 - Hours Worked: Ranks

<table>
<thead>
<tr>
<th>Hours Worked Per Week</th>
<th>N</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and Effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-10 Hours</td>
<td>26</td>
<td>137.46</td>
</tr>
<tr>
<td>11-20 Hours</td>
<td>73</td>
<td>145.82</td>
</tr>
<tr>
<td>21-30 Hours</td>
<td>55</td>
<td>158.39</td>
</tr>
<tr>
<td>31-40 Hours</td>
<td>131</td>
<td>164.16</td>
</tr>
<tr>
<td>41+ Hours</td>
<td>29</td>
<td>173.09</td>
</tr>
<tr>
<td>Total</td>
<td>314</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.22 - Test Statistics\textsuperscript{a,b}

<table>
<thead>
<tr>
<th></th>
<th>Total Perceived Quality and Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>4.104</td>
</tr>
<tr>
<td>df</td>
<td>4</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.392</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Kruskal Wallis Test
\textsuperscript{b} Grouping Variable: Hours Worked Per Week
The above output (figure 6.6) based on an initial 'eyeball test' seems to indicate that hours worked per week is unlikely to be a potential covariate of significance to the measurement of quality and effectiveness in online learning. However, to establish the extent of any relationships, a Kruskal-Wallis H Test was undertaken to determine the level of variance between the number of hours students work (table 6.21) and their perceived level of quality and effectiveness (table 6.22), to ascertain if a significant level of influence from 'working hours' is apparent within this population sample.

The null hypothesis in this instance 'The distribution of Total Perceived Quality and Effectiveness is the same across differing categories of hours worked per week' must be retained (Kruskal-Wallis H=0.392, df=4, p>.05). The significance level is 0.05 (two-tailed). These results suggest there is no statistically significant difference in perceptions of quality and effectiveness between students with differing levels of weekly working hours in this sample population. These results therefore suggest that 'weekly working hours' can be ruled out as a potential covariate.

Figure 6.7 – The Influence of Institution and Location on Total Perceived Quality & Effectiveness
The above output (figure 6.7) based on an initial 'eyeball test' seems to indicate that student's home institution and location are unlikely to be a potential covariate of significance to the measurement of quality and effectiveness in online learning. However, to establish the extent of any relationships, a Kruskal-Wallis H Test was undertaken to determine the level of variance between student rankings from different locations (table 6.23) with regard to their perceived level of quality and effectiveness (table 6.24), to ascertain if a significant level of influence from 'location' is apparent within this population sample.

Table 6.23 – Location: Ranks

<table>
<thead>
<tr>
<th>Location-All</th>
<th>N</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and Effectiveness</td>
<td>UHI</td>
<td>354</td>
</tr>
<tr>
<td></td>
<td>Univ. of Glou.</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>UCD</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>406</td>
</tr>
</tbody>
</table>

Table 6.24- Test Statisticsa,b

<table>
<thead>
<tr>
<th></th>
<th>Total Perceived Quality and Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>9.039</td>
</tr>
<tr>
<td>df</td>
<td>3</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.029</td>
</tr>
</tbody>
</table>

a. Kruskal Wallis Test  
b. Grouping Variable: Location-All
The null hypothesis in this instance 'The distribution of Total Perceived Quality and Effectiveness is the same across differing categories of location' must be rejected (Kruskal-Wallis H=0.029, df=3, p<.05). The significance level is 0.05 (two-tailed).

These results suggest there is a statistically significant difference in perceptions of quality and effectiveness between students from differing locations and institutions in this sample population. An inspection of the mean ranks suggests that the 14 students based at UCD in Ireland provide the highest level of ratings for quality and effectiveness within online learning and 26 students based at 'other' locations provide the lowest rating levels.

As this difference in ratings is significant between locations, this suggests that some of the variance in student perceptions of quality and effectiveness (the dependent variable) is attributable to location. However, some caution must be taken with these results due to the small number of students (n=14) only 3% of the student sample for the covariate measure item whose ranked mean is significantly higher than those for other locations and (n=26) only 6% of the sample for the covariate measure item whose rank mean was the lowest of the groups tested from each location.

Furthermore due to the lesser power of non-parametric tests, in instances where they are close to the critical value (0.029 is within 0.021 of the critical value of significance, 0.05, used in this instance), Pell, (2005) advises caution in drawing any inferences. Siegel & Castellan, (1988) further state that when sample sizes are small using the Kruskal-Wallis analysis of variance ‘...it is difficult to distinguish between outcomes reflecting merely chance deviations (when H0 is true) and true differences (when H1 is true)' (p.210).
So, although location appears to be a statistically significant covariate which needs to be considered in context, the actual influence of this covariate measure on skewing the results connecting the independent variables with the dependent variable may be limited and of less significance to the sample population than determined by the statistical test applied here to analyse levels of variance.

However, as a confirmed covariate, some further tests have been undertaken to ascertain just where the difference are most pronounced in student’s perception of ‘quality and effectiveness’ in differing locations. A series of Mann Whitney U tests were undertaken to define the differences between each group of students based at each location. The results are as follows:

Table 6.25–Location UHI and UCD: Ranks

<table>
<thead>
<tr>
<th>Location-All</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and Effectiveness UHI</td>
<td>354</td>
<td>182.94</td>
<td>64760.00</td>
</tr>
<tr>
<td>Effectiveness UCD</td>
<td>14</td>
<td>224.00</td>
<td>3136.00</td>
</tr>
<tr>
<td>Total</td>
<td>368</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.26 -Test Statistics

<table>
<thead>
<tr>
<th>Total Perceived Quality and Effectiveness</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1925.000</td>
<td>64760.000</td>
<td>-1.428</td>
<td>.153</td>
</tr>
</tbody>
</table>

a. Grouping Variable: Location-All
Null Hypothesis: 'there is no difference in student perceptions of quality and effectiveness at the locations: UHI and UCD.' These results (tables 6.25 and 6.26) suggest that the null hypothesis must be accepted (Mann Whitney U=1925, z= -1.428, p>0.05). The significance level is 0.05, two-tailed. Students located at UHI and UCD do not therefore perceive differences in quality and effectiveness in online learning simply due to their differing locations.

Table 6.27- Location UHI and Univ. of Glouc.: Ranks

<table>
<thead>
<tr>
<th>Location-All</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and</td>
<td>UHI</td>
<td>354</td>
<td>184.16</td>
</tr>
<tr>
<td>Effectiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Univ. of Glouc.</td>
<td>12</td>
<td>164.04</td>
<td>1968.50</td>
</tr>
<tr>
<td>Total</td>
<td>366</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.28 Test Statistics

<table>
<thead>
<tr>
<th>Total Perceived Quality and Effectiveness</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1890.500</td>
<td>1968.500</td>
<td>-.653</td>
<td>.514</td>
</tr>
</tbody>
</table>

a. Grouping Variable: Location-All

Null Hypothesis: 'there is no difference in student perceptions of quality and effectiveness at the locations: UHI and University of Gloucestershire.' These results (tables 6.27 and 6.28) suggest that the null hypothesis must be accepted (Mann Whitney U=1890.5, z= -.653, p>0.05). The significance level is 0.05, two-tailed. Students located at UHI and the University of Gloucestershire do not therefore perceive differences in quality and effectiveness in online learning simply due to their differing locations.
Table 6.29 - Location Univ. of Glouc. And UCD: Ranks

<table>
<thead>
<tr>
<th>Location</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Univ. of Glouc.</td>
<td>12</td>
<td>11.21</td>
<td>134.50</td>
</tr>
<tr>
<td>UCD</td>
<td>14</td>
<td>15.46</td>
<td>216.50</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.30 - Test Statistics\(^b\)

<table>
<thead>
<tr>
<th>Total Perceived Quality and Effectiveness</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
<th>Exact Sig. [2*(1-tailed Sig.)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and Effectiveness</td>
<td>56.500</td>
<td>134.50</td>
<td>-1.439</td>
<td>0.150</td>
<td>0.160(^a)</td>
</tr>
</tbody>
</table>

a. Not corrected for ties.
b. Grouping Variable: Location-All

Null Hypothesis: 'there is no difference in student perceptions of quality and effectiveness at the locations: UCD and University of Gloucestershire.' These results (tables 6.29 and 6.30) suggest that the null hypothesis must be accepted (Mann Whitney U=56.5, z= -1.439, p>0.05). The significance level is 0.05, two-tailed. Students located at UCD and the University of Gloucestershire do not therefore perceive differences in quality and effectiveness in online learning simply due to their differing locations.

In summary, as there is no significant difference in how students associated with the main institutions targeted in this study perceive quality and effectiveness in online learning, we can reject 'location' as being a potential confounding covariate.
The 'other' category is not a cohesive category as it is comprised of students from a range of 16 different locations and so the individual results that make up this category are not considered to be a statistically significant influence on overall student perceptions of quality and effectiveness in online education.

Further research found that students in the 'other' category differed significantly in their views on quality and effectiveness in online education from students at UHI (Mann Whitney U=3279, z= -2.466, p<.05) and from students at UCD (Mann Whitney U=78, z= -2.979, p<.05), but not from those students at the University of Gloucestershire (Mann Whitney U=124.5, z= -1.004, p>.05).

Finally, a series of six further Kruskal-Wallis H tests examined each of the six independent variable measures and found that the null hypothesis in each instance related to 'does not vary with study location' had to be retained:

'The distribution levels of student perceptions of 'ICT, Access, Skills & Knowledge' does not vary with study location' must be retained (Kruskal- Wallis H=0.901, df=2, p>0.05). The significance level is 0.05 (two-tailed).

'The distribution levels of student perceptions of 'Readiness & Preparation' does not vary with study location' must be retained (Kruskal- Wallis H=0.210, df=2, p>0.05). The significance level is 0.05 (two-tailed).

'The distribution levels of student perceptions of 'Tutor to Student Interaction' does not vary with study location' must be retained (Kruskal- Wallis H=0.195, df=2, p>0.05). The significance level is 0.05 (two-tailed).

'The distribution levels of student perceptions of 'Student to Student Interaction' does not vary with study location' must be retained (Kruskal- Wallis H=0.461, df=2, p>0.05). The significance level is 0.05 (two-tailed).

'The distribution levels of student perceptions of 'Course Design' do not vary with study location' must be retained (Kruskal- Wallis H=0.235, df=2, p>0.05). The significance level is 0.05 (two-tailed).

'The distribution levels of student perceptions of 'Knowledge & Experience of Delivery Technologies' do not vary with study location' must be retained (Kruskal- Wallis H=0.073, df=2, p>0.05). The significance level is 0.05 (two-tailed).
In each instance the null hypotheses testing student perspectives between each independent variable and location are retained, suggesting that the findings from the statistical tests (on the data gathered in this study) in section 6.7 are representative of student views from all three locations.
6.7 An Analysis of the Significance of the Independent Variables on Quality and Effectiveness

A series of statistical tests have been undertaken to ascertain the level of correlation between the independent measures outlined in table 6.12 with the dependent measure also outlined in the same table named 'Measure of Quality and Effectiveness'. The means by which the strength of the relationships between the independent variables and the dependent variable will be established is set out in table 6.2. Spearman's Rank Order Correlation ($\rho$) is used. This method is the non-parametric alternative to Pearson's product-moment correlation ($r$), the parametric equivalent. When compared to this 'powerful' parametric equivalent, the efficiency of $\rho$ is seen to be 91% of $r$. In other words $\rho$ is as efficient as $r$ in rejecting the null hypothesis 91 times out of 100 (Siegel & Castellan, 1998).

Furthermore, with a sample size of over 500 students ($n=507$) the ability of these tests to discriminate between the null and alternative hypotheses is high in comparison to the majority of studies published in the field which were examined as part of the research for this study. According to Florey, (1993) the sample size used should be justified by examination of other published material in the sector. Due to power-efficiency this means that $\rho$ at 91% will be just as effective as a parametric test with a sample size that is 9% larger, if all assumptions were met (Siegel & Castellan, 1998). So even if we presumed a 9% smaller sample size ($n=461$) and the application of parametric tests, the sample would still compare well with samples used in other published material in the sector and we could be confident in our results.

The scatter plot diagrams in appendix 3 are able to illustrate the relationships between the dependent variable (Measure: Quality & Effectiveness) and the independent variables (Measures 1-6) are positive.
The above-mentioned statistical test \((\rho)\) is able to determine the strength of the positive relationships indicated by the scatter plot diagrams. Pallant, (2001) advises an interpretation of \(\rho\) in line with the criteria used to interpret \(r\). The output range -1.00 to 1.00 indicates the direction and strength of the relationship between the variables being measured.

A correlation of 0 indicates the absence of any relationship at all. -1.00 indicates a perfect negative correlation and 1.00 indicates a perfect positive relationship.

Kraemer et al, (2003) suggest the following interpretation (table 6.31) of the ‘\(r\) family’ correlation, including Spearman’s \(\rho\):

<table>
<thead>
<tr>
<th>General Interpretation of the Strength of a Relationship</th>
<th>The (r) Family</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much Larger than Typical</td>
<td>(\geq 0.70)</td>
<td>.70 to 1.0</td>
</tr>
<tr>
<td>Large or Larger than Typical</td>
<td>0.50</td>
<td>.50 to .69</td>
</tr>
<tr>
<td>Medium or Typical</td>
<td>0.30</td>
<td>.30 to .49</td>
</tr>
<tr>
<td>Small or Smaller than Typical</td>
<td>0.10</td>
<td>.10 to .29</td>
</tr>
</tbody>
</table>

The first measure to be tested against the dependent measure (quality and effectiveness) is the independent variable ‘ICT Skills, Access & Knowledge’.
Table 6.32 – Correlations- Measure 1

<table>
<thead>
<tr>
<th></th>
<th>Total Perceived Quality and Effectiveness</th>
<th>Measure 1 - ICT Access, Skills &amp; Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Perceived Quality and Effectiveness</td>
<td>Spearman’s rho</td>
<td>Correlation Coefficient</td>
</tr>
<tr>
<td>Effectiveness Sig. (1-tailed)</td>
<td>.</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>406</td>
<td>397</td>
</tr>
<tr>
<td>Measure 1 - ICT Access, Skills &amp; Knowledge Correlation Coefficient</td>
<td>.323</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>397</td>
<td>475</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (1-tailed).

The null hypothesis being tested is: ‘Students that are measured as having enhanced levels of ICT skills, access and knowledge for online learning will not rate their online learning experience as being of higher quality than that of the wider student sample.’

These results (table 6.32) suggest that the null hypothesis must be rejected (Spearman’s rho=0.323, n=397, p<0.01) as the relationship between Measure 1 (ICT Skills, Access & Knowledge) and the dependent variable is both positive and significant. The significance level is 0.01, single-tailed. As there is a positive correlation that is significant, students who have enhanced levels of ICT, skills, access and knowledge will perceive their online education experience to be positively associated with the dependent measure: quality and effectiveness.

The second measure to be tested against the dependent measure (quality and effectiveness) is the independent variable ‘Readiness & Preparation’.
The null hypothesis being tested is: *Students that are measured as having enhanced levels of readiness and preparation for online learning will not rate their online learning experience as being of higher quality than that of the wider student sample.*

These results (table 6.33) suggest that the null hypothesis must be rejected (Spearman's rho = 0.083, n = 401, p < 0.05) as the relationship between Measure 2 (Readiness & Preparedness) and the dependent variable is both positive and significant, albeit only approaching the 'smaller than typical' relationship level. The significance level is 0.05, single-tailed.

As there is a positive correlation that is significant, students who have enhanced levels of readiness and preparedness for online education will perceive their online education experience to be positively associated with the dependent measure: quality and effectiveness.

The third measure to be tested against the dependent measure (quality and effectiveness) is the independent variable ‘Tutor-Student Interaction’.
Table 6.34– Correlations – Measure 3

<table>
<thead>
<tr>
<th></th>
<th>Total Perceived Quality and Effectiveness</th>
<th>Measure 3 - Tutor to Student Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Perceived Quality</td>
<td>1.000</td>
<td>.482**</td>
</tr>
<tr>
<td>and Effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness Sig. (1-tailed)</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>394</td>
<td>414</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (1-tailed).

The null hypothesis being tested is: ‘Students that are measured as having enhanced levels of tutor-student interaction/communication will not rate their online learning experience as being of higher quality than that of the wider student sample.’ These results (table 6.34) suggest that the null hypothesis must be rejected (Spearman's rho=0.482, n=394, p<0.01) as the relationship between Measure 3 (Tutor-Student Interaction) and the dependent variable is both positive and significant. The significance level is 0.01, single-tailed.

As there is a positive correlation that is significant, students who have enhanced levels of Tutor-Student Interaction will perceive their online education experience to be positively associated with the dependent measure: quality and effectiveness.

The fourth measure to be tested against the dependent measure (quality and effectiveness) is the independent variable ‘Student-Student Interaction’.
Table 6.35 – Correlations – Measure 4

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Total Perceived Quality and Effectiveness</th>
<th>Measure 4 - Student to Student Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>Sig. (1-tailed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>406</td>
</tr>
<tr>
<td>Measure 4 - Student to Student Interaction</td>
<td>Correlation Coefficient</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>376</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (1-tailed).

The null hypothesis being tested is: ‘Students that are measured as having enhanced levels of student-student interaction/communication will not rate their online learning experience as being of higher quality than that of the wider student sample.’ These results (table 6.35) suggest that the null hypothesis must be rejected (Spearman’s rho=0.375, n=376, p<0.01) as the relationship between Measure 4 (Student-Student Interaction) and the dependent variable is both positive and significant. The significance level is 0.01, single-tailed.

As there is a positive correlation that is significant, students who have enhanced levels of Student-Student Interaction will perceive their online education experience to be positively associated with the dependent measure: quality and effectiveness.

The fifth measure to be tested against the dependent measure (quality and effectiveness) is the independent variable ‘Student-Student Interaction’.
Table 6.36 – Correlations – Measure 5

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Total Perceived Quality and Effectiveness</th>
<th>Correlation Coefficient</th>
<th>Measure 5 - Course Design</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1.000</td>
<td>.170</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>406</td>
<td>336</td>
</tr>
<tr>
<td>Measure 5 - Course Design</td>
<td>Correlation Coefficient</td>
<td>.170*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>336</td>
<td>346</td>
</tr>
</tbody>
</table>

\* Correlation is significant at the 0.01 level (1-tailed).

The null hypothesis being tested is: ‘Students that are measured as having enhanced levels of satisfaction with course design issues will not rate their online learning experience as being of higher quality than that of the wider student sample.’ These results (table 6.36) suggest that the null hypothesis must be rejected (Spearman’s rho=0.170, n=336, p<0.01) as the relationship between Measure 5 (Course Design) and the dependent variable is both positive and significant. The significance level is 0.01, single-tailed.

As there is a positive correlation that is significant, students who have enhanced levels of satisfaction with Course Design issues will perceive their online education experience to be positively associated with the dependent measure: quality and effectiveness.

The sixth and final measure to be tested against the dependent measure (quality and effectiveness) is the independent variable ‘Knowledge and Experience of Delivery Technologies’.

Page 264
Table 6.37 – Correlations – Measure 6

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Total Perceived Quality and Effectiveness</th>
<th>Measure 6 - Knowledge and Experience of Delivery Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>406</td>
</tr>
<tr>
<td>Measure 6 - Knowledge and Experience of Delivery</td>
<td>Correlation Coefficient</td>
<td>.437**</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>392</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (1-tailed).

The null hypothesis being tested is: ‘Students that are measured as having enhanced levels of knowledge and experience of delivery technologies will not rate their online learning experience as being of higher quality than that of the wider student sample.’ These results (table 6.37) suggest that the null hypothesis must be rejected (Spearman's rho=0.437, n=392, p<0.01) as the relationship between Measure 6 (Knowledge and Experience of Delivery Technologies) and the dependent variable is both positive and significant. The significance level is 0.01, single-tailed.

As there is a positive correlation that is significant, students who have enhanced levels of knowledge and experience with delivery technologies will perceive their online education experience to be positively associated with the dependent measure: quality and effectiveness.
In summary, all the independent variable measures identified and developed as part of this research study are found to have a positive correlation with the quality and effectiveness dependent measure. In other words those measures with high scores in terms of levels of agreement (on the Likert-scale) related to each measure, are directly related with high scores originating from student perspectives on the dependent variable, quality and effectiveness.

In each instance (table 6.38), the level of positive association between the independent variables and the dependent variable was found to be significant at the p<0.01 or p<0.05 level, one-tailed.

Table 6.38 – Level of Correlation – All Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality &amp;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>0.323**</td>
<td>0.083*</td>
<td>0.482**</td>
<td>0.375**</td>
<td>0.170**</td>
<td>0.437**</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01

This research established that there are positive correlations between the independent measures developed and the dependent measure. This does not tell us that there is a causal relationship present between such measures. In this instance before we can attempt to consider elements of causation, we must also control for any potential confounding relationships. As outlined above, it is the three measures with the most significant correlation with the dependent variable that will be explored further.
In this instance: Measure 3 – Tutor-Student Interaction, Measure 6 – Delivery Technologies and Measure 4 – Student-Student Interactions were the three measures most positively correlated with the dependent measure - Quality and Effectiveness. As indicated in Section 6.1, it is the nature of the relationship of these three measures with the dependent variable that we will now go on to investigate further. To do this we must calculate what is referred to as the ‘coefficient of determination’ (Pallant, 2001). This test indicates to what extent future tests might be able to predict outcomes using this particular research model. It is a test of the 'goodness of fit' of the statistical model used in the research.

Measure 3 (Tutor-Student Interaction) is able to explain 23.2% ([0.482 x 0.482] x100) of the variance in respondents’ scores on the ‘Quality and Effectiveness’ scale.

Measure 6 (Delivery Technologies) is able to explain 19.1% ([0.437 x 0.437] x100) of the variance in respondents’ scores on the ‘Quality and Effectiveness’ scale.

Measure 4 (Student-Student Interaction) is able to explain 14.1% ([0.375 x 0.375] x 100) of the variance in respondents’ scores on the ‘Quality and Effectiveness’ scale.

Together, the three most significant measures are able to account for 56.4% of the variance in respondents’ scores. According to Diamond and Jefferies, (2001) an $r^2$ value of around 0.5 in the social sciences is considered to be a good fit, where 1 is considered a perfect fit. Collectively, the three remaining measures (ICT Skills, Access & Knowledge, Preparedness & Readiness and Course Design) account for a further 14% of the variance of respondents’ scores on the ‘Quality & Effectiveness’ scale. In total, the six measures tested as part of this research account for 70.4% (refer to table 6.39) of the variance of respondents’ scores.
Table 6.39 – Calculated Variance Per Measure

<table>
<thead>
<tr>
<th>Measures</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>r² x 100</td>
<td>10.4%</td>
<td>0.7%</td>
<td>23.2%</td>
<td>14.1%</td>
<td>2.9%</td>
<td>19.1%</td>
</tr>
</tbody>
</table>

Yet to be confident of these findings, the potential confounding covariate of ‘age’ must now also be examined.

Although the Kruskal-Wallis H Test allows us to conclude that there are significant differences amongst the groups sampled (age groups: 15-20; 21-29; 30-39; 40-49; 50+) it does not tell us what these differences are. To determine the potential interacting or confounding impacts effects from differing age groups, a Spearman’s rho correlation test was undertaken to determine the strength of the relationship between differing age groups and the dependent measure – Total Perceived Quality & Effectiveness.

Table 6.40 – Potential Covariate Correlation: Age

<table>
<thead>
<tr>
<th>Spearman’s rho</th>
<th>Total Perceived Quality and Effectiveness</th>
<th>Correlation Coefficient</th>
<th>Age Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1.000</td>
<td>.059</td>
</tr>
<tr>
<td></td>
<td>Total Perceived Quality and Effectiveness</td>
<td>Sig. (2-tailed)</td>
<td>.240</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>406</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>402</td>
</tr>
<tr>
<td>Age Groups</td>
<td>Correlation Coefficient</td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.240</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td></td>
<td>402</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>501</td>
</tr>
</tbody>
</table>
The null hypothesis being tested on this variable as a result of previous findings is: "The differences in student perceptions of quality and effectiveness which vary with age group will not have a significant influence on the overall variance in respondents' scores on the quality and effectiveness scale." These results (table 6.40) suggest that the null hypothesis should be accepted (Spearman's rho=0.059, n=402, p>0.05) as although the relationship between differing age groups and the dependent variable is positive, it is not considered significant. The significance level is 0.05, two-tailed.

Ultimately, 'differing age groups' is only able to explain 0.3% ([(0.059 x 0.059) x100] of the variance in respondents' scores on the 'Quality and Effectiveness' scale and this effect is not statistically significant. These correlation findings therefore suggest that this potential covariate (differences in age) can be ruled out as having a significant interacting or confounding effect on the main independent variables tested.

To confirm these results a further partial correlation (table 6.41) was run to control for the effect and influence of 'age' on the correlations linking the three most significant independent variables with the dependent variable. The results were as follows (note: the before and after values will vary slightly from the original Spearman's rho correlation coefficients as SPSS uses 'zero-order Pearson correlations' for its partial correlation calculations).

Essentially, this is a parametric test being applied on ordinal data and so is shown for illustrative purposes:
Table 6.41 – Partial Correlation: Age-Controlled Results

<table>
<thead>
<tr>
<th>Measure</th>
<th>Original Correlation Result (r1)</th>
<th>Age-Controlled Result (r2)</th>
<th>$r^2$ (coefficient of determination)</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>r1</td>
<td>r2</td>
</tr>
<tr>
<td>3</td>
<td>0.472</td>
<td>0.479</td>
<td>0.223</td>
<td>0.229</td>
</tr>
<tr>
<td>6</td>
<td>0.470</td>
<td>0.467</td>
<td>0.221</td>
<td>0.218</td>
</tr>
<tr>
<td>4</td>
<td>0.354</td>
<td>0.371</td>
<td>0.125</td>
<td>0.137</td>
</tr>
</tbody>
</table>

As the variance calculated by $r$ is close in value to $\rho$, we can make the case to use this test for illustrative purposes, with caution, to investigate the controlling of the effects of ‘age’ (holding this third variable constant) on the correlations involving the three independent variables with the most significant correlation with the dependent variable.

The results, with their limitations, suggest a non-significant confounding effect from ‘age’. With only a small increase or decrease in the strength of the correlations in table 6.41, this suggests that the observed relationships between independent variable measures 3, 6 and 4 on the dependent variable are not significantly influenced by age.

The combination of results above suggests that the potential confounding effects of ‘age’ on this research model is minimal and can be ruled out for statistical purposes.
6.7.1 Socio-Demographic Factors and Variance

Anecdotal evidence associated with the case study online UHI degree programme which has been compared and contrasted throughout this research study, suggests that socio-demographic factors play a significant role in the resilience of adult online learners and is therefore also likely to impact on quality perceptions. Several studies from associated literature also suggest a similar potential impact from other socio-demographic factors.


In summary, in addition to the case study degree considered as part of this research, numerous other researchers have also identified socio-demographic factors within the scope of their studies (Yukselturk & Bulut, 2009; Lu & Chiou, 2010; Blackmore et al, 2008). Therefore, in attempting to further investigate the 29.6% of variance unaccounted-for from the use of the research model applied in this instance, an investigation of the cumulative impact of socio-demographic factors (gathered as part of this research study) was examined.
A series of further Spearman's rho correlations are used to further investigate these factors in table 6.42:

### Table 6.42 - Socio-Demographic Factors and Variance

<table>
<thead>
<tr>
<th>Socio-Demographic Factors</th>
<th>Spearman’s rho (correlation coefficient)</th>
<th>$r^2$ (coefficient of determination)</th>
<th>% Variance</th>
<th>Cumulative Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differences in Age Group Perceptions</td>
<td>0.059</td>
<td>0.003</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Presence of a 'friends and family' support system</td>
<td>-0.048</td>
<td>0.002</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Impact of Caring responsibilities</td>
<td>0.026</td>
<td>0.001</td>
<td>0.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Impact of Child Dependents U16</td>
<td>-0.178</td>
<td>0.032</td>
<td>3.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Impact of Hours Worked Per Week</td>
<td>0.039</td>
<td>0.002</td>
<td>0.2</td>
<td>4.0</td>
</tr>
<tr>
<td>Differences in Male-Female Perceptions</td>
<td>0.026</td>
<td>0.001</td>
<td>0.1</td>
<td>4.1</td>
</tr>
<tr>
<td>Impact of Level of Education Achieved</td>
<td>-0.044</td>
<td>0.002</td>
<td>0.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Impact of Differing Study Modes</td>
<td>-0.166</td>
<td>0.027</td>
<td>2.7</td>
<td>7.0</td>
</tr>
<tr>
<td>Impact of Study Status: Full, Part-time or Unstructured</td>
<td>-0.038</td>
<td>0.001</td>
<td>0.1</td>
<td>7.1</td>
</tr>
<tr>
<td>Impacts of Length of Time Studying (Year of Study)</td>
<td>0.170</td>
<td>0.029</td>
<td>2.9</td>
<td>10.0</td>
</tr>
<tr>
<td>Differences in Location and Preferences</td>
<td>-0.069</td>
<td>0.005</td>
<td>0.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>

The conclusion is that the analysis of the socio-demographic factors collected as part of this research study suggests that a further 10.5% of variance in student perceptions of the dependent variable: quality and effectiveness, is due to their influence.

In total, the research model's independent measures and socio-demographic factors combined, account for 80.6% of the variance in student scores on the quality and effectiveness scale. According to Diamond and Jefferies, (2001) an $r^2$ value of around 0.8 in the social sciences is considered to be an 'excellent fit, where 1 is considered a perfect fit. A further discussion of these results and how they link to findings from the literature and further qualitative data captured is presented in chapter 7.
6.8 Focus Group Findings

A series of three focus group sessions were carried out as part of this research, with three separate student cohorts in each institution. Comparing and contrasting the qualitative data attained at these focus group sessions with the data obtained and examined from a quantitative perspective from the main survey, provides an important check on the questionnaire-derived data and findings.

Each focus group session took place during existing ‘residential’ events where online distance learning students have been provided an opportunity to meet-up with their peers and tutors. The first meeting with students took place in Carnew, County Wicklow, Ireland in February 2007. The second meeting with students took place in Inverie, Knoydart, Scotland in April 2010. The third and final meeting with students took place in Cheltenham, Gloucestershire in England in January 2011.

The approach taken with each group was designed to create a relaxed and friendly atmosphere in which students could be free to express their thoughts and experiences. The facilitator (i.e. myself) introduced himself and gave a short introduction about his work background, provided background to his current research and sought to empathise with the group. The facilitator began the sessions by talking first-hand about the challenges of part-time study whilst working full-time and bringing up a young family provided a means to draw students into relaying their own experiences. This proved an effective method in each instance to draw-out discussion on the challenges facing distance learning students.

As recommended by Morgan, (1997) rather than opinions and attitudes, the approach to these sessions focused on drawing students into discussing personal experience.
This is based on the belief that self-reported behaviour is of more use to the research process than views and opinions based on an unknown grounding in knowledge and experience (ibid, p.20). The very process of sharing and comparing experiences and the observation of consensus and diversity forming is potentially of enormous value to the researcher in understanding student perspectives (ibid, p.21). As pointed out by Kitzinger, (1995) although questionnaires can point to differences in knowledge and behaviour, focus groups are perhaps better able to provide the explanations as to why these differences occur.

Building upon the 80.6% of variance of student ratings of quality and effectiveness shown to come from the independent variables and socio-demographic factors identified, focus groups, through their discussions of actual student experience and perceptions were used to investigate the other aspects of variance not captured in survey data.

6.8.1 Communities of Practice

The Irish student group dynamic was centred around ‘camaraderie’ and was described by one student as a ‘sense of being it in together’ which was echoed widely and was a cultural norm for this group. The consensus view was that inter-student communications were as important a support network (more so to some) than that provided by their tutors. To illustrate this, one particular student intimated how her daughter had got sick and she had to take time off work to look after her and fell quite far behind with the course, to the point she decided she should leave. Having phoned another student to let her know about her decision a subsequent campaign of phone calls and emails from her classmates persuaded her to stay on. She felt she could not leave as she might be letting others down. Several other students had similar stories.
The Scottish student group was from a more diverse range of backgrounds and appeared 'less connected' than the Irish group of students. These students emphasised the role of residential events where students could meet face-to-face as being of central importance to their development of social links.

The consensus amongst this online group was that their social links to support studying at a distance were not as strong as they might be. This was refuted by one student from a different programme which included more face-to-face on-campus daytime classes.

She observed that this online group of learners was actually much more socially interactive than her classmates in her daytime on-campus classes that she attended in person in Inverness. She used a particular example to illustrate her point. This student pointed out that her face-to-face classmates had never worked together to make a student application for funding to attend a UK conference on sustainability in London, as this online group of students had done only months earlier. The 'dissenting voice' led to a consensus that on reflection the social linkages in this student group were strong, but there was a desire to develop them further.

Although being from a geographically diverse spread of locations, the working background of the English cohort of students was very uniform, as in the Irish instance. Similar to the Irish group they placed considerable emphasis on support from other students in the group, although this group did emphasise the importance of their tutors in this role too. One student commented that he considered the sense of togetherness as being essential to his resilience on the course.
This was agreed with by the wider group and one student recounted how just during the previous week she and three others from the student group had met at her house one evening to discuss approaches to upcoming presentations and to generally support each other. A light-hearted debate then ensued about which of the students provided the best hospitality and it became apparent that this group had strong social linkages. Regular emails and telephone calls were reported to take place between students.

It is clear that student-student interaction played an important role for the Irish and English groups in particular and clearly contributes towards the resilience of the student group in each instance. In the Scottish group, although social links were apparent, there seemed to be less of a willingness to communicate ‘out of hours’ on study issues and they appeared to be closer to some descriptions of ‘field independent learners’ (Oh & Lim, 2005).

6.8.2 The Tutor and Support

In addition to support from the student group, several students in the English group emphasised the important role of the tutors in providing extra support when necessary. This role and expectation was the consensus view and was emphasised more strongly than by either the Scottish or Irish groups. The English student cohort considered their level of access to their tutor as being the most important factor related to the quality of their experience as online distance learners. Both the other groups acknowledged the importance of tutor direction and facilitation, but appeared to seek advice and help from staff less than the English group for general studies support.
6.8.3 Family and Friends Support

The importance of family and friends as part of the distance-learner's support network was discussed with all three groups. The Irish cohort of students placed most emphasis on this element. One Irish student relayed to the group how at weekends her partner was able to look after the kids and give her time to progress her studies.

Another Irish student then imparted how when her partner had come home from work that very weekend she has passed the kids straight to him, gave him a peck on the cheek, packed her bags and set off (without looking back) for this weekend of study. She joked as to how her partner would be coping without her and this resulted in some further jokes and comments about other partners of those present, at home coping with their kids. This drew out quite a bit of laughter, but seemed a familiar scenario to most students present.

This typified the strength of this community of learners and their camaraderie and feeling of all being in this learning process together. A supportive, rather than competitive, environment was apparent amongst the Irish group of learners. This resonates with a number of points and issues identified in the literature review (Paulus, 2006, Rovai, 2002).

Both Scottish and English groups of students recognised family and friends support as being important but neither expanded on this particular point when prompted. In the main study questionnaire only 0.2% of variance in student ratings on the quality and effectiveness of the student online learning experience was attributed to this factor.
6.8.4 Delivery Technologies & ICT Skills

The Irish student cohort did not view delivery technologies as an important issue. Only three students at the time of the focus group (2007) had broadband. These students reported the enhanced web-search abilities which were not previously available. The rest of the student group only used Blackboard to keep up with course news and assessment deadlines. In the Irish instance all course materials, including podcasts in some instances, were available on CD-ROM. Their internet use was limited (by dial-up) and this may explain the consensus which rated technology-related issues as being a low priority to their success on the course.

In addition to changes in their home and work life, one student in the English cohort identified technology as being a stress factor in their studies. He mentioned in particular the move from WebCT to Moodle and his lack of technical know-how. Subsequent technology issues were mentioned e.g. about the Moodle Discussion Board and a consensus formed that lack of familiarity with Moodle was a technological stress factor. However, the Discussion Boards were used regularly and liked by some students in the group, whilst others admitted rarely entering them as they were not marked towards course grades.

The Scottish cohort of students were users of Blackboard and like the English cohort, many of them admitted failing to use the Discussion Boards regularly due to the fact that they were not marked and so seen as an ‘overhead’, in the words of one student. Another student indicated that in her experience of using other ‘discussion’ software online, it was the Blackboard Discussion Board software itself that was the problem as it did not lend itself effectively to threaded discussions.
The following view expressed by the English student cohort was also expressed by
the Scottish cohort of students. If the first student posting was comprehensive then
it often meant that there was nothing left to say, particularly if they agreed with its
sentiments. In other instances in both groups, students felt intimidated by such
postings. They described the discussion as being 'killed' by such large opening
comprehensive postings. In the Scottish instance during this discussion one student
apologised to the wider group. This was accepted with some humour by those
present.

The Scottish cohort also critiqued the chat element of Blackboard and widely
expressed a liking for Skype as a viable alternative. A debate ensued on the pros
and cons of both technologies and the consensus view was that Skype was the
preferred technology. A further debate on recorded video conference classes
ensued and the consensus view was critical of such content as being of real
educational use. It was further noted that at exam time when such a resource might
be useful in terms of revision, such weekly recordings had been deleted. The
institution, it was discussed, had a time limit policy on such recordings.

In terms of whether student use of course technologies should be compulsory or
not, a surprising consensus was reached that agreed that use of participatory
technologies should be compulsory and that there should be some penalty for not
engaging. If the use of prescribed communication technologies (e.g. discussion
forums) was not compulsory then they should not be used, as the student group
claimed they would just be viewed as an additional overhead and so would not be
willing to participate regularly. The English cohort of students stated a similar
perspective, as if not marked, students rarely entered discussion boards.
6.8.5 Course Design & Web 2.0

Neither the English or Irish cohorts of students had any significant knowledge of Web 2.0 technologies and indeed were not able to name any Web 2.0 applications when asked. With some prompting the English group identified social networking and Skype.

Most of the Scottish cohort of students was able to name three separate Web 2.0 applications (Blogs, Wikis and Facebook being the most common responses). Both Scottish and English cohorts mentioned the added complexity of having to setup additional logins at separate sites. This was seen as a negative factor by both these groups.

The Scottish cohort of students was asked about an initiative to update and standardise the design of the tutor-developed online content. The new content was in the words of one student 'a significant improvement on the mis-mash of tutor content previously available'. The student group came to a consensus that it should strongly support this course design initiative.

The English cohort of students also discussed the course design with regard to the use of the VLE and its flexibility benefits. Some students agreed that it was a useful tool given its flexibility, although other students indicated they rarely used the discussion boards as they were not marked. No consensus was reached about the usefulness or otherwise of discussion boards in the design of the course from either group.
6.8.6 Assessment & Feedback

Assessment was a big challenge for all three cohorts. The Irish students expressed a view that was expressed by all three groups and this related to meeting assessment deadlines. Time management was difficult for all three adult learning groups. The Irish cohort in particular came to a consensus that it was difficult, as a mature student, to hand-in work that was not considered to be their very best. Yet often compromises had to be made on quality to meet deadlines and most students in the Irish cohort admitted to having to do this and not feeling comfortable in doing so. The English cohort of students also discussed this latter point and identified meeting assessment deadlines as being one of the stresses that impacted on the quality of their experience.

The consensus within the Scottish cohort focused on the lack of logic of programming exams as assessments within online courses. As their course promoted itself on its flexibility as being a selling point and a means which attracted students present onto the programme, the logic of scheduling inflexible assessments at several periods throughout the year, in their view, appeared flawed.

6.8.7 Motivations

The motivations of the English cohort varied from helping them advance their careers and helping to undertake their existing job better. In several instances amongst older students the motivation was more about 'getting a degree'. The motivations of the Irish cohort were very similar and also with a work-related focus on helping them to do their existing job better. Relevant and transferable skills applicable to their workplace were mentioned and this was a consensus perspective.
The Scottish cohort were also drawn on what their motivations were. Several students stated the course provided skills of relevance to the workplace and this link with real-life skills was mentioned by two students present. One other student commented that she was doing the degree 'to get a degree' and perceived the subject of the degree as being relevant to her ability to find more suitable/permanent work in the future. One other student mentioned she was doing it for interest. The mix of motivations appeared to be wider in the Scottish cohort than in the other two groups.

**6.8.8 Flexibility**

The Scottish cohort of students discussed flexibility of course attendance with regard to course tutorials in particular. A majority of students agreed that if increased flexibility led to a drop-off in attendance at online chat tutorials then it may be reasonable to reduce flexibility in this area and make attendance at a level of 70% mandatory at such events.

Not all students agreed with this majority view, although no specific points were made against it. A consensus was reached on the value of online chat tutorials being diminished by drop-offs in attendance. The majority of Scottish students present suggested a move away from exams as a means to enhance the flexibility of the course and adhere to its ethos of flexibility. This was not a unanimous view, as two students present did state that they preferred to retain exams. Continual assessment was suggested by the majority of students as the most appropriate means to test flexible online student cohorts, rather than end-of-module exams.
Flexibility was also identified by the English cohort of students as being an important reason why some of those students present registered on the course in the first instance. One student indicated that if it was not for the flexibility of the course, she would not be studying a Higher Education course at all. Several other students present nodded their heads in agreement.

6.8.9 Summary and Analysis of Findings

Although all three groups were registered on courses whose delivery was centred around VLEs (Blackboard and Moodle) and were considered to be online distance learners, it is clear that significant differences in the cohorts existed. This qualitative data highlights the extent to which online learners differ in their outlook and priorities when it comes to online learning. Although there are similarities in some instances (e.g. in focusing on student communities for support, or in their views on the use of discussion boards) there are many differences (e.g. views expressed on the importance of tutor input and support, perspectives of technology as an enabler, study motivations). In this data capture instance (from focus groups) the sample number of students included at each site was similar and so some of the limitations discussed in section 6.5 do not pertain to this dataset. A further discussion of the findings from these focus groups will be undertaken in the concluding chapter of this research dissertation.
6.9 Qualitative ‘Open-Ended Question’ Comments

Students were asked to post ‘any final comments on issues that influence the quality of your studies’. There was a total of 106 qualitative comments added to the end of the main survey. An examination of qualitative statements from the main survey is a means to add a third data source and triangulate the data gathered to provide a more trustworthy and pervasive set of results in comparison to those that rely on a single data source (JISC, 2007d). Cutcliffe & Mckenna, (2002) describe qualitative research as "...a craft paradigm, that is, an activity that is not described solely or wholly as neither a science nor an art, but might have elements of each."

In recognition of a range of different approaches in the literature (Fillion et al, 2009; Harrison, 2006; Wu & Hiltz, 2004) to the analysis of qualitative data a consistent approach will be used for qualitative coding in this research. To be consistent the headings used in the focus group analysis will also be applied to the examination of qualitative statements from the main survey. Verbatim comments made by participants will be used and placed in quotation marks and italics to illustrate research interpretations of the data. Table 6.43 represents the breakdown of the 106 contributors who left comments as part of this qualitative data-capture exercise (note some comments had multiple codings):

<table>
<thead>
<tr>
<th>Qualitative Comment</th>
<th>Number of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communities of Practice</td>
<td>13</td>
</tr>
<tr>
<td>The Tutor and Support</td>
<td>25</td>
</tr>
<tr>
<td>Family &amp; Friends Support</td>
<td>1</td>
</tr>
<tr>
<td>Delivery Technologies &amp; ICT</td>
<td>16</td>
</tr>
<tr>
<td>Course Design &amp; Web 2.0</td>
<td>25</td>
</tr>
<tr>
<td>Assessment &amp; Feedback</td>
<td>8</td>
</tr>
<tr>
<td>Motivations</td>
<td>4</td>
</tr>
<tr>
<td>Flexibility</td>
<td>3</td>
</tr>
</tbody>
</table>
6.9.1 Communities of Practice

A limited number of comments were made on this particular issue, although those comments that were forthcoming were illuminating and present some real pause for thought relating to course design. The comments were split between those students who wished more inter-student participation and those students who preferred to work on their own and who chose online learning for this very reason. One student also reported that he/she was just not sure of the level of communications and/or support the he/she should be seeking from her/his peers. In terms of enhancing communications and community building among the student group, one student suggested the need for each VLE module site to have a ‘less formal’ discussion board area for general chat between students. Another student commented that more inter-student communications are needed to enhance the quality of his/her experience. Three further student postings linked feelings of ‘isolation’ relating to online study, with the need to develop enhanced student-student opportunities for interaction, being suggested. Another student commented on more formal student communications associated with groupwork and the need for everyone to engage: “The student group works well if everyone in the group is motivated and wants to get things done but it can be very disheartening if your are trying to get work done and a member(s) of your group just can’t be bothered.”

Two further comments of note relate to a type of student who actively chooses online learning in the belief that it will provide them with an opportunity to work on their own and not have to engage with classmates. Both these students stated they are keen to avoid groupwork and having to interact with other students. A final comment was from a student just not sure what he/she was supposed to be doing with regards to communicating online with others, both students and tutors.
This highlights an issue related to induction and preparation for online learning which if not present will clearly diminish the student experience.

6.9.2 The Tutor and Support

The coded comments on this issue were the second highest in number. A clear and common theme was discernible through the majority of comments and that was the link between the variance in tutor interaction and commitment to online teaching and the quality of the student learning experience. Students pointed to the need for regular weekly communications with their tutor as being essential to their on-going motivation. The absence of such regular communications was considered to be demotivating to the learner: "My overall opinion after completing 7 modules, is that the overall concept of on-line learning is brilliant but if tutors just upload lecture notes (same ones as last year, not updated) and fail to comment/reply to questions, then the whole learning experience is going to be poor and in my own opinion, has demotivated me."

There appear to be a series of linked traits originating from student comments linked to the quality of their experience. Tutors need to be 'supportive and interested' with 'regular' interaction being essential. Tutors need to be 'comfortable' with online teaching and need to clearly relay their availability to students. Tutors need to upload their course content in advance and in good time to allow advance planning by students. For similar reasons, course activities also need to be programmed well in advance (or at the start of the module) by 'organised' tutors.
One student mentioned "preparedness of the tutor, responsiveness and how up to date materials are" as key factors. Another student stated that tutors need to have a 'duty of care' for their student groups and should actively contact them should they appear to be falling behind. One student described experiences with 'disaffected' tutors who are consistently poor and seem to lack accountability to the institution. Another student pointed to the need to have tutors that were active and effective in stimulating discussions online and another one emphasised the need for tutors to answer emails (in a timely manner).

Ultimately, as one student stated, excellent access to her tutors led to the success she achieved on her modules. Students in this research population clearly perceived active and regular tutor support as being a fundamental element of successful online learning and the need for more consistency of approach across course teams was highlighted.

6.9.3 Family and Friends Support

Only one comment was forthcoming relating to this factor and it related to the 'juggling' of time, work and kids.

6.9.4 Delivery Technologies & ICT

A mix of comments was posted by students relating to how their experiences with delivery technologies could impact on their studies. Three separate students mentioned that they were experiencing problems with the reliability of their broadband link and this impacted negatively on their studies. A further three students mentioned Blackboard VLE functionality and highlighted perceived limitations, how it looks and its intuitiveness.
One student stated "...it looks appalling, does not 'invite' you in and the digital dropbox will only accept one file at a time." The lack of email subscriptions/alerts when new elements are added to the VLE (e.g. the Announcements page) along with a lack of advanced training were two further elements mentioned. One student mentioned that providing a means to enable a fast and efficient way to sort out ICT problems is very important to the online student experience.

Two students mentioned that they found the institutional e-library service complex and one mentioned specifically the 'timing-out of e-books' and the ability to read and manipulate large .pdf documents as being particularly problematic. Other individual comments relate to the variability in quality of recorded/streamed VC tutorials and suggest that tutors are made to watch their own tutorials to improve their presentational efforts.

Another student mentioned that the audio conference technology being used for tutorials was not able to effectively support the number of students logging in for tutorials as the classes were too big in her/his view. Another view mentioned that recorded audio extracts were recorded at too low a volume to be useful and easily heard.

Lastly, one student mentioned how useful it was to be able to access his/her course materials on their home PC. Another two students for similar reasons (time efficiency and flexibility) suggested that podcasts would be a good addition to their online modules.
6.9.5 Course Design (& Web 2.0)

A number of themes were able to be coded from the qualitative statements on course design. Firstly, most commonly reported in relation to course design issues (by five separate students) was the level of variance in course structure, style and design being experienced by students. A consistent layout of modules would save time at the start of modules argued one student.

In another instance one module had marks allocated for active engagement and in another module on the same course students were given a DVD and told to get on with it. This led to a lack of clarity in terms of the teaching approach being pursued. Two other students reported an anomaly between engagement being marked and encouraged on some modules but not on others. In some instances the VLE seemed to being used as a repository of course content rather than being an interactive online course.

In four instances students reported that they felt the amount, and in some instances level, of reading that was being set each week for module participants was not realistic and left little time for anything else: "When only offering a course as an online one it is vitally important that all the links to additional reading work. Tutors can be quite free with their addition of links within the body of the study notes without really taking into account quite how much time it will take students to read all the information." In another three instances students pointed to poor management of VLE module sites in terms of the content and activities.
Specifically they mentioned broken weblinks, missing library journal links, poorly organised and so confusing VLE sites, last minute changes (e.g. to tutorials) and an over reliance on groupwork, without tutors appearing to appreciate what the impacts are on the students. In two instances students expressed frustration that some modules were designed to release course material on a weekly basis rather than it all being released at the start of the module to allow them to plan ahead:

"Tutors need to be organised and share course content as soon as it is available to allow the student to plan ahead, not just academically but home/holidays and work commitments."

Other individual comments related to the value of online induction materials on the UHI VLE. A further comment related to the need to design modules to be valuable to the workplace. Another student highlighted the value in terms of teaching presence achieved gained by scheduled weekly tutorials, which was not a design feature in all his/her modules being studied. Finally, one student that has clearly not been persuaded the value of his/her studies recommended a change in course design for online courses: "I do not find e-learning resources useful but I do use them a lot. I think that education should be taught face-to-face, as its more effective rather than waiting for a response."

6.9.6 Assessment & Feedback

A range of quite separate issues were raised on assessment and feedback with only two common themes connecting two students each time. This was on the marking of discussion board contributions and tutor feedback. In the view of one student, participation in discussion boards should be credited and those not engaging should be penalised.
Another student recognises why discussion boards should be credited but in his/her opinion it is disadvantageous as it reduces flexibility as he/she is often not able to engage every week (due to work commitments), but instead makes up for lost time during the weeks in which he/she does engage.

With regard to tutor feedback, one student raises the need to receive timely feedback whilst another student focuses on the amount of feedback given in his/her experience and suggests that more needs to be provided to online students. Another student questions the legitimacy of examinations as a realistic online course assessment: "I was very surprised that exams are held in college when it is an online course. People are surprised that this happens. The whole point of online is just that....It almost contradicts the whole idea of distance learning – that is a major downside to the degree."

Three further points were made by students with regard to assessment in the online context. One student focused on groupwork assessments and indicated that lack of participation by some group members ended up making such assessments a negative experience for all involved. Another student outlined how important it was for students to receive in advance all relevant assessment procedures, information and any marking strategies that apply. Lastly, one student highlighted how online courses in her/his experience only used essays and that they therefore disadvantaged students with learning styles that were better suited to other types of assessment.
6.9.7 Motivations

Only four students specifically commented on motivations within the context of issues that influence the quality of their online experience. In the first instance one student stated: "...desire to learn is the most important" factor in influencing student quality in online environments. Another student has added that online students need the "motivation to complete the course" to experience a quality learning environment and another student added 'personal motivation' as being important. Finally, one student stated that although he/she was enjoying the course and learning a lot, they were finding it "difficult to get motivated to get online and complete my modules."

6.9.8 Flexibility

Only three students were coded as commenting specifically on 'flexibility' as a quality factor. One student stated that they would not be able to be doing their course if it was not for the fact it was accessible online. Another student stated that in attempting to promote flexibility by offering evening tutorials, some students actually found such sessions difficult to attend and so this limited the course's flexibility in their view. The final student to comment on flexibility commented: "if it were not for the flexibility of the course, I would have missed an opportunity to study at this age."

A discussion of all this qualitative-comment data-set and where it fits into the wider research will be presented in the concluding chapter.
Chapter 7 – Discussion and Conclusions

7.1 Introduction

This chapter will be divided into twelve sections. Section two will provide an overview of the research results. The third section will then examine the limitations of the research methodology and then a fourth and following section will consider the strengths of the research methodology. A further six sections will specifically discuss each of the research hypotheses articulated. The discussion will examine the findings from the main Likert survey, focus groups and additional qualitative data, whilst comparing and contrasting the findings of other researchers and academics, to seek to derive meaning and understanding that will add to the current body of knowledge on online education. A further section will then discuss location and the influence of socio-demographic factors on student perceptions of quality. Finally, a conclusions section will consider the findings of this research for online course delivery models and techniques and ultimately pedagogies most appropriate to attaining quality in online education. Opportunities for further research will then be identified.

7.2 An Overview of the Research Results

Firstly, a range of socio-demographic information was gathered and analysed to provide the background context to this study. Then, six research questions linked to each of the research hypotheses in this study were derived to establish if there is a link between six key influences that appear to impact on the perceived quality of online education, across three separate student cohorts in three separate countries.
These potential influences were identified from a wide range of literature (Peltier et al, 2002; Schrum & Hong, 2002; Pearson & Trinidad, 2005; Sun et al, 2008; Lee et al, 2009a; Ginns & Ellis, 2009; Richardson, 2009; Garrison et al, 2010; Teo, 2010; Paechter et al, 2010) and it was hypothesised that they were positively correlated with 'quality' in online education. A measure of quality was identified (Peltier et al, 2003) and developed from this research and its level of acceptance tested via a five-item Likert scale.

Further analysis was undertaken to establish the potential influence of identified socio-demographic covariates and factors such as 'age' and 'location' were examined. The majority of these potential confounding or interacting covariates were ruled as being non-significant, to help avoid type I and type II errors. 'Age' however was found to be a potential confounding factor at the significance level p<0.05 (two-tailed) and so warranted further investigation at a later stage.

A number of statistical tests (Kruskal-Wallis between-groups analysis of variance) were then undertaken to determine the level of variance and so influence of 'location' on the six independent variables, in addition to the dependent variable, to confirm that the population data being used captured accurately the perceptions from all three study locations. A series of Mann Whitney statistical tests was used to determine the similarity or otherwise of perceptions of quality and effectiveness (the dependent variable) between locations. No significant differences in perceptions between locations were found between student perceptions on either the dependent variable or any of the independent variables.
Having established that the data gathered is not subject to statistically significant confounding or interacting socio-demographic influences or skewed by student location, a series of correlation tests was applied to the research data. The Spearman’s rho correlations examined the levels of correlation between each independent variable and the dependent variable to establish the direction (positive or negative) of correlation and quantify its level. As simple correlations do not imply causal relationships further testing was undertaken to calculate the coefficient of determination ($r^2$). This test indicates the level of variance in perspectives on the dependent variable that are attributable to specific measures used in the current research model. The six measures explored in this research study account for 70.4% of the variance in respondents’ scores in rating the independent variables against the dependent variable. This suggests the model was highly effective in its implementation.

To analyse any potential confounding effects from ‘age’ on these results a further Spearman’s rho correlation was undertaken examining the variance effects of differing age groups on perceived quality and effectiveness. This effect was found to be non-significant. Yet, as it was close to the critical value, a further partial correlation was undertaken to further investigate and control for any potential effects of age on the main questionnaire statistical findings. As the findings were again non-significant, the potential effects of ‘age’ as a confounding covariate on the sample population data analysed, was considered to be insignificant.

Confidence in these findings led to a further series of correlations and calculations (as above) which were undertaken on the range of socio-demographic factors gathered as part of this research.
This additional analysis discovered a further 10.5% variance of student’s scoring of their perceptions of quality and effectiveness that can be explained by socio-demographic variables. In short, this research model's independent variables along with the socio-demographic factors examined, accounted for 80.9% of the variance in students' scorings on their perspectives on quality and effectiveness in online education.

Finally, some further qualitative data gained from both focus groups and questionnaires was coded and examined to attempt to provide further insights into the remaining 19.4% of variance in student perceptions and also to add depth to the quantitative findings. A series of coded themes was identified of relevance to both data sources and were as follows: communities of practice, tutor support, family and friends support, delivery technologies and ICT, course design, assessment, motivation and flexibility. This triangulation of data sources aims to provide trustworthy and persuasive results (JISC 2007d).

The following sections shall now analyse and discuss the above findings.

### 7.3 Limitations of research methods

There are a number of recognised limitations of this research which must be placed in context. These limitations are: a self-selecting survey population; complexity of research questions; the mixing of experience and attitude surveying; researcher bias; non-response data and skewing of location data.
7.3.1 External validity

This concept refers to the extent to which the findings of the study are able to be generalised to the wider population. Students in this population sample were self-selecting and likely to be the more engaged student elements of their cohort. With a lower response rate in the UHI context, then the majority of the participants are likely to have been the more motivated rather than disaffected, given the time and effort taken to find and seek out the main module questionnaire.

A positive bias may therefore be found in all the data sources used in this research and this may therefore limit the validity of these research results and limit their ability to be generalised to the wider population. This issue of non-response bias and its distorting effects is commonly identified in the literature (Cohen et al, 2000) as a limitation of educational research.

7.3.2 Complexity of Survey Questions

As can be viewed in appendix 5, the survey questions used in the main Likert-survey were long and detailed in comparison to those commonly used in other research in the sector. In attempting to capture specific and detailed feedback from student participants approximately 20% of students failed to complete the survey, despite detailed testing with students and other e-learning tutors.

Furthermore, in an attempt to develop a construct grounded in feedback drawn from personal experience rather than opinions, with an unknown grounding in behaviour (Morgan, 1997), the subtlety of some of the questioning was lost.
In some instances where student experiences themselves were poor in a particular area of questioning (e.g. student-student communications) their response was more negative where conceivably it might have been more positive to highlight the importance of the particular issue with regard to quality.

Although such misinterpretations were to some extent evened-out due to the usage and interpretation of 'Likert scales' rather than individual 'Likert items' in this research, this loss of accurate recording of student feedback was a failure of the research due to the over complexity of the main survey questionnaire. An example was an individual question item on the importance of student-student dialogue with classmates which students appeared to interpret as a gauge of their current engagement levels with classmates and so answered with a higher level of ambivalence in comparison to follow-up questions on the scale.

7.3.3 Missing data

Approximately 20% of the Likert-scale survey respondents failed to complete the survey in full. The actual numbers contributing to each statistic in this study varied between n=336 to n=507. However it may be argued that due to the size of the sample, any perceptible loss of power was minimal. Yet those Likert scales that included 'problem' questions that repeated students may have failed to answer, had the potential for the skewing of individual items and to a lesser extent the Likert scales. However, as in several instances the correlation data was on the margins of categories of significance, then it is conceivable that missing data may have impacted on the reliability of these results. As the extent of this impact has not been quantified here and would require significant further analysis, this is a limitation of this research.
7.3.4 Researcher bias

The secondary method of data capture for this research partly involved directly engaging with groups of students in focus groups to attain qualitative data on their experiences.

In this situation research bias is a concern as by directing the group, the researcher will bring bias to the data and so the accuracy of data captured must be a potential limitation in such instances. In this instance the researcher is involved in the sector already and so it is possible that research bias was introduced to focus group data capture events. There is also the influence of ‘the group’ to consider, as according to Morgan, (1997) the presence of the group will affect what participants say and how they say it and so a bias in views expressed will be present, unless explored further by the researcher.

7.3.5 Correlation analysis and extent of findings

"Correlational research is particularly useful in tackling problems in education and the social sciences because it allows for the measurement of a number of variables and their relationships simultaneously." (Cohen et al, 2000, p.199)

Correlation coefficients were calculated in this research study in a predictive capacity as the factors anticipated to be strong influences on the quality of online education were thought to be known in advance from research carried out into the literature.

These correlation coefficients were used in three ways to determine association: as a measure of the strength of relationship present between the independent and dependent variables, their level of significance and, their use in calculating the coefficient of determination ($r^2$).
As can be determined from table 6.38, although four of the independent variable measures have correlations in the 'upper third' (> 0.3) of correlation coefficients as found by Hemphill, (2003) in 380 meta-analytical studies, two of the measures on test were considered to be in the 'lower third' (>0.2). Although statistically significant ('preparation and readiness' at the p<0.05 level and 'course design' at the p<0.01 level), neither of these measures appear to indicate a strong statistical association with the dependent variable.

Although triangulating qualitative data and the literature appear to support their 'significance' with the dependent measure, caution in their strength of association is suggested, based on at least some of the data analysis associated with this study. Ultimately, the strength of associations tested using correlation analysis to at least in part prove or disprove the null hypotheses, do not tell us anything about causation, i.e. the independent variables identified in this study may be associated with quality and effectiveness in online education but do not necessarily lead to students to enjoy a quality online education experience.

7.3.6 Reliability testing

Reliability (test-retest) testing of the main survey questionnaire was undertaken under uniform conditions for only six of the eight students due to student access issues relating to online off-campus learners. Two students were tested in a separate location, although using identical time gaps between testing. However, it can be argued that the gap between the first run through the questions and the second run through the questions may not have been sufficient. As Cohen et al, (2000) state, the time period between different test events should not be too short or too long to ensure reliability.
In this instance it was limited by student availability and so happened over a period of 60 minutes with a 15 minute first test interspersed with a 30 minute break and a change of activity, prior to a second test of the research instrument. To improve the validity of the test-retest exercise further, the ordering of the questions in the second test may have been changed to better test the robustness of the individual Likert questions and rule out memorization as a confounding factor. Arguably, a longer gap between questionnaire testing may have been beneficial in terms of reliability.

7.3.7 Comparability

As a strict interpretation of the applicability of statistical methods to the ordinal data from Likert questionnaire was followed, many of the statistical findings by using non-parametric alternatives are not directly comparable to the findings in much of the rest of the field. This is because parametric tests predominate in the analysis of Likert-scale data gathered on student perspectives.

This statistical methodology was more suited to investigating trends in smaller sample populations and although the main survey sample population was sufficient, it did vastly over-represent the views of UHI online learning students. This large UHI sample may have 'crowded out' some of the subtleties in student responses originating from other locations in this study. Although, tests were run to confirm overall agreement in perspectives on the dependent and independent variables, a further drilling-down into the individual responses was not undertaken within the scope of this study. It can therefore be argued that some of the richness of the inter-location survey data may have been overlooked as a result of this further study not being undertaken.

In recognising these limitations, there are also a number of strengths of this research methodology that also should be considered.
7.4 Strengths of the Research Methods

This section will consider some of the strengths of this research exercise (the power of the sample data, appropriateness of sample population, range of literature reviewed, testing and re-testing of Likert questionnaire, appropriate use of statistical methods and appropriateness of the research model) that

7.4.1 Power Analysis

An initial target sample population between the three sites was in the range of 200-300 and this is considered to compare well with sample student populations studied in other published work in the field.

A random sample of ten research papers published and collected for this study had the following student samples sizes: n=19 (Kanuka et al, 2007), n=21 (Brown, 2001), n=36 (Beisenbach-Lucas, 2003), n=71 (Drouin, 2008), n=99 (Deka & McMurray, 2006), n=133 (Levy, 2007), n=186 (Coll et al, 2007), n=200 (Mazzolini & Madison, 2002), n=212 (Cassidy & Eachus, 2002) and n=287 (Garrison et al, 2010). The actual sample population size achieved in the main Likert questionnaire in this study, from which results were derived, was n=507. A further 39 students provide qualitative input through focus group sessions and a further 106 students provided qualitative comments which were reviewed from an open-ended question at the conclusion of the main questionnaire survey.

In a number of aspects, the power of the statistical tests examining the correlation between the dependent variable and the independent variables is argued to be high.
The relatively large sample size (n=507), along with a significance criterion of 0.01 applied to five measures and 0.05 applied to one measure, along with four effect sizes (the discrepancy size between $H_0$ and $H_1$) at the medium level and only two at the low level (or near to the low level in one instance), point to a favourable analysis of statistical power. Further investigations and analysis of potential covariate impacts are also known to strengthen the power of statistical models further.

Furthermore, the six main hypotheses being tested in this research study are single-tailed. Such hypotheses have more power than their two-tailed counterparts, providing the sample effect is in the direction expected (Cohen, 1992). This is indeed the case in this instance.

Where results were less powerful (with a significance level of $p<0.05$ and/or were in the 'small' effect size category) further qualitative data from two separate sources was analysed and able to confirm or potentially help reject findings near the critical level to aid the avoidance of Type I errors.

Given the additional triangulating evidence queried in the form of qualitative data in this instance, the evidence points to confidence in not rejecting the null hypotheses in each and every instance when in fact they might have been true (Type I error).

The research model ultimately accounted for 70.4% of the variance in student perspectives on quality and effectiveness.
7.4.2 Appropriateness and Relevance of Population Sample

In so far as the sample population was drawn from three separate institutions in three separate countries this research appears to be highly relevant and able to contribute to the depth of knowledge in the field. Such multi-national investigations into online education are rare in the literature. Furthermore, as identified by Shih et al, (2008) in examining 444 selected papers in the field of e-learning research and trends, many existing studies within the online education field are/were still focusing on on-campus students. One of their conclusions was that more focus needed to be placed on off-campus learners in future studies. In this study only 7% of students responding considered themselves to be ‘classroom based’ and focusing their studies on-campus. In so far as this sample population is predominantly off-campus, distance learning students involved in some form of online education, this again suggests that the relevance and appropriateness of this sample population is strong.

7.4.3 Range of Literature Reviewed

An extensive range of literature informed this research. A total of 477 background articles were included in the literature review undertaken as part of this research. Out of a total of 477 references used the majority were sourced from peer reviewed journal articles.

However, it also included some other diverse sources including, 66 items of ‘grey literature’ in the form of industry reports (35), conference reports (8), magazine articles (4), a hearing (1) and websites (19).
In a fast moving sector, this deliberate focus on materials that have a relatively short lead-in time to publication (e.g. electronic journal articles) was pursued to ensure the currency of the ideas and knowledge gained from the literature. A further 123 journal articles were examined and remained unused in forming part of the literature which informed this research.

7.4.4 Reliability: Test and re-test and inter-rater reliability

A deliberate attempt was made to try and use the Likert scale questionnaire to capture complex views, perspectives and experience from the online learning sector. The simple agree – disagree continuum on simple statements such as 'I enjoy using the VLE' was not pursued, but instead a more complex although potentially informative data capture exercise was undertaken. The complexity of the questioning led to two separate piloting stages with students and staff involved in online education.

The process of achieving the balance between complexity and understanding was challenging and resulted in considerable re-drafting of questions. The re-formatting of the Likert style away from both positive and negative statements to provide consistency in wording in more complex questioning was a means by which the reliability of the original questionnaire was improved. In addition, to avoid agreement bias, all answers were offered with 'disagree' options presented from the left-right to improve reliability further.

A further test-retest exercise on two separate groups of students appeared to prove the reliability and level of understanding of the questionnaire questions to be high.
Each questionnaire was completed by the same students on two separate occasions and the results were between 90% and 100% similar in terms of summated independent variable agreement responses and between 70% and 87% for non-summated responses. For the dependent variable, the results were 97% similar for the summated responses and 90% similar for the non-summated responses. A series of Spearman’s rho correlation tests further confirmed the strength of association of the answers in the test-retest exercise. A completion rate of 80.3% for all elements of the survey questionnaire was achieved.

With regard to the reliability of focus group data an inter-rater reliability test was undertaken with another e-learning tutor to check and authenticate the data recorded and how it was represented in the main study report. This was validated and a check was also provided by an e-learning tutor present at one of the focus group sessions that the data recorded and used for the session that he was present at, was a fair and accurate representation of the discussions. According to Cohen et al, (2000) this method is one means that research bias can be minimised and reliability increased.

7.4.5 Appropriate Use of Statistical Methods

The use of Likert-scale questionnaires determined (from an early stage in this research) that non-parametric tests would be the most appropriate approach to reliably testing the research hypotheses articulated. The production of ordinal data from Likert-scales rules out the application of more powerful parametric tests. Although these tests are only applicable to interval data they are widely applied to Likert-scale data in the majority of instances throughout the literature, without justifying comment.
According to Siegel & Castellan, (1988) applying parametric tests, in error, to ordinal data to infer substantive meaning in hypotheses testing is 'problematic'.

Statistical tests were only used in instances where they would clearly add to the arguments and knowledge being sought. This is in contrast to persistent problems in educational literature identified by Gorard, (2001) related to the over-use of statistical tests, the inappropriate use of statistical tests, poorly designed questionnaires and confused approaches to analysis.

7.4.6 Appropriateness of Research Model

The research model displays a high level of construct validity achieved from a wide and detailed literature search and review along with a clear set of constructs related to online education that participants were both familiar with and understood given the detail and depth of feedback achieved. A number of other constructs were considered from the literature and elements of each extracted and reformed to provide the dependent and independent variables tested in this research study.

This research model displays strong ecological validity as it was confirmed to show that it contained a rich variety of research components relevant to participants and mapped many characteristics of their experience and background circumstances in several different locations. The research model has strong content validity as it covers and represents a wide breadth of factors that it purports to measure with regard to online education. This can be supported by the depth and breadth of literature review undertaken, by the level of peer review used, and by participant input used in formulating and finalising the research model.
6.7.1 Socio-Demographic Factors and Variance

Anecdotal evidence associated with the case study online UHI degree programme which has been compared and contrasted throughout this research study, suggests that socio-demographic factors play a significant role in the resilience of adult online learners and is therefore also likely to impact on quality perceptions. Several studies from associated literature also suggest a similar potential impact from other socio-demographic factors.


In summary, in addition to the case study degree considered as part of this research, numerous other researchers have also identified socio-demographic factors within the scope of their studies (Yukselturk & Bulut, 2009; Lu & Chiou, 2010; Blackmore et al, 2008). Therefore, in attempting to further investigate the 29.6% of variance unaccounted-for from the use of the research model applied in this instance, an investigation of the cumulative impact of socio-demographic factors (gathered as part of this research study) was examined.
Triangulation methods used in this research strengthens the findings. This research method uses two or more data collection methods. As indicated by Cohen et al, (2000):

"...triangular techniques in the social sciences attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint and, in so doing, by making use of both quantitative and qualitative data." (p.112)

In this instance multiple data sources (data triangulation) were used to help ‘understand a phenomenon’ (Johnson, 1997, p.283). In addition, the mix of quantitative and qualitative research methods used in this research study added value and depth of the study.

For example, the qualitative data by attempting to explain an element of human behaviour (views on quality in online education) provided insight where quantitative statistics alone appeared to fail to fully capture student perspectives (measures 2 and 5 seeking to validate their respective hypotheses) added to credibility of the data and subsequent confidence statements made of its meaning.

A series of statistical tests on the significance of covariates were carried out on this data to investigate and rule out the potential confounding or interacting effects of socio-demographic factors on the main survey data. In one instance where such a relationship appeared a possibility a further investigation concluded with a partial correlation analysis being undertaken to control for the effect of a third variable, to establish any potential impacts. Any significant effects were ruled out, suggesting a high level of confidence in the data set in measuring what it sought to measure.
7.4.7 External Validity and Ecological Validity

This research, with its acknowledged limitations sought to and attained views from three different faculties in three quite different educational institutions (traditional – Irish; modern – English; new – Scottish) in three different European countries. In doing so and varying the ‘real world’ contexts of the research participants then the external validity and the ecological validity of this research study can be considered to be higher than the majority of studies in the educational field. In many other studies on student attitudes and perceptions, the norm is to gather research data from within one institution and often just one faculty and sometimes just one course.

7.5 Hypothesis 1 – ICT Access, Skills & Knowledge

H1 - Students that are measured as having enhanced levels of ICT access, skills and knowledge appropriate to online learning will rate their online learning experience as being of higher quality than that of the wider student sample.

The findings related to this Likert-scale research measure provide support for the research hypothesis H1 and indicate that student’s level of ICT access, skills and knowledge are positively correlated with student perceptions of quality and effectiveness (Spearman’s rho=0.323, n=397, p<0.01) at the probability level p<0.01, single-tailed (refer to pages 234-5 for a discussion on ‘single-tailed’). The research item suggests a total of 10.4% of student’s variation in their scoring of perceived quality and effectiveness can be attributed to this factor.
Levels of agreement on the scale items within this Likert-scale measure ranged from 63.6% (levels of technical support) to 81% (ability to search and find information on the internet) and shows strong recognition and identification with the scale items in this measure.

The qualitative data explored in this study also examined elements influencing student's quality of experience in online education. Surprisingly some students played-down the importance of this element (ICT access, skills and knowledge) in at least one focus group session, whilst other data from focus groups indicates that reliability of access, ICT support levels and delivery methods and associated ICT knowledge and skills, are stress factors and impact on the quality of experience (e.g. confusing e-library services, lack of knowledge and levels of dissatisfaction with VLEs).

These latter perspectives linked to the questionnaire findings are very much evident in the literature. Information skills and knowledge described as 'digital' or 'information' literacy (Rennie, 2005; Kirkwood, 2007; Durkee et al, 2007) are recognised key requirements for adult learners and independent learners in online education who need to be able to filter and discriminate between differing sources of information on the world wide web. New students in particular frequently lack digital literacy understanding and skills (CICLE, 2009). The related issue of online communication skills is also highlighted by numerous researchers as being a distinct and definable attribute – i.e. the ability to communicate effectively through the online environment.
This is described as 'basic technical facilitation skills' by Wang, (2008) and is about helping students gain the capacity to get their point across in an online environment (Penman & Lai, 2003). Communication skills as opposed to internet skills are complicated but are fundamental for effective participation and accessing social networks in online environments (Chu, 2010).

In summary, the findings of this research suggest an acceptance of research hypothesis H1. The balance of evidence indicates that students agree that levels of their ICT skills, access and knowledge are related to the quality of their subsequent online education experience. Data from the main Likert survey suggests this association is at the lower end of the 'medium or typical' level of association (Kraemer et al, 2003). Further qualitative data interrogated and findings and perspectives from the literature confirm evidence towards the robustness of this assertion.

7.6 Hypothesis 2 – Preparedness and Readiness

H 2 – Students that are measured as having enhanced levels of readiness and preparation for online learning will rate their online learning experience as being of higher quality than that of the wider student sample.

The findings related to this Likert-scale research measure provide support for the research hypothesis H2 and indicate that student's level of readiness and preparation are positively correlated with student perceptions of quality and effectiveness (Spearman's rho=0.083, n=401, p<0.05) at the probability level p<0.05, single-tailed.
However the research model suggests a total of only 0.7% of student's variation in their scoring of perceived quality and effectiveness can be attributed to this factor. As a correlation coefficient of 0.083 where 1 represents a perfect correlation then it is clear that this set of results does not fit well and that this factor (levels of readiness and preparation) is only weakly associated with quality.

As Cohen et al, (2000) state, 'low coefficients will have low predictive value' (p.201) and so on its own, this quantitative research result appears to dismiss the important of this measure, even although appearing significant at the p<0.05 level. Levels of agreement on the scale items within this Likert-scale measure ranged from 41.5% (rating of value of student handbook) to 65.8% (understanding of privacy and security threats). A discussion on these ‘agreement’ levels follows.

An expected much stronger association did not materialise in this instance. This can be at least partly explained by an over-emphasis on student experience informing Likert-item responses within this measure. The focus on self-reported experience to inform research item responses has its advantages for research (Morgan, 1997), but clearly where experiences are less good, then clearly links between such a related measure and ‘quality and effectiveness’ will be lower. This suggests that students in this sample population were often not ready and prepared for online study.

From the qualitative data, one focus group of students appears to echo the above experience. Several students did not know what was involved on entry to their online education experience and indeed stated "if they knew what was involved they would not have come on the course" (Focus Group, 2011).
Only two students who had previous degree study experience reported their experience to be close to their expectations. Specifically students mentioned their lack of knowledge about the level of commitment required and lack of knowledge of the technologies used. A further experience of preparedness is highlighted by another student in the qualitative questionnaire responses. This student suggests that students should be prepared before the course starts and that a pre-enrolment course should be offered about the technology required for online learning in advance of the start of tuition.

Another student indicates that s/he had not even heard of VLEs before they were actually on the course and claimed that this was common within the class. Another student pointed to the fact that they just did not know or understand the level of expectations for students to participate on joining their online course. An additional view related to a lack of preparation with regard to the isolation likely to be experienced through the online learning environment although one student did report attending an induction event and thought they had a big advantage over other students who started without attending such an event in order to become familiar with the technologies intended to be used.

The quality perspectives discussed above, echo many of the suggested findings and approaches outlined in the literature.

Students need to be prepared to cope with the expectations of the online environment and understand the nature of the ‘flexible’ workload (Morse, 2003; McDonald, 2002) and their expectations need to be managed effectively (Hara & Kling, 2000; Chaney et al, 2009).
Dahl, (2005), Cowan and Duggleby, (2005), Meyer, (2003), Pillay et al, (2007), Cowan and Eachus and Holsapple & Lee-Post (2006) all point to the early assessment of readiness and the related assessment of learning needs as being essential at the very start of courses to overcome potential stress points for new entrants. The clarification of 'ground rules', social norms, protocols and netiquette are all said to be required upfront to prepare new online learners (Wang, 2008; Rovai, 2007; Shea et al, 2003; Motteram and Forrester, 2005) and students must be made aware of their role in the learning process and understand their need to be active learners rather than passive learners (Price et al, 2007; Spiceland & Hawkins, 2002).

Students need to appreciate very quickly their participatory role in the learning process (McAlister et al, 2001; Durkee et al, 2009) as 'community building' cannot hope to take place until students are familiar and confident in the online environment and associated technologies (Swan et al, 2000). Ultimately, as Salmon, (2003) points out, new students need time to get used to communicating online and the time required should not be underestimated.

In summary, the findings of this research suggest an acceptance of research hypothesis H2. The balance of evidence indicates that students agree that levels of their readiness and preparedness are related to the quality of their subsequent online education experience. Data from the main Likert survey suggests this association is approaching the 'lower than typical' level of association (Kraemer et al, 2003) and in the 'lower third' of correlation coefficients in the literature (<0.2).
As discussed above, because of the focus on personal experience in eliciting questionnaire responses (which appear to have reduced the strength of the items in this measure) a skewing of the results may have occurred. To determine such impacts would require a further study. However, in recognition of those views also expressed in the qualitative data queried, and the literature, one might argue that this factor is more closely associated with quality and effectiveness than the current research appears to suggest. It is positively correlated with quality and effectiveness at the p<0.05 level.

7.7  Hypothesis 3 – Tutor-Student Interaction

H 3 – Students that are measured as having enhanced levels of tutor to student interaction/ communication will rate their online learning experience as being of higher quality than that of the wider student sample.

The findings related to this Likert-scale research measure provide support for the research hypothesis H3 and indicate that student’s level of tutor-student interaction is positively correlated with student perceptions of quality and effectiveness (Spearman's rho=0.482, n=394, p<0.01) at the probability level p<0.01, single-tailed. The research model suggests a total of 23.2% of student’s variation in their scoring of perceived quality and effectiveness can be attributed to this factor alone.

Levels of agreement on the scale items within this Likert-scale measure ranged from 63.1% (quality of dialogue with tutor) to 82.3% (tutor rapport / social interaction) and shows strong recognition and identification with the scale items in this measure. In all instances in the focus group sessions, students recognised the importance of tutor support.
In one instance having regular access to their tutor was identified by a number of students present as being the most important factor in the quality of their experience as online distance learners. In qualitative data captured from the main survey questionnaire students pointed to the need to have regular tutor contact if they were to maintain motivation. Tutors also needed to be 'supportive and interested' in their interactions with students.

Students also stated that tutors needed to have a 'duty of care' for their student groups and initiate contact with them if they appeared to be falling behind. Students also look to their tutors to be active and effective in stimulating discussions online and expect them to answer emails in a timely manner. These comments have resonance in much of the literature investigating the importance of the tutor's role in online education.

Student's feedback through qualitative methods also complemented perspectives that are found throughout the literature. Rovai, (2002) investigated this relationship in more depth and identified a series of roles expected from tutors from student's perspectives. This research pointed to an interactive role that included the tutor being an 'encourager, harmoniser, compromiser, gatekeeper, standard setter, observer and follower' (p.9). A wide range of expectations on tutors is able to be identified from the literature. As Rennie, (2003) observed, the quality of personal contact and support is a primary factor in the success or otherwise of online modules. This need for an active online facilitator is also identified by other researchers in the field as being a key service for online learners (Peltier et al, 2003; Barron 2003; Carroll et al, 2009; Baran & Correia, 2009; Kirkwood, 2006).

Ultimately, 68% of students stated that their online instructor played a crucial role in motivating them to communicate effectively online according to Wu & Hiltz, (2004). Findings from several research studies suggest a direct link between student perceptions of a stronger teaching presence with that of a stronger development of an online learning community accompanied by a sense of connectedness and learning (Rovai, 2000 and 2002, Garrison & Kanuka, 2004, Shea et al, 2005, Shea, 2006 and Garrison 2006).

Peltier et al (2003, p.265) seek to summarise some of the key roles of the online tutor in developing an online presence and sense of community: "...the need for guidance, warmth, rapport and motivational skills are a high priority for online educators." This socialised role required by tutors is recognised strongly by respondents the Likert survey related to this research study.

In summary, the findings of this research suggest strong support of research hypothesis H3. The balance of evidence indicates that students agree that levels of tutor-student interaction are related to the quality of their subsequent online education experience.
Data from the main Likert survey suggests this association is close to the 'large or larger than typical' level of association (Kraemer et al, 2003). Further qualitative data interrogated and findings and perspectives from the literature strongly confirm evidence of the robustness of this assertion.

7.8 Hypothesis 4 – Student-Student Interaction (Communities of Practice)

H4 – Students that are measured as having enhanced levels of student to student interaction/communication will rate their online learning experience as being of higher quality than that of the wider student population.

The findings related to this Likert-scale research measure provide support for the research hypothesis H4 and indicate that student's level of tutor-student interaction is positively correlated with student perceptions of quality and effectiveness (Spearman's rho=0.375, n=376, p<0.01) at the probability level p<0.01, single-tailed.

The research model suggests a total of 14.1% of student's variation in their scoring of perceived quality and effectiveness can be attributed to this factor. Levels of agreement on the scale items within this Likert-scale measure ranged from 42.9% (level of dialogue with classmates) to 68.3% (importance of student interaction to overcome isolation). In all but one Likert item (above) levels of agreement were above 50%.
Once again, the focus on self-reported experience to inform research item responses may have advantages for research (Morgan, 1997), but clearly where experiences are less good, (i.e. in current levels of student interaction in the study population) then clearly links between such a related measure and 'quality and effectiveness' will be lower. This suggests that students in this sample population were often not involved in a high level of student-student interaction. So a stronger association did not materialise in this instance and can be at least partly explained by student experience informing responses to this measure. The limitation of this research approach will be discussed further in section 7.10 of this chapter.

Qualitative data from focus group sessions highlighted student experience and perspectives on student-student interactions as being vitally important in two out of three instances and important to develop further in a third instance. Students noted their camaraderie as being important and a sense of 'being in it together' and with this a vital support network was able to be achieved.

All three groups recognised that it was important for online learners to develop social links to aid their learning experience to the level that it was important to their on-going resilience on their course. In the two most well established courses from larger institutions, communities of practice were established and described as helping students through their studies. With the third group it was recognised that their social links were strong but that there was scope to evolve them further to the benefit of all.
Such comments clearly add support to retaining the research hypothesis, as do further qualitative comments from individuals elicited from an open-ended qualitative question at the end of the main survey. A number of students made comments to highlight how important they thought student-student interactions were to their study experience and overcoming feelings of isolation.

In this context other students pointed to assessment and the need to include all students in groupwork and another student focused on the technology and suggested the insertion of non-formal 'cafe' discussion board areas in each module within the VLE. Yet another student reported that he/she was just not sure of their role in contributing and communicating with other students and so was not sure what was expected or the norm. However, there were some dissenting voices by a small number of students who highlighted that they chose online learning so they did not have to work with others and so were not enthused about enhanced student-student interactions.

The literature points strongly to many benefits for learners from enhanced levels of student-student interaction. Students that collaborate and engage actively with their coursework and interact socially with their classmates become more successful learners and learn more during their studies according to Koszalka & Ganesan, (2004) and Pelz, (2004). Further researchers have found similar results. According to Chen et al, (2008) student engagement is related to high grades, student satisfaction and persistence. Heiman, (2008) links student interaction with both student performance and motivation. Drouin, (2008) found a significant link between a 'sense of community' and student interaction with satisfaction and student retention. Greber et al, (2007) makes the point that it is very important that students understand why they are participating and recognise the link between their levels of participation and their final grade.
Ferdig, (2006) and Cook & Dupras, (2004) highlight the 'additional benefits' realised from social interaction established from student groups and communities of practice. Haythornwhaite, (2006) suggests communities of online students can enhance the learning experience by allowing work to get completed quicker, learning outcomes to be achieved and student satisfaction to be increased. A key goal for an online community is the development of 'camaraderie' after an extended period working together online, often in multiple classes (Brown, 2001). The notion of collective and inclusive participation being needed to develop a sense of community is recognised by many researchers in the online education field (Rovai, 2000; Salmon, 2003; Wickersham & McGee, 2008; Gerber et al, 2008; Skinner, 2009).

As in the qualitative data discussion there are some dissenting views in the literature on the value of participation and communities. This questions just how clear the links between enhanced levels of interaction are with increased levels of student performance (Ginns & Ellis 2007; Bernard et al, 2004a; Garrison & Cleveland-Innes, 2005; Picciano, 2002).

However, in total, a wealth of evidence from a wide range of sources points to the link between student-student interaction and the quality and effectiveness of the student experience. The goal is to create an online community in which off-campus students can feel connected through interaction with their peers (Rovai, 2007).

In summary, the findings of this research study suggest an acceptance of research hypothesis H4. The balance of evidence indicates that students agree that levels of student-student interaction are related to the quality of their subsequent online education experience.
Data from the main Likert survey suggests this association is in the 'medium or typical' level of association (Kraemer et al, 2003). Further qualitative data interrogated and findings and perspectives from the literature strongly confirm evidence towards the robustness of this assertion.

7.9 Hypothesis 5 – Course Design

H 5 – Students that are measured as having enhanced levels of satisfaction with course design issues will rate their online learning experience as being of higher quality than that of the wider student sample.

The findings related to this Likert-scale research measure provide support for the research hypothesis H5 and indicate that student's level of satisfaction with course design is positively correlated with student perceptions of quality and effectiveness (Spearman's rho=0.170, n=336, p<0.01) at the probability level p<0.01, single-tailed. The research model suggests a total of 2.9% of student's variation in their scoring of perceived quality and effectiveness can be attributed to this factor. As the correlation coefficient is 0.170 where 1 represents a perfect correlation, then it is clear that this set of results appears to fit poorly and that this factor (levels of satisfaction with course design issues) is only weakly associated with quality. As Cohen et al, (2000) state 'low coefficients will have low predictive value' (p.201) and so on its own, this quantitative research result appears to dismiss the importance of this measure, even although appearing significant at the p<0.01 level.

Levels of agreement on the scale items within this Likert-scale measure ranged from 43.7% (weekly participation linked to final mark) to 93.2% (importance of design, structure and presentation).
A discussion on these ‘agreement’ levels follows. Levels of agreement in three of the Likert items in this measure were above 60% (one of these items being above 90%) and two were below 50%.

It is clearly the latter two items (with less than 50% agreement on the Likert-scale) that impacted on the overall strength and influence of this 5-item measure, as a contributor to quality and effectiveness as measured within this research study. Yet, it must be remembered that individual Likert items are not considered reliable (Gliem & Gliem, 2007) and so are only of note when incorporated into a larger Likert-scale measure. However, in this instance it is worth discussing the two ‘non-performing’ elements of this scale briefly to gain an insight into a measure that the literature suggests, should have figured more significantly.

Firstly, with regard to Web 2.0 and its integration into modern online courses, 19% of students disagreed that Web 2.0 elements should be integrated into modern day online courses. A further 33% were ambivalent to the integration of such technologies. Triangulated with the qualitative data this result for this student population is not such an anomaly for the following reason. Only one out of three student groups demonstrated some level of working knowledge with these technologies and only two comments out of one hundred and six comments mentioned Web 2.0 technologies at all. Within this context then this individual Likert item score is not a surprise with this student population. In instances where there is a lack of recognition and interest in such technologies it would be unusual for such a student population to support more of its use.
Secondly, with regard to making student participation count towards the module final mark, 33% disagreed that this should happen and a further 23% were ambivalent on this issue. Yet another individual Likert item from this same population reports that 66% of students agree, 25% are neutral and only 9% disagree that the 'more interactive and supportive my online student group is the more likely I will be to complete my studies'. So on the one hand students do appear to recognise the benefits of active student participation, though they would apparently not wish to see it count towards their final mark.

Muirhead, (2007) also questioned the wisdom of ‘forcing’ such participation and suggested that such inter-student communications are a natural and valuable contributing element of online communities without being scored. It would seem that the predominance of (female) adult returners in this sample population are of the same opinion.

So a stronger relationship did not materialise in this instance associating course design with quality and effectiveness from the main Likert survey and this can be at least partly explained by the above discussions.

Further qualitative data from the focus groups identify that in terms of course design two out of three participating groups had little knowledge of Web 2.0 technologies. Two comments on supporting more podcasting were coded in course design from the qualitative data from the main Likert questionnaire. There were the only two further references to Web 2.0 within the qualitative data. One focus group was asked about standardisation of design and the consensus was that such initiatives were valuable and should be supported.
From the main Likert questionnaire qualitative data, the main themes on course design were with regard to the variability being experienced by students in their online learning courses.

Variability between approaches in terms of marking and encouraging engagement within online modules was noted by two students, although it was more the lack of consistency that was the context. The negative response to the marking of course engagement in the main Likert questionnaire is surprising. This issue was not brought up in the focus groups (although one student commented on what they considered to be modules with too much groupwork) as a negative other than through ‘opportunities for further comment’ in the lack of consistency context.

A range of further qualitative statements on course design regarding content loading, structuring, VLE management, induction and teaching presence were all forthcoming. As this element (course design) was the (equally) most commonly coded qualitative comment grouping from this data source, it appears to be an area of importance to students perhaps not fully captured by the main Likert questionnaire study. A brief review of the key findings in the literature would appear to validate this perspective.

Designing online courses only around the provision of content and information is simply no longer tenable according to McCombs & Vakili, (2005). The result from such an online design philosophy is what is termed ‘shovelware’ according to Morrison & Anglin, (2006). It is important to sell the design and learning approach being implemented to students and explain rationale of learning experience they are signing-up for according to Kirkwood, (2009).
An online design philosophy is important and the simple mimicking of traditional classroom approaches is not tenable (Bird, 2007). Gu, (2006) found that many online programmes are simply a transference of materials that work in the classroom and he too stated that this is not an appropriate design philosophy. What works in the classroom face-to-face with a tutor will not necessarily work at home on a computer.

In discussing the above qualitative data it was the variance in course design that students experienced that had the strongest perceived impact. This was specifically due to the apparent lack of the consistent design approach and philosophy, in the experience of students responding to qualitative response opportunities. Lee et al, (2009a) found that course design was found to have a major impact on student satisfaction. A simple, intuitive and consistent design is suggested as being most appropriate.

Social constructivist methods are described as being in contrast to and a shift away from traditional lecture-based classroom methods of 'passive transmission'. They represent a move towards student-centred learning essential for effective online education (Bishop et al, 2007; Mason, 2001). Fundamental ingredients of a social constructivist design model include content, knowledge construction, reflection and the assimilation of multiple viewpoints (Bird, 2007; Levy et al, 2003). As McDonald, (2002) concluded, online materials need to be user-friendly, relevant, interactive and problem-orientated and methods should not be compared to face-to-face learning methods.
Prensky, (2008) somewhat controversially is of the opinion that ultimately traditional methods in education (back-up education) should be phased out as soon as possible for the future benefit of the ‘digital native’ generation.

Course design issues are clearly considered to be fundamental influence on the quality and effectiveness of the on-going student experience.

In summary, the findings of this research study suggest an acceptance of research hypothesis H5. However, evidence from the main questionnaire only found a weak association between this factor and quality. Yet, other triangulating evidence suggests that students agree that levels of satisfaction with course design issues are related to the quality of their subsequent online education experience. Data from the main Likert survey suggests this association is at the lower end of the ‘small or smaller than typical’ level of association (Kraemer et al, 2003). Some reservations were expressed over student responses to two of the contributing Likert scale measure items. Further qualitative data interrogated and findings and perspectives from the literature confirm evidence towards a positive and significant link between course design and quality and effectiveness in online education (p<0.01).

7.10 Hypothesis 6 – Delivery Technologies

H6 – Students that are measured as having enhanced levels of knowledge of delivery technologies will rate their online learning experience as being of higher quality than that of the wider student sample.
The findings related to this Likert-scale research measure provide support for the research hypothesis H6 and indicate that student's level of tutor-student interaction is positively correlated with student perceptions of quality and effectiveness (Spearman's rho=0.437, n=392, p<0.01) at the probability level p<0.01, single-tailed. The research model suggests a total of 19.1% of student's variation in their scoring of perceived quality and effectiveness can be attributed to this factor.

Levels of agreement on the scale items within this Likert-scale measure ranged from 39.7% (rating of depth of learning possible online) to 80.6% (importance of e-tutoring skills). A brief discussion on these 'agreement' levels follows due to the level of variance apparent within the measure.

Three of the Likert scale items in the measure representing 'knowledge and experience of delivery technologies' had agreement levels of over 50%. One of these items had an agreement level over 80%.

Of the two remaining Likert item questions (contributing to this measure) the first one of note related to the e-library service and its place in the success or otherwise of e-learners. Although 45.2% of students agreed that it was important to their studies, a further 30.1% were undecided of its value and so 25% disagreed that this item was important to the student experience.

JISC, (2007a) found that institutional technologies can often be more complex than those technologies already familiar to learners such as Google and Google Scholar. Students will ultimately choose and use technologies that they perceive are most suited to their needs (ibid). So the large number of undecided returns to this item is most likely due to this phenomenon identified by JISC in the UK.
The second item that accounted for only 39.7% agreement relates to the perceived depth of learning available from online education. Clearly (in this sample population) adult returners from a more traditional teaching background remain to be convinced that interactive and engaging participative online learning methods can provide a higher depth of learning than those of traditional passive lecture methods.

Drilling-down to the actual response data it can be determined that 30% of students disagree that online education can provide a depth of learning that can match or exceed traditional methods, 30% are undecided and 40% agree that online methods in fact can provide a greater depth of learning. Yet when questioned as part of the 'quality and effectiveness' measure as to whether these same students had 'learned a lot' 50% agreed and 39% strongly agreed. Only eight students (2%) in total disagreed and 3 (0.7%) strongly disagreed.

Another possibility might be that the interactive technologies at the crux of this question are not being widely used across the three institutions surveyed, with traditional content-led teaching methods still being followed and so student's actual experience skewed the results in this item. This particular issue would be an interesting issue for follow-up research.

From the focus group sessions the one with the Scottish cohort centred most around student knowledge and experience of delivery technologies. Support was provided for non-institutional and non-VLE communication solutions. Skype was preferred by many students in the focus group in terms of its usability and reliability in comparison with the VLE chat facility.
Blackboard was commended for its archiving potential, whilst Skype was credited for being able to show when other participants were actually writing and taking part in the chat.

Once again on the institutional versus external software debate, students criticised the VLE’s discussion board interface and suggested it did not lend itself well to threaded discussions of the type experienced on external websites. Blogs were used as an example of an external technology better designed for online discussion than the institution’s VLE discussion boards. Within the Scottish cohort of students, knowledge and experience of Web 2.0 non-institutional technologies was commonplace.

It appeared that although the Irish student cohort’s course was online, the majority of students did not interact online regularly through modern online delivery technologies (e.g. VLEs), as many did not have broadband. They tended to use the telephone, face-to-face contact and email most regularly for communications and used the VLE as a resources hub rather than a communications hub. The English cohort of students’ use of the VLE was also less extensive and engaged than the Scottish cohort, although some students did use the discussion board of the VLE for communications. This group also tended to use the telephone, face-to-face and email most regularly for communications. This lends some credence to the possibility that many students across the three survey sites are still not using online interactive technologies on a regular basis.

Further qualitative data came through from the main questionnaire’s open-ended question asking students to provide final comments on issues that influence the quality of their online education experience.
A number of students reported broadband reliability problems and highlighted how this impacts on online education. Several other students mentioned the VLE interface as being poor and others also commented on its lack of usability compared to other non-institutional software. Qualitative statements from this data source also pointed to the complexity of the institutional software and e-library services and variability of other video and audio institutional technologies used for online distance education.

A number of students also commented on the variability of tutor knowledge and experience of using institutional technologies and commented that some were 'poor' and 'awful' and others 'very good'. Two students mentioned the increased use of podcasting (Web 2.0) technologies would be beneficial to their experience. Students did not comment on the use of the VLE as a transferable technology of relevance to their workplace. Yet, some students implied, by having an excellent online learning experience their depth of learning may have been high. However, in almost all instances such good experiences appeared to be tempered by as many poor online learning experiences.

These qualitative statements provide some further insight into the role of students' knowledge and experience of delivery technologies.

Findings by Sharpe et al, (2006) and Sun et al, (2008) suggest that student understanding of the technologies being employed in their learning was found to be important to their learning strategies.
However, Cassidy & Eachus, (2002) found that often students require to be proficient users of a range of institutional technologies (with which they are not familiar) and other external technologies within a short period of time after entering online courses. This initial level of knowledge and experience will therefore often have an impact on student success in overcoming the barriers of distance within online education (Durkee et al, 2009).

Crawley et al, (2009) suggest that if technology is used correctly it can be a means to provide enhanced opportunities to intellectually engage students more fully than they would be able to do in a time-limited, competitive traditional class environment. Yet the technology needs to be appropriate to the teaching task. Discussion boards are not always appropriate, being less prompt and instantaneous and often at odds with more active methods of online communication common in social networks in Web 2.0 environments (JISC, 2007b; Oliver & Shaw, 2003). Yet in other instances the VLE managed learning environment allows students to study at a place and time of their choosing and is a means to manage the majority of content and interactions (Weyers et al, 2004).

In numerous instances the literature also suggests that the delivery technologies used, should be familiar to students in their everyday lives (e.g. mobile communications) (Wang, 2008). Knowledge of instant messaging is another technology often looked-for by employers with multiple operating sites. At the same time it is a fundamental tool for developing a sense of community and one that many students will take with them onto course (Rabe-Hemp et al, 2009 and Weller et al, 2005b).
The biggest challenge for online education is to select the most appropriate delivery technologies to create a learning community or community of practice in which opportunities to exchange knowledge, ideas and experience are enhanced to ensure a suitable depth of learning is achieved (Durkee et al, 2009 and Redecker, 2008).

The above evidence, taken in combination, clearly points to the importance of this measure in supporting the quality and effectiveness of the online learner. In summary, the findings of this research study suggest an acceptance of research hypothesis H6. The balance of evidence indicates that students agree that levels of knowledge and experience with delivery technologies are related to the quality of their subsequent online education experience. Data from the main Likert survey suggests this association is towards the high end of the 'medium or typical' level of association (Kraemer et al, 2003). Further qualitative data interrogated above and findings and perspectives from the literature strongly confirm evidence towards the robustness of this assertion.
7.11 Location analysis

This research has been designed to gather differing perspectives from three different institutions and seeks to add to the depth of knowledge and debate on quality indicators in online education. Each of the three institutions surveyed were known to have active off-campus based online learners. The student populations were known to be predominantly adult returners with a high percentage of part-time students. Each institution was known to hold regular face-to-face residential-type events which could be utilised to gather focus group qualitative data to add to the insights provided by the quantitative methods being implemented. Therefore the main ‘socio-demographic’ factor focused upon in this research related to ‘location’ and its potential influence on the results.

However, the vast majority of respondents (n=444) disclosed their location in the main questionnaire as ‘UHI’. This compares to much lower numbers of respondents originating from University College Dublin (n=16) and the University of Gloucestershire (n=12).

A further number of respondents provided ‘other’ locations (n=35). The ability of the main study questionnaire to effectively capture and represent the views of all three student groups to an equivalent level of significance may therefore be limited to some extent due to a lack of ‘power efficiency’ (Siegel & Castellan, 1988, p.21). That said, in terms of the qualitative data being analysed in this research-study from focus groups, the sample number of students included at each site was similar (between 12-15 participants at each site). Yet, other qualitative data drawn from the main questionnaire’s open-ended question is again likely to be skewed towards UHI perspectives.
As the international element of this study across three separate institutions and locations is largely unique within the literature, it was an aim of this research to attempt to capture and represent data from all three sites effectively. To investigate the feasibility of these aims a series of Mann Whitney U tests was completed to compare student perspectives from each of the three sites. The findings are presented in section 7.7. The Mann Whitney U tests measured whether student groups at two separate locations in each instance differed in terms of their perceptions of quality and effectiveness.

A further set of The Kruskal-Wallis H tests measured whether students at three separate locations varied in their recorded perceptions for each independent variable. In no instance was any significant difference in views detected (refer to results outlined on page 285).

So, with some caution, this research evidence suggests that the views captured in the main study and backed up by further reinforcing qualitative data, are representative of student views across each of the three study sites. Differences in location only accounted for 0.5% in the variance of student attitudes towards their views on quality and effectiveness in online education.
7.12 Socio-demographic factors

Other socio-demographic was captured and closely scrutinised as anecdotal evidence and survey evidence from one course in which the writer has an active role implied that such factors were significant influencers on the quality of student experience. Youn & Vachon, (2005) advise institutions and programme managers to separate unhealthy attrition (withdrawals that could have been prevented) with healthy attrition (expected withdrawals). The latter was described as changes in home and work circumstances that were outwith the control of the course team. Park & Choi, (2009) investigated such factors and found socio-demographic factors such as age, gender and educational level did not appear to affect the resilience of students. Yet there were factors found to be significant and these were the levels of family and organisational support provided from external sources (ibid). Further research by Dobbs et al, (2009) and Wickersham & McGee, (2008) found that adult returners (with non-traditional entry qualifications) tend to skew retention rates downwards for both face-to-face and online courses alike.

Such students seek primarily flexibility and convenience in attendance to fit their studies around, due to work and family responsibilities and so are prone to changes in life circumstances impacting on their studies.
The influence of several socio-demographic indicators was therefore investigated as part of this research. It was anticipated that much of the remaining variance in student perspectives on quality and effectiveness not explained by the research model would be accounted for by the range of socio-demographic factors investigated (refer to table 6.42). Of the 29.6% of student variance not explained by the research model, only a further 10.5% was explained by a combination of eleven separate socio-demographic factors. By calculating the coefficient of determination for each socio-demographic factor the overall percentage of variance in student perceptions of quality and effectiveness attributed to these factors was able to be calculated.

In summary, no particular socio-demographic indicator is a major influence on the quality and effectiveness of the student experience within this sample survey population. For example support available through ‘family and friends’ in the focus group sessions was considered important by all three groups and very important by one group. However, in the main Likert survey this factor only accounted for 0.2% of the variance in student perspectives. Further qualitative comments did not provide further support for such issues being a major influence on the quality and effectiveness of student experience in online courses.
7.13 Conclusions

Numerous separate studies have been undertaken in the literature on elements of online education that are separately important to the student experience (e.g. the use of asynchronous discussion boards). However, few have attempted to pull together a wide range of factors from the existing literature and measure their influence collectively on quality and effectiveness and so consider the implications for delivery and design in the future.

The objectives of this study were threefold: to determine a set of primary quality and effectiveness indicators applicable to online learning, identify the delivery techniques most suited to achieving quality and to consider the implications for course design. To meet these objectives a research model comprising a 35-point Likert-scale was issued to students in three separate faculties in three separate institutions in three separate countries.

Three follow-up focus groups were progressed at each of the three study sites to gain qualitative data to add to the confidence levels of the quantitative data findings from the main study. A further series of qualitative elements of feedback to a final open-ended survey question was also used to add to the depth of the research.

The literature review process identified six separate independent variables that by testing on a Likert-scale (n=507) against a dependent variable and assessed using non-parametric methods were shown to contribute directly to 70.4% in student variation in perspectives on quality and effectiveness in online education. The latter being the dependent variable used in this study.
The application of further statistical methods found that another 10.5% of variation in student views could be accounted for by socio-demographic factors. This research model's collective measures in assessing quality and effectiveness in online learning can be considered to be a good fit in view of the statistical methods applied.

The findings of this research study lead us to conclude that: 'student-tutor interactions' (0.48); 'experience and knowledge of delivery technologies' (0.44); 'student-student interactions' (0.38) and 'ICT skills, access and knowledge' (0.32) are all correlated with quality and effectiveness with coefficients in the medium level (0.30-0.49) of association (Cohen, 1988) or in the top third (>0.30) of recorded associations (Hemphill, 2003). All these associations were found to be significant at the p<0.01, single-tailed level. Two further correlations: 'course design issues' (0.17) significance p<0.01, single-tailed and 'preparedness and readiness' (0.08) significance p<0.05, single-tailed, were also found to be positively associated with quality and effectiveness, although with a lesser level of association. These associations were considered to be lower than typical or in the lower third of associations by the definitions used in this research.

Although such questionnaires can point to differences in knowledge and behaviour that can be determined by quantitative methods, additional qualitative methods can provide the depth of explanation behind these finds to enhance confidence in findings (Kitzinger, 1995).
Findings from the qualitative data highlighted a number of issues that added depth to the quantitative findings outlined above. The main key findings from this research element are as follows:

The development of communities of practice amongst learning groups to develop a sense of ‘camaraderie’ was identified by students as being important to the quality of their study experience. This appeared to function as social support to aid the overcoming of the isolation of remote study and also to aid with the collaborative forming of knowledge around course work.

Further findings identified support for a central and key role for the tutor in supporting and directing students and an expectation of tutors to have a ‘duty of care’ for their student groups. Effective tutors were responsive to student communications, communicated regularly with their student group and were prepared and well-organised.

With regard to delivery technologies and ICT skills, student found the actual management and moderation of delivery technologies (such as asynchronous discussion boards), to be important. The need to understand how to use delivery technologies (e.g. Web 2.0, mobile technologies...etc) effectively, was highlighted (for both students and tutors) to enhance learning and interaction.

In addition, students demand full inclusion from all their peers in participatory group activities. They supported these contributions as counting towards their final module mark in a number of instances and students appeared receptive to new forms of technology utilising assessments.
Several other areas of interest to students were detailed too. In terms of course design, the findings suggest a continuity of approach between modules in terms of structure, content, management and assessment is essential. Students indicated they needed to better understand course technologies on entry and also the requirement and skills for 'participation' in advance.

Ultimately, the dependent variable used in this research, the measure of quality and effectiveness, does not presume a direct link with student satisfaction and student retention, although this may be implied. This presents clear scope for follow-up research to articulate and define the linkages between quality and effectiveness, student satisfaction and student retention.

This research study has successfully identified a range of primary quality indicators that influence online education based on research data collected from three separate institutions in three separate countries in Europe. In doing so it has identified a number of key measures that may be used as indicators of quality and effectiveness. These may be used to modify current design models of online education to improve quality and effectiveness to potentially meet student needs. Yet this research has also identified a range of linked research opportunities which will be further detailed in the following and final section.
7.14 Opportunities for further research

This research has identified a number of topics throughout the data collection process that were not able to be pursued within the scope of this research exercise, yet appeared to warrant further investigation.

For example issues such as student finance and motivation were also found to be potential factors but not included in this study’s independent variable question groupings and so were outwith the scope of this study. Yet student responses indicated that they were clearly further potential contributing factors to student’s perception of experiencing quality and effectiveness in their studies. Such variables may go some way to explaining elements of further variance that were not encapsulated within this research model and so provide a clear opportunity for further research into their influence on student experience.

The measure of quality and effectiveness examined in this study does not presume a direct link with student satisfaction and student resilience although this implied. This presents clear scope for follow-up research to articulate and define the linkages between quality and effectiveness, student satisfaction and student retention. This could make a significant additional contribution to the field.

In the short to medium term a series of research studies in the field of online course delivery and design can be determined from this research study that may be progressed to better measure the effects of quality standards on student satisfaction and levels of student retention.
Firstly, this study has determined that student’s level of skills, knowledge, and access to ICT is directly linked to the degree of perceived quality and effectiveness they experience within online education. It is therefore suggested that further research could investigate the effects of enrolling students on online courses who are clearly informed of their need for regular and undisturbed access to a modern PC or mobile device and broadband link, ensuring they understand the importance of this factor in the quality of their experience. How will this impact on student satisfaction and retention?

Secondly, short periods of often interrupted access to a family PC or mobile device and broadband link will not be sufficient. From the course delivery and design perspective, the programming of a series of interactive activities to build-up student knowledge and skills using course technologies must be considered vitally important. A one-off intensive induction is not sufficient to build such skills for new entrants and so a programmed and structured set of activities (a linear induction) will be necessary through the new entrant’s first term on their online course. Appropriate front-loading of engagement with course technologies (e.g. e-library services) will be required often during the first week of term. This is a further clear research opportunity. How will this impact on student satisfaction and retention?

Thirdly, this study has determined that student’s preparation and readiness for their online course at the time of entry to their studies is directly related to the subsequent perceived quality and effectiveness of their online education experience. It is therefore suggested that further research could investigate the effects of making available a form of pre-entry assessment to new online course entrants to enable course teams to assess the potential risk factors related to each new student’s fit with the skills and requirements of online study.
Student advisers would then be tasked with reviewing readiness assessments and be available to discuss potential issues and conflicts with new students. This proactive approach to work to seek to address problems with new students, in advance of identified issues becoming a problem that impacts on the continuity or success of their studies is worth researching. This is a further clear research opportunity. How will this impact on student satisfaction and retention?

Fourthly, this study has determined that the level and nature of student interaction with their tutor is directly related to the perceived quality and effectiveness of the student experience with online education. Effective tutor-student communications are not necessarily about quantity, but about the quality of and type of engagement. In terms of support, it was concluded that tutors must make sure that online students are absolutely clear on their availability during each week, so that important communications are not left unanswered for any length of time. Timely feedback to enquiries, assessment and forum postings, where appropriate, are all considered essential. Yet, to what extent does the level and nature of student-tutor engagement reflect student satisfaction and retention? A research opportunity exists to attempt to further quantify the nature of this relationship contrasting the perceived needs of online students with on-campus students.

Fifthly, this study has determined that the development of an engaged and active community of online learners is essential to the perceived quality and effectiveness of the online education experience. A social constructivist approach is essential to foster an online community of practice where students are able to work in a social network of learners and build and construct knowledge together.
They will feed off each others' perspectives, reflecting on their strengths and weaknesses within the group to attain a level and depth of learning often unmatched through conventional 'passive learning' traditional methods.

Online tutors need to re-orientate their course activities to bring student groups together to progress their modules and increasingly assess their contribution to the 'community of practice' in addition to their individual learning gained from such activities. Importantly, students too must be very clear about the need for, rationale and learning benefits behind enhanced levels of online group activities and interaction in developing a community of practice. How do we quantify the impact of social constructivist approaches in online learning? A clear research opportunity therefore exists to examine in detail the link between students engaged with social constructivist approaches and student satisfaction and retention.

Next, this study, through the combination of its mixed methods research has determined that course design is directly related to the level of student perceived quality and effectiveness within online education. A simple, intuitive consistent structure and design philosophy across all modules appears to be an essential element in the quality and effectiveness of the student experience. A clear opportunity exists for a comparative study examining the consistency or otherwise of online course material and approaches with student satisfaction and retention. Do consistent design strategies focused around experiential learning, problem-solving and reflection within a socialised online environment lead to enhanced student satisfaction and so retention?
Within new course designs social spaces must be provided to encourage the development of online communities and tutors and students alike must work together to provide an environment conducive to learning that overcomes the traditional feelings of isolation associated with online learning. With a lesser focus on uploaded course content in an information-rich society, a structured and ever-present, multi-faceted, reactive scaffolding tutor role will be required.

This role must seek to engage, maintain and direct collaboration within student groups in effectively designed online courses. This changed and enhanced tutor role presents new time pressures on staff engaged in online learning, rarely recognised by education institutions. A yet further research opportunity presents itself here. Just what are the additional time requirements of online-active staff and how can this be managed?

This study has also determined that student experience and knowledge of delivery technologies is directly associated with perceived levels of quality and effectiveness in online learning. Important aspects to students relate to the reliability and the provision of support provided both from the institution and the online tutor. Students increasingly expect an ICT support role to be available from tutors too. Awareness of Web 2.0 and mobile technologies is growing and for those students familiar with it, there is an expectation that it be integrated into their learning experience. There are clear advantages too for course teams, for example being able to enter into students’ social networks external to the institution too. Yet, there remain a significant number of students whose awareness and desire to utilise non-institutional Web 2.0 and mobile technologies remains low. A further research opportunity therefore exists here too. Just how might Web 2.0 and/or mobile technologies be successfully integrated into adult learning courses?
In addition, in terms of research opportunities it appears that few online courses across the world are regularly using synchronous technologies such as Skype and instant chat to the extent it is used in the University of the Highlands and Islands for tutorials. Experience to date has found that student groups receiving such synchronous chat tutorials view them as a valuable teaching and learning aid. A research opportunity therefore exists to quantify the perceived value of synchronous chat tutorials for online education. To what extent is synchronous group communications viewed as a primary indicator of student satisfaction and so factor in student retention?

A further theme that came through strongly in this research was digital literacy skills and their importance to the online learning experience. The nuances of the requirements for successful online study without doubt include a set of advanced ICT skills highlighted already by a number of writers cited in this study and complemented by this research. Within the social constructivist online paradigm digital literacy skills are arguably essential from day-one on student courses. However, it appears that student awareness of digital literacy skills is almost universally low and a presumption that being able to browse the web and send emails is enough. This presents a further research opportunity. Just what do students understand by digital literacy and what do they think the key skills are? Do students with higher digital literacy skills demonstrate higher student satisfaction and so retention?

As found in the literature and reviewed and explored in this research, e-assessment is an area of particular interest amongst students and online education tutors alike. Students, many of whom are adult returners (and not ‘digital natives’) appear receptive to assessments based on new technologies.
This issue of assessment presents a clear opportunity to research further in the context of student satisfaction and retention. Just what are student expectations with regards to e-assessment and how does this link to student satisfaction and student retention?

Lastly in terms of research opportunities, this research has found that the tutor-student relationship is perceived to be the core element of perceived student perspectives on just what is a quality online experience. With additional learning, teaching and course management roles along with enhanced technology skills requirements and enhanced online pedagogic knowledge (e.g. online socialisation of student groups) just how should modern Higher Education faculties be modifying their priorities to assist staff engaged with online learning?

Finally, overall this research study has revealed a wealth of information about online education and it has pulled together many themes from disparate sources and added to existing knowledge. Nevertheless, as this is an incredibly fast moving and innovative sector the research itself has identified a wealth of further areas to explore to gain greater insights of value to the online education sector. It is the intention of this researcher to pursue these research opportunities in the coming years.
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Appendix 1 - Graphs and charts from an initial Pilot Study on Broadband and its influence as a Quality Factor in e-Learning.

1.1

<table>
<thead>
<tr>
<th>Source of Replies</th>
<th>No. of Replies Per Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Management</td>
<td>35</td>
</tr>
<tr>
<td>Child and Youth Studies</td>
<td>30</td>
</tr>
<tr>
<td>Computing</td>
<td>25</td>
</tr>
<tr>
<td>Cultural Studies</td>
<td>20</td>
</tr>
<tr>
<td>Environment &amp; Heritage Studies</td>
<td>15</td>
</tr>
<tr>
<td>Health Studies</td>
<td>10</td>
</tr>
<tr>
<td>Infection Control</td>
<td>5</td>
</tr>
<tr>
<td>Interpretation: Management &amp; Practice</td>
<td>5</td>
</tr>
<tr>
<td>Natural Sciences</td>
<td>2</td>
</tr>
<tr>
<td>Managing Sustainable Rural/Mountain Development</td>
<td>2</td>
</tr>
<tr>
<td>Rural Development Studies</td>
<td>2</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>1</td>
</tr>
<tr>
<td>MAPD</td>
<td>1</td>
</tr>
</tbody>
</table>

1.2

What represents best what you consider 'broadband' to be in your experience? (March, 2007)
1.3

If you have upgraded to broadband how many hours per day on average do you spend online?

- >100% increase in time online
- 100% increase in time online
- 50% increase in time online
- 0% No Change in usage

1.4

To what extent has moving from dial-up to broadband influenced what you do online?

- I now create content and publish it online (e.g. web pages, blogs, videos, etc.)
- I am online daily for at least 50% longer than I was with dial-up
- I am able to email attachments and download files more effectively and so undertake such activities more often than before
- I use a wider range of communication tools than previously and can participate in multi-tasking leisure based discussion boards and chat more easily
- I am able to undertake my course research quicker and am able to free up more time for my family, work and other commitments
- I am able to undertake a wider range of research related to my studies and leisure interests within a shorter period of time
- I undertake more or the same activities now as I did when that dial-up
- I visit websites and undertake activities which I did not do previously due to the faster speed of access
Is access to broadband the most important factor in encouraging students to access online courses?

No, other issues such as time work finance and family commitments are more important determinants

It is an important factor but NOT one of the top three elements of decision-making related to entry on to an online course

Yes, it is the most important factor which influences student’s choice with regard to online courses

What Factors Influence the Quality of the Distance Learning Experience with UHI?

- Other factors have influenced the quality of my experience if you strongly agree or totally agree go to question 3
- In my experience studying at a distance with UHI is a totally positive experience
- In my experience studying at a distance with UHI is a largely positive experience
- In my experience the reliability of my PC has been a constraining factor on the quality of my experience
- In my experience dial-up communications are a major constraint on the distance learning experience of students
- In my experience health issues are a major constraint on the distance learning experience of students
- In my experience changing family commitments/circumstances are a major constraint on the distance learning experience of...
- In my experience changing work commitments are a major constraint on the quality of the distance learning experience of...
- In my experience finance issues are a major constraint on the quality of the distance learning experience of students
1.7

The Quality of the Distance Learning Experience

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Factors that Impact on the Quality of Experience

<table>
<thead>
<tr>
<th>Significant problem high impact</th>
<th>Constant problem low impact</th>
<th>Intermittent problem low impact</th>
<th>Not a problem</th>
<th>N/A</th>
</tr>
</thead>
</table>
What Could UHI Do Better to Support Distance Learning?

- Increased use of Skype or other instant messaging software
- Provide more digitised content and enhanced access to online journals and ebooks
- Use an enhanced level of PC-based video and audio communications with students
- Use an enhanced web-based email system
- Provide an enhanced level of access to tutors
- Provide an enhanced level of induction in both September and January
- Use just one Virtual Learning Environment: Blackboard / WeBCT / CLIL / Moodle
- Provide a better level of 24/7 telephone-based technical support
- Provide more opportunities for students to meet up – e.g. at weekends 2-3 times per term so that those with weekly commitments may attend

Legend:
- Top priority
- Second priority
- Third priority
- Fourth priority
- Fifth priority
Appendix 2 – Focus Group Summary Comments

11-02-07

Focus Group Meeting

Adult Distance Learning Group, Carnew, Wicklow, Ireland

1.1 There were 12 community based workers (several with the LEADER programme itself) and 2 farmers present. All these students were registered on the NUI Rural Development Diploma or Degree in Rural Development.

1.2 This meeting began with tea and scones, jam and butter. These in-person workshop sessions are a regular occurrence and happen 2-3 times per semester. It was obvious from the start that the camaraderie between these students was high even although they did not see each other often.

1.3 These students were asked specifically about their e-learning experience with regard to their: support system for distance learning; the importance of meeting face-to-face during the term; how they fit their studies in with their lives; the level of access they had to their university services; their motivations for studying remotely at a distance; the level of ICT skills they possessed; what could be done better, and; how they finance their studies.

1.4 Students indicated that these workshops were an essential part of their distance learning course and a number of the students present recalled having setbacks (family, health or work) during which they considered leaving the course. However as they had the other students to phone and talk to and as word soon got round they were struggling they were soon inundated with support from their classmates. There was a feeling that they were all in it together and a real community of learners had been established.
1.5 When asked why the workshops were so important it was answered that they developed the personal links missing from other forms of distance learning. Students also felt that they learned as much within these 6 hour workshops as they did the previous 6 weeks. Being adult returnees they were very happy to question their tutors until they were confident they understood the issues presented fully.

1.6 The main challenges faced by the students were time and the need to spend more time than they had to submit assessments of a quality that they were happy with. Most of the students present found it difficult to spend a limited amount of time on an assessment and submit a less than optimal piece of work to meet a deadline. Most had done it in the past but had not been comfortable with doing so.

1.7 Work and family commitments all impacted on time available and in some/certain instances health related issues too. The majority of students present (80%) had a support system in place (family and friends) that enabled them to free up time for their studies.

1.8 Only 3 of the students present had broadband and they indicated that it improved their experience significantly and sped up research and study-based searching on the internet. This saved much time. Lack of speed a searching the internet was a frustration more than any form of serious impediment that kept students back from completing their studies.

1.9 When asked about their motivations and how they thought the course would help them, all students present were convinced that the course was of direct use to them in their working lives and the motivation seemed to be about more being aware of and being as good as possible in what they were doing rather than gaining a specific qualification. Their main motivation appeared to be ‘self advancement’ as they viewed the course content as being relevant and the transferable skills to be applicable to their work environment.

1.10 This was largely a group either of practitioners wishing to improve their skills or, to a lesser extent, farmers and/or other rural people wishing to improve their employment or diversification prospects. In many ways this group would be very similar to many we encounter in the Highlands & Islands, except they seemed much more cohesive.
1.11 In terms of IT skills coming on to the course, all the students had some level of knowledge although few, if any, had advanced skills. Level of technological know-how was not seen as obstacle or disadvantage in doing this course according to the students present.

1.12 The students were disappointed that there was no library book distribution system as there is within UHI, but were largely content in having accepted that if they needed a book they had to drive into Dublin. One or two problems had occurred if the books had not been ordered in advance. If they were in the store when sought then student have to wait until the next day to collect and this meant at least one or more wasted journeys by students in attempting to access books. Reading physical books was preferred and a first option before seeking e-books or online digital resources by approximately 80% of the student group.

1.13 In terms of what could be done better they felt, and this is a common response amongst our student too, that feedback could be given quicker than it was in some modules where it was not given within 3 weeks. It was felt for adult returnees studying at a distance such timely feedback is absolutely essential.

1.14 In terms of funding to travel to the meeting all the students had paid their own way and were happy to do so. Some shared transport too. With regard to fees, none of the students paid full fees. Student fees were funded by the LEADER programmes in Ireland and the Dept. of Agriculture. Most of the student questioned had 95% of their fees funded by a combination of the above two sources. Several students only had 50% of their fees funded.

1.15 A final observation was that this is a very strong community of online learners and the level of personal interaction seemed higher than it might be in a normal face-to-face class. There was a clear sense of camaraderie.
Focus Group Meeting
Adult Distance Learning Group, Knoydart, Scotland

1.1 This was a group of 12 adult learners, several of whom are community based workers and also a number of whom are running businesses in rural areas and several others who are valued members of staff working for existing established businesses in rural areas. 10 of these students were registered on the Sustainable Rural Development degree with UHI and 2 of the students were registered on the Environment & Heritage degree with UHI.

1.2 These students possess typical characteristics of non-traditional students as they are committed to living and working in rural areas. They have a range of home and work commitments during the day that means traditional forms of study requiring daily campus attendance, or even moving to a location where a main Scottish Higher Education institution is located, is not a realistic possibility.

1.3 These students were asked specifically about their e-learning experience: synchronous tutorials; attendance issues in e-learning; asynchronous discussion boards; usability and suitability of Blackboard VLE; course content; standardisation of course design; networking issues; the meeting of perceived learning needs; face-to-face meetings and retention; Web 2.0, and; exams.

1.4 Live Chat Tutorials - With regard to the Blackboard model both synchronous and asynchronous communication elements were discussed. A clear preference was made towards the Skype interface as a tool for tutorial sessions. On the other hand some students stated specifically the real advantage of the Blackboard Chat was its archive facility and some students liked to go in a browse the discussions from the previous year (when available) to help prepare themselves for the online tutorials.
1.5 Skype was not seen to offer such flexibility in archiving but its real plus points were its modern interface (and ability to use picture icons) and the ability to see when someone is typing at the other end, after they have 'won the floor'. The Skype connection was seen as more robust and less susceptible to drop-outs.

1.6 Chatroom tutorials were considered to be a very important element in keeping students engaged on the course on a weekly basis. Students liked being able to go back over the transcripts after the class or to read them if they were not able to attend.

1.7 Attendance issues were discussed and I put it to the students that often in the first few weeks of online courses attendance is high but drops off thereafter. The issue of compulsory attendance was discussed and students did feel that this would not be unreasonable providing the tutorials were offered at a time that suited students – i.e. evenings. A minimum requirement of attending 7 out of 10 tutorials was discussed (subject to mitigating circumstances) and this was considered a reasonable for the adult returners present.

1.8 It was discussed that if students did not make the minimum number of tutorials, they would not be allowed to be put forward to sit the exams or be eligible to submit a second assessment. The students present were not perturbed about this possible change in policy. The point was made that these tutorials were of significantly less value if poorly attended.

1.9 The value of how asynchronous discussion boards were being used was questioned by the student cohort. The lack of participation was mentioned as students present largely failed to engage with this asynchronous element of the course. This part of the discussion then became about finding out why participation was so patchy and limited, despite the efforts undertaken by staff. Many students presented commented that if a first student posting in response to the tutor's question posted something comprehensive and thorough, they often felt either they had nothing to add on the subject, or else they felt intimidated and not willing to participate as they felt 'the first posting' had 'set the bar too high'.
1.10 There was a unanimous feeling amongst the students present that running asynchronous discussion board activities in parallel with weekly synchronous tutorials did not work well and had to be changed. Even when multiple postings were apparent weekly on some modules, it was found that there was not one clear threaded discussion going on as the week went on. A number of the students blamed the VLE (Blackboard) user interface/front end which they said did not lend itself well to threaded discussions, in comparison with other software they have used for internet discussions out with their course.

1.11 Another point that was made was that students could (and often did) start new threads and replied directly to the tutor’s question, rather than adding to any threaded discussion that managed to take hold. This led to some confusion and it was suggested by the student group that students be blocked from being allowed to ‘start a new thread’ options. This would at least make them use the single thread coming from the tutor’s original question, whether it would make such postings any closer to being a true exchange of ideas and debate on the related issues remained open to question.

1.12 An example of the integration of a Blog as an alternative asynchronous debating tool which can be integrated into Blackboard with its new modern interface and single path discussion threads was received favourably by those students present. Such Web 2.0 tools were considered to be better designed for asynchronous communications that the Blackboard discussion boards.

1.13 The overwhelming feedback was that unless discussion boards are to count towards final marks and their usage is assessed, then their use should be discontinued. They are considered to be a non-mandatory ‘overhead’ which do not add much to the learning experience.

1.14 With regard to course content itself, the students seemed to be largely satisfied with the directions that their courses were going, with regard to its latest changes which were passed around the students.
1.15 The standardised format and design style of online tutor notes being produced in 2009-10 by staff in a similar style 'with the green bars' was said to be a significant improvement on the 'mis-mash' of staff content previously uploaded. This initiative was strongly supported by the students in attendance.

1.16 The students present were asked if there were any problems presented by the increased networking of the course modules. A number of students stated that particular modules had not been contextualised or developed correctly for either online students or for their degree subject. Examples given included instances where assessments had not been contextualised at all and so the relevance of the module to students seemed to be largely lost. This is one of the key challenges of networking modules across different courses with differing delivery priorities. It was emphasised by students that all staff (including part-time and infill) needed to understand the differing needs of the mixed student cohorts enrolled on different modules.

1.17 An alternative form of online course content, in the form of recorded video conference lectures was discussed by the group. The consensus was that such content was of little use to their learning needs. Furthermore, it was said to be deleted after a set time limit by the institution and so when such recordings might have been useful as an additional revision resource, they were not available. The quality of such recordings were noted as being of varying quality.

1.18 Providing residential trips each term that allowed online distance students to come together, was considered invaluable to students in their development of a learning community and so the retention of students on their distance learning programmes. The opportunity to meet up with other students on the programme each term, away from home, allowed social relationships to be developed between the students that could just not be developed from online study alone.
1.19 The Web 2.0 tools that are used with these students were reported to be understood by the students as being expected within the scope of a modern learning experience. However, as their use was not core in most instances, due to time constraints few students actively sought out and used them. 80% of the students present were at least aware of three or more Web 2.0 tools used in conjunction with their studies. Awareness of Skype was highest given its use in delivering some online tutorials.

1.20 Given the ethos of increased flexibility in terms of studying options that is required for the non-traditional students present at this meeting, the continued prospect of exams within the boundaries of an online course that was selling itself on its flexibility of access seemed peculiar to the majority of students present. Several students did nevertheless state that they preferred exams, although very much in the minority. The online students present considered continual assessment to be more appropriate to an online course geared towards providing maximum flexibility for its enrolled learners.
1.1 There were 15 distance learning students in attendance. All these students were registered on the Community Engagement & Governance Foundation or Honours degree at the University of Gloucestershire.

1.2 The students themselves worked almost exclusively in town and parish councils across England or in organisations that had regular dealings with such councils.

1.3 The occasion of the meeting of all these distance learning students was their attendance at their twice yearly residential which is held in Cheltenham itself. Students travel from far and wide to attend. Attendance is not compulsory although is strongly encouraged. It helped address the feeling of isolation sometimes felt by the students in remote-based studies.

1.4 The meeting began with me providing a brief summary of how my research had gone to date and what it was about. Thereafter I begun to ask a series of questions of the students focussed on the following areas: their readiness on entry; course design; sense of community; web 2.0; feedback, and; motivations.

1.5 The students agreed that they had minimal conception, as adult learners, of what was going to be involved in distance learning. Only two students who had studies previously to obtain previous degrees suggested that their expectation were in line with the experience. A number of students indicated that if they had known what was involved then they would not have come onto the course. Specifically the level of commitment required and the technology to be used were unknowns on entry.

1.6 The flexibility of the course was indicated as being a key reason why students registered on the course. They indicated they would not be in Higher Education if it was not for the flexibility.
1.7 On asked what the very most important issue that affected the quality of their experience as online learners a unanimous answer was given that related to the quality of their access to their tutors and their level of engagement with the student group.

1.8 Some members of the student group were concerned that although they paid the same money as on-campus students, the latter had more access to tutors. This issue of equivalence was felt important to all students present with particular regard to the level of access to tutors and tutor time devoted to their studies.

1.9 Students in attendance also indicated that the development of their group into a community of learners in which they supported each other was considered very important to their resilience on the course. The type of event they were attending during this focus group (i.e. a face-to-face residential) was considered to be very important in developing a sense of camaraderie. In doing so, students' personal communications were enhanced (in the aftermath of these events) and students' e-mail and telephone connections were extended amongst their group. The regularity of such communications increased too.

1.10 There was a low level of web 2.0 understanding and recognition amongst this group of distance learning students. They acknowledged that courses would need to change to meet the demands of the new generation, but they felt that it would be an unnecessary layer of bureaucracy (i.e. another login) and yet another technology to try and understand and use.

1.11 The students were asked about the importance of feedback. The issue of the time taken in some instances was highlighted. Timely feedback on student work and discussion board postings was expected as a fundamental. When asked if students would prefer shorter feedback in a quicker timescale the class was split. Some students just wanted to know their mark and a sentence or two on their performance overall, whilst other students in the group would prefer to wait longer for a higher quality and more thorough piece of feedback on their work.
1.12 Students were asked if there were any stress factors that impacted on their studies such as changes at home or work. All students present indicated that such factors could ultimately lead to their non-completion in the current timescale. Other areas of stress related to technology. During the course the VLE was changed from WebCT to Moodle. The transition was difficult and so there were was technological factors that increased stress. Problems with submitting assessments online and also meeting deadline dates were mentioned as stresses in some instances for many of the students.

1.13 Course design helped the flexibility of the course though and the use of discussion boards although not marked were considered to be their primary expected weekly communications. Some students reported as they were not marked, they rarely entered into the discussion boards. Other students felt that the tutors needed to start off the discussion boards and ask questions of the students. This was not a universal view though as some students preferred that the discussion boards were student-led and questions were asked of the tutors when required.

1.14 The question was asked about the importance of support from friends and family in helping students complete their studies and meet deadlines. The understanding of their family was important and support from other students on the course who have become their friends is important too. Before this residential several students had travelled 100s of miles to meet up in each others home in helping support each other in the preparation of their presentations.

1.15 Students mentioned that the type of contribution was important too, as either tutors or students could ‘kill’ the discussion by providing comprehensive postings to which other students agreed with and thought they could not easily add to or meet a similar quality in posting.

1.16 Lastly, student motivations ranged from career advancement, to ‘getting a degree’ and self fulfilment reasons (prevailing in older adult learners) and to help them do their existing job better. All were of the opinion that if an online distance learning option with flexibility was not available, they would not be doing a degree in their current circumstances.
Appendix 3 – Scatter Plots and Box Plots

1. A graphical representation of the relationship between ICT Access, Skills & Knowledge and Quality and Effectiveness

Measure 1 Vs Quality

![Measure 1 Vs Quality Scatter Plot](image-url)
2. A graphical representation of the relationship between Preparedness and Readiness and Quality and Effectiveness

Measure 2 Vs Quality

PrepTot1

QuTot
3. A graphical representation of the relationship between Tutor to Student Interactions and Quality and Effectiveness
4. A graphical representation of the relationship between Student to Student Interaction and Quality and Effectiveness

Measure 4 Vs Quality
5. A graphical representation of the relationship between Course Design Issues and Quality and Effectiveness
6. A graphical representation of the relationship between Knowledge of Delivery Technologies and Quality and Effectiveness

[Diagram showing a scatter plot with labels and data points representing Measure 6 Vs Quality]
7. Potential Covariate: Location And Quality And Effectiveness

[Box plot diagram showing the distribution of Total Perceived Quality and Effectiveness across different locations: UHI, Univ. of Glouc., UCD, Other.]

Locations:
- UHI
- Univ. of Glouc.
- UCD
- Other

Values:
- 101
- 229
- 451
- 433
- 339
- 247
- 107
- 257
- 113
8. Potential Covariate: Age Groups And Quality And Effectiveness

![Box plot showing perceived quality and effectiveness across different age groups.](image)
Appendix 4 – Spearman’s Rank Order Correlations: Test-ReTest Reliability Results: Likert Questionnaire

### 4.1 Subject 1 – Test Results

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Test-Retest1</th>
<th>Test-Retest1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho</td>
<td>Test-Retest1 Correlation Coefficient</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Test-Retest1 Correlation Coefficient</td>
<td>.761*</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

### 4.2 Student 2 – Test Results

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Test-Retest2</th>
<th>Test-Retest2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho</td>
<td>Test-Retest2 Correlation Coefficient</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Test-Retest2 Correlation Coefficient</td>
<td>.833*</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

### 4.3 Student 3 – Test Results

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Test-Retest3</th>
<th>Test-Retest3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho</td>
<td>Test-Retest3 Correlation Coefficient</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Test-Retest3 Correlation Coefficient</td>
<td>.757*</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
## 4.4 Student 4 – Test Results

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Test-Retest4</th>
<th>Test-Retest4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho</td>
<td>Test-Retest4</td>
<td>Correlation Coefficient</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

| Test-Retest4 | Correlation Coefficient | .725 | 1.000 |
| Sig. (2-tailed) | | .000 | . |
| N | 35 | 35 |

**. Correlation is significant at the 0.01 level (2-tailed).

## 4.5 Subject 5 – Test Results

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Test-Retest5</th>
<th>Test-Retest5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho</td>
<td>Test-Retest5</td>
<td>Correlation Coefficient</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

| Test-Retest5 | Correlation Coefficient | .819 | 1.000 |
| Sig. (2-tailed) | | .000 | . |
| N | 35 | 35 |

**. Correlation is significant at the 0.01 level (2-tailed).

## 4.6 Subject 6 – Test Results

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Test-Retest6</th>
<th>Test-Retest6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho</td>
<td>Test-Retest6</td>
<td>Correlation Coefficient</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

| Test-Retest6 | Correlation Coefficient | .650 | 1.000 |
| Sig. (2-tailed) | | .000 | . |
| N | 35 | 35 |

**. Correlation is significant at the 0.01 level (2-tailed).
### 4.7 Subject 7 – Test Results

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Test-Retest7</th>
<th>Test-Retest8</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test-Retest7</td>
<td>Correlation Coefficient</td>
<td>Test-Retest8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.000</td>
<td>.913</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

### 4.8 Subject 8 – Test Results

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Test-Retest8</th>
<th>Test-Retest8</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test-Retest8</td>
<td>Correlation Coefficient</td>
<td>Test-Retest8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.000</td>
<td>.913</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
Appendix 5 – Likert Survey Questionnaire

SOCIO-DEMOGRAPHIC INFORMATION:

1.1 Where did you register as a student? (Please enter institution and current study location e.g. Inverness):

1. UHI________ / Study Location________________
2. University of Gloucestershire__________ / Study Location________________
3. University College Dublin___________ / Study Location________________
4. Other________________________ / Study Location________________

1.2 How long have you been studying on your current course? (Please tick):

1. Less than one year __ 2. Between one and two years __ 3. Between two and three years __ 4. Between three and four years __ 5. Four years or more __

1.3 What is your study status? (Please tick):

1. Full-time_____ 2. Part-time_____ 3. Studying individual module(s) ____ 4. N/A _____

1.4 What is your gender? (Please tick):

1. Male_____ 2. Female_____

1.5 What age were you on your last birthday?

(Years old)

1.6 What is your normal mode of study? (Please tick):

1. Wholly online degree_____ 2. Blended learning degree/studies (some online modules)_____ 3. Classroom or VC based (with Blackboard, WebCT, Moodle [VLE] support)_____ 4. Not Applicable _____

1.7 Please enter the number of children that you have living with you? (Enter 0, if none):

1.8 Do you have any other daily caring responsibilities? (Please tick):

1. Yes_______ 2. No_______
1.9 What is the highest level of education you have achieved to date? *(Please tick):*
1. Primary school  
2. Partial Secondary school  
3. Completed Secondary school  
4. Workplace / Trade training  
5. FE College Course  
6. University (undergrad.)  
7. University (postgrad.)

1.10 If you work in addition to studying, how many hours per week do you work? *(Enter 0, if none):*

1.11 Do you have a “friends & family” support system in place that can be called upon to free-up your time on occasions of particular importance to your studies (e.g. preparing for and sitting assessments and exams)? *(Please tick):*
1. Yes, I can regularly depend on such assistance  
2. Yes, but I can only call upon such support from time to time  
3. No, although I am hoping circumstances will change soon  
4. No, I have no such support system in place  
5. Other

*(If other, please outline)*
Measure 1 – ICT Access, Skills & Knowledge:

1.1 To what extent do you agree or disagree: that you have the appropriate skills to locate and access essential e-books, electronic journal articles and other resources for online studies through the University library service? *(Please enter a value):*

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 Strongly Agree |

1.2 To what extent do you agree or disagree: that you have the appropriate skills to locate and access essential e-books, electronic journal articles and other resources for your online studies through the use of the World Wide Web and related search engines? *(Please enter a value):*

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 Strongly Agree |

1.3 To what extent do you agree or disagree: that the level of technical support available to e-learners is a significant factor in the overall quality of course experienced? *(Please enter a value):*

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 Strongly Agree |

1.4 To what extent do you agree or disagree: that you are fully familiar with the privacy and security threats that you may encounter searching for information on the Web? *(Please enter a value):*

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 Strongly Agree |

1.5 To what extent do you agree or disagree: that if it was not for the flexibility of the online format I would not have been able to study on my current course? *(Please enter a value):*

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 Strongly Agree |
Measure 2 – Preparedness & Readiness for E-Learning

2.1 When you started your online course just how much did you understand about the
course, its online content, relevance and related learning activities? (Please enter a
value):

| Very Poor Understanding | 1 | 2 | 3 | 4 | 5 | Very Good Understanding |

2.2 How would you have rated the level of your ICT and internet skills on entering your
e-learning course? (Please enter a value):

| Very Poor | 1 | 2 | 3 | 4 | 5 | Very Good |

2.3 To what extent do you agree or disagree: that when you started your online academic
studies you were not able to fully appreciate the time commitment required? (Please
enter a value):

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 | Strongly Agree |

2.4 When you started your online course how would you have rated the effectiveness of
your study skills (e.g. essay writing, referencing...etc)? (Please enter a value):

| Very Poor | 1 | 2 | 3 | 4 | 5 | Very Good |

2.5 To what extent would you agree or disagree that your institution’s student
handbook is an effective tool in preparing students, specifically online students,
for their studies? (Please enter a value):

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 | Strongly Agree |
Measure 3 – Tutor - Student Interactions

3.1 On average, how would you rate the importance of quality of dialogue with your online tutor(s) in completing your studies? (Please enter a value):

| Very Unimportant 1 | 2 | 3 | 4 | 5 Very Important |

3.2 To what extent would you agree or disagree: that the tutor’s weekly role in communicating with you and directing your studies is central to your success on any particular module? (Please enter a value):

| Strongly Disagree 1 | 2 | 3 | 4 | 5 Strongly Agree |

3.3 To what extent would you agree or disagree: that timely tutor feedback to assessment and timely responses to your questions and discussion board postings was/is a significant factor in motivating you to progress your studies? (Please enter a value):

| Strongly Disagree 1 | 2 | 3 | 4 | 5 Strongly Agree |

3.4 To what extent would you agree or disagree: that the more regular contact I receive from my student adviser, the more likely I am to successfully complete my studies? (Please enter a value):

| Strongly Disagree 1 | 2 | 3 | 4 | 5 Strongly Agree |

3.5 To what extent would you agree or disagree: that it is part of the responsibility of online tutors to develop some level of ongoing rapport/ social interaction (i.e. more than just a welcome email or forum posting) with their student group? (Please enter a value):

| Strongly Disagree 1 | 2 | 3 | 4 | 5 Strongly Agree |
Measure 4 – Student - Student Interactions

4.1 How would you rate the importance of your level of dialogue with your classmates and fellow distance learners? *(Please enter a value)*:

<table>
<thead>
<tr>
<th>Very Unimportant</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Very Important</th>
</tr>
</thead>
</table>

4.2 To what extent do you agree or disagree: that student-student interactions are the most important means to help online distance learners overcome their 'feelings of isolation'? *(Please enter a value)*:

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Strongly Agree</th>
</tr>
</thead>
</table>

4.3 To what extent do you agree or disagree: that responding to other students’ postings on Discussion Boards/Forums (and to points made during online chat tutorials, if applicable), is crucial to the overall online learning experience? *(Please enter a value)*:

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Strongly Agree</th>
</tr>
</thead>
</table>

4.4 To what extent do you agree or disagree: that group assessments are a means to generate student interactions within online classes that would not otherwise have developed? *(Please enter a value)*:

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Strongly Agree</th>
</tr>
</thead>
</table>

4.5 To what extent do you agree or disagree: that some form of student face-to-face interaction during the term is crucial to the development and cohesion of online communities of distance learners? *(Please enter a value)*:

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Strongly Agree</th>
</tr>
</thead>
</table>
Measure 5—Course Design & Pedagogy

5.1 To what extent do you agree or disagree: that the design, structure and presentation of online materials significantly contribute to the overall e-learning experience? (Please enter a value):

Strongly Disagree 1 2 3 4 5 Agree

5.2 To what extent would you agree or disagree: that it is important that my e-learning tutors are/were able to explain concepts to me clearly and/or managed tutorial events effectively (Please enter a value):

Strongly Disagree 1 2 3 4 5 Agree

5.3 To what extent do you agree or disagree: innovation requires that interactive Web 2.0 technologies (e.g. YouTube, Skype, Blogs, Wikis) should be integrated into the design and delivery of any modern-day online course? (Please enter a value):

Strongly Disagree 1 2 3 4 5 Agree

5.4 To what extent do you agree or disagree: that participating in weekly course activities within online e-learning courses should be compulsory for students and count towards their final mark? (Please enter a value):

Strongly Disagree 1 2 3 4 5 Agree

5.5 To what extent do you agree or disagree: that it is important that online modules from the same degree course adhere to similar design and style templates, to create a similar look, feel and structure for each module? (Please enter a value):

Strongly Disagree 1 2 3 4 5 Agree
Measure 6 – Delivery Technologies

6.1 If your online tutor-developed weekly content was available in the form of an audio-downloadable podcast, how often would you use such a resource? (Please enter a value):

Very Often

1 2 3 4 5 Never

6.2 To what extent do you agree or disagree: that interacting with the online University library service is a daily or weekly activity that is central to your success as an e-learner? (Please enter a value):

Strongly Disagree

1 2 3 4 5 Strongly Agree

6.3 To what extent would you agree or disagree: that in using your course’s and institution’s delivery technologies you have developed transferable skills of value to the workplace? (Please enter a value):

Strongly Disagree

1 2 3 4 5 Strongly Agree

6.4 To what extent would you agree or disagree: that the depth of learning possible from online delivery technologies (participation in discussion forums/boards, participation in live chat tutorials, guided online reading & research...etc) is able to match or exceed traditional classroom-based lecture methods? (Please enter a value):

Strongly Disagree

1 2 3 4 5 Strongly Agree

6.5 To what extent do you agree or disagree: that the modern-day distance learning tutor must be fully conversant with e-learning delivery technologies and be able to provide technical support/advice if required? (Please enter a value):

Strongly Disagree

1 2 3 4 5 Strongly Agree
Dependent Variable – Measure of overall quality and effectiveness

7.1 I would recommend this course to friends or colleagues? *(Please enter a value):*

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7.2 I have learned a lot in this course? *(Please enter a value):*

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7.3 I have enjoyed taking this course? *(Please enter a value):*

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7.4 The more interactive and supportive my tutors and student advisers are, the more satisfied an e-learner I will be. *(Please enter a value):*

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7.5 The more accessible, relevant and thought provoking my tutor-designed online content is, the more effective I will be as an e-learner. *(Please enter a value):*

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>