An analysis of learner satisfaction and learning outcomes in an online learning course at the University of Botswana's Faculty of Engineering.

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Declaration

This research has been carried out as partial fulfillment of the requirement for the award of a degree of Master of Arts (Digital Media) in the Faculty of Human Sciences at the University of KwaZulu-Natal. I declare that this thesis is my own work that I have achieved through consulting various sources acknowledged here.

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Abstract

Research findings have shown that online learning has the potential to improve the quality of learning if it is designed effectively to embrace interactive, collaborative knowledge building among learners. Online learning has the capacity to facilitate efficient and enjoyable learning through skills acquisition in a context specific environment especially in Southern Africa but there are a number of challenges that designers of online learning need to factor in to the design of this pedagogy.

This study explores how learner - learner; learner - course facilitator and learner - content interactions influenced and shaped learners' online learning experiences particularly satisfaction with a course facilitated from the University of Botswana for participants within the SADC region. These three forms of interactions were further explored through using 6 online learning evaluation dimensions to provide a guide to the analysis. The study employed a range of data collection methods that provided rich qualitative data including: Life world accounts, discussion forum entries, online surveys, expert reviews, and learners' grades.

The findings suggest that the learners' level of interaction at the levels of the 6 dimensions could have influenced what they perceived to be valuable, effective and satisfactory. Other influencing variables were course design and community of learning presence. The findings also reveal that although the participants found the course to be very valuable to them, there were areas that could improve the learning experiences. Further longitudinal research and investigation into alternative technologies is also recommended.

List of Acronyms

CMC	Computer Mediated Communication.
CR	Critical realism.
ICT	Information and Communication Technology.
HCI	Human Computer Interface.
KEWL	Knowledge Environment for Web-based Learning – an online learning management system developed at the University of the Western Cape.
np	in references this refers to a document that has no page numbering.
nd	in references this refers to a document that is not dated.
SADC	Southern African Development Community
UB	University of Botswana.
UBEL	University of Botswana E-Learning.
ZPD	Zone of Proximal Development.

Conventions used

University	when the upper case is used in the word University it is used to represent the University of Botswana unless otherwise made explicit in the text. The word university in lower case represents universities in general.
Programme	is used to represent a programme of study and any other activity according to usual dictionary definitions
Program	represents a computer program

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Chapter 1: Introduction

1.1   Introduction

Using online learning effectively in tertiary education requires a strong theoretical foundation, responsive human computer interface and social presence to allow for easier interactions among learners and with the course facilitator (see for instance Wang, Kanfer, Hinn and Arvan 2001). The challenge lies in balancing all these to enable a learning environment that allows flexibility of use, intuitive learning and an enjoyable and rewarding learning experience. This is more complicated for online learning developers and practioners in developing countries, such as Botswana, where the pedagogy is relatively new and the culture of using Information and Communication Technologies (ICTs) for improved tuition has not yet taken root.

The greater challenge is how online learning program developers create learning environments that engage learners in a pedagogy that allows them to fully participate in the constructivist collaborative educational methodology (Wang et al 2001). In this framework then the challenges are: how can this learning environment mitigate learning needs, how can the learning environment facilitate greater interactions among learners and with the course facilitator to ensure learner satisfaction with their learning experiences and how can the learning environment facilitate improved learning outcomes and achievement?

1.2   Background

I am a citizen of Botswana working in education and interested in the use of online learning to facilitate education in my country. I am committed to applying what I have learnt in the Digital Media in Education course at the University of KwaZulu-Natal to the needs of Botswana and it is therefore important that this research be seen from this perspective.

Botswana is a landlocked country in Southern Africa largely made up of desert and reliant on diamonds, beef and tourism as its economic mainstays. Despite these limitations the country is often reported as being the 'success story of Africa', and the Government of Botswana is committed to ensuring this success goes beyond the life span of the diamond fields. To do this the government has always placed great emphasis on the importance of education offering free education for all citizens. The focus is on ensuring that Botswana does not lag behind the "information age" and this is seen as a way forward in diversifying the economy and ensuring an "educated and informed nation" Botswana, Republic of (1997, np). Along these lines educational institutions in Botswana have explored ways of using Information and Communication Technologies (ICTs) in education both in the teaching of ICT skills as well as using ICTs to support learning.

Online learning initiatives at the University of Botswana started in 2001 and were spearheaded by the Centre for Academic Development. The University of Botswana describes online learning as "the appropriate organisation of information and communication technologies for advancing student-oriented, active, open, collaborative and life-long teaching-learning processes" (Uys 2003 , np). The online learning programme at this

institution was modeled on the national vision and sought to make the University a centre for excellence by providing education for empowerment and sustainable development. Uys (2003) asserts that the rationale for using online learning at the University of Botswana includes:

i.   increasing the quality of learning and the success rate of students

ii.   creating and supporting new research opportunities

iii. alleviating increasing administrative and teaching pressures on academic staff

iv.   supporting academic freedom and freedom of speech through free information flows, and

v.   making teaching more rewarding and exciting for academics (Uys 2003: np).

Since the inception of the online learning initiative at the University extensive research has been done in the use of the technology at the institution; however, to a large extent this has been conducted from the institutional and staff perspective (see for instance, Thurab-Nkhosi and Giannini-Gachago (2005); Shemi and Mgaya (2003); Thurab-Nkhosi, Lee and Giannini-Gachago (2005); Uys (2004); Uys (2003); Uys, Nleya and Molelu (2003); Uys and Siverts (2001) for research conducted in Botswana). There are some notable exceptions such as that of a conference paper presented by Giannini and Seleka (2004) where they looked at factors that influence online discussions amongst students in two online learning courses. It is my view that the perceptions of learners participating in online courses needs to be more fully explored and understood to obtain a holistic view of the potential and pitfalls of online learning in the Botswana context.

This topic is important in the light of the country's "Vision 2016" statements policy plan Botswana Republic of (1997) and the stated intention of using Information and Communication Technologies (ICTs) to facilitate the provision of education that is responsive to local market needs and that satisfies global trends. Through this vision the Botswana government wishes to use ICTs as a platform to facilitate quality education necessary for attaining "a prosperous, productive and innovative nation" (ibid) by the year 2016.

1.3   The case study

In order to add to the growing body of research I have chosen to conduct a case study at the University. The course selected, Postgraduate Diploma in Information and Communication Technologies for Telecommunications is a fully online course offered through the University of Botswana's Faculty of Engineering. Significantly it draws its participants from Botswana and other countries in the SADC region. This allows an investigation into the extent to which this learning paradigm is responsive to learners' needs in the broader Southern Africa area and Botswana in particular.

Problem statement

It has been argued by some that Botswana's education system suffers from a dearth in responsiveness to current market needs and in providing an education that meets learners' needs - see Professor Richard Tabulawa's Wednesday column in the weekly newspaper – *The Botswana Gazette's Education Review* - (Tabulawa 2007; Tabulawa 2008). In response to

this the government of Botswana has through the national Vision 2016 provided a national ICT framework to facilitate embracing ICTs in education.

However, there are a number of factors that need to be in place for ICTs to be used in the support of education and skills development in Africa. In particular mention is made of technological limitations, and more specifically bandwidth limitations and access, reliable infrastructure, government commitment, culturally relevant electronic resources. I would like to add to this list and include a culture of engagement by students that allows them to fully participate in the constructivist collaborative educational methodology.

The government's commitment and Botswana's technological strengths and weaknesses have already been addressed in prior research within the University. The strengths and weaknesses, cultural imperatives and possible other inhibitors from the students' perspectives need further analysis.

Purpose of the study

The purpose of this study is to establish the levels of learner satisfaction and outcomes in the online Postgraduate Diploma in Information and Communication Technologies for Telecommunications, as interrogating students' affective responses to an online course and comparing these with the students' results may illuminate areas that need to be addressed in the development and facilitation of online courses that are particularly relevant to the region. It will also assist the University to ensure that their rationale item one, increasing the quality of learning and the success rate of students (Uys 2003), is addressed.

The "Postgraduate Diploma in Information and Communication Technologies for Telecommunications" course was selected as the University has pioneered online learning in Botswana and this particular course is run wholly online with students drawn from the Southern African Development Community (SADC) area. Therefore, using the technological infrastructure provided by the University and taking their experience of offering online courses over the last 6 years one can focus particularly on student interactions and perceptions.

The original purpose of this study was to find out:

1. the perceptions of learners towards online learning,

2. the attitudes of learners towards online learning,

3. whether online learning provides barriers to learner satisfaction and achievement in the course,

4. if online learning provides opportunities for learner satisfaction and achievement in the course, and

5. what extent participants successfully incorporate e-research into their own work environments.

This study seeks to reveal how learners at the University of Botswana's Faculty of Engineering use an online learning platform. It also seeks to obtain evidence of learners' satisfaction of

the online learning platform and find ways to improve the online learning platform. In particular it examines learner interaction and sense of presence in the course and how these influence learner performance and learner course satisfaction in an online course.

The research aims to observe and analyze the impact of ICTs learning environments using a constructivist paradigm on learners' interaction with the content, with their peers, and the course facilitator with the intention to evaluate how these enhance their learning.

Research questions

The broader research questions that guide this study are:

1. What are the learners' learning needs and expectations?

2. What are the perceptions of learners towards learner– instructor interactions, learner – learner interaction, course structure, and course support?

3. Are students satisfied with their learning experiences and the learning outcomes (perceived content knowledge, quality of course projects, and final course grades)?

Population of study

The primary information source of this research is the online learners themselves as it was felt they would be better placed to interrogate the challenges inherent in the online learning environments. The second target information source the course facilitator and program designers as they would be clear about the educational aims and objectives and could provide critical evaluation data

1.4   Significance of the study

As a student in Digital Media and the use of ICT in education and having undergone tuition in online learning environments I feel empowered to undertake this study. Also, given my involvement with tutoring at a college of education I consider myself to be in a favorable position to investigate the efficacy of on-line learning in Botswana's tertiary education from the viewpoint of learners. I believe that the outcomes of this study have the potential to assist in creating improved online learning environments and improved online learning practices at the University of Botswana and my own college.

The "Postgraduate Diploma in Information and Communication Technologies for Telecommunications" is ideally positioned to use as a case study in this regard. Students participating are geographically distant, culturally diverse and have different home and work issues that they need to deal with during their studies. Findings from this case study could also be used to inform the SADC region's online learning initiatives.

The arguments for the use of ICTs in education are varied and compelling, for instance it is often stated that these technologies provide an alternative to expensive face to face learning especially as the demand for tertiary education increases (Johnson, Aragon, Shaik and Palma-

Rivas 2000). The flexibility afforded by their use caters for learners in different geographic locations, allows a design that can meet the needs of diverse learning styles, supports increased interactivity and collaboration.

In addition it has become popular among a working populace that wants to further its education from the comfort of their homes or offices (Mutula 2002). Wang et al (2001) reported that many companies are adopting the self-paced online learning platforms for employee training in lieu of the conventional instructor-led face to face training so that learners do not have to move from their place of work.

There are however contradicting theories emanating from scholars from polarized camps on the efficacy of use of ICTs in learning. On the one hand affiliates of the use of ICTs state they have a profound positive role in learning and many of these scholars have reported significant gains accrued by learning using ICTs for tuition as opposed to those using conventional methods of tuition (Hong, Lai and Holton 2003). On the other hand detractors have questioned the veracity of such contentions and argue that not much in the area of research has demonstrated unequivocally that the use of ICTs in learning facilitates epistemic agency and investigative learning (Oliver, Herrington and Omari 1996). Those who follow this school of thought contend that though the internet has been used as a platform for enquiry based learning its impact has remained minimal (Hao 2004) generally showing a trend of 'no significant difference'.

In a local context there are persuasive arguments for the use of ICTs in education. The global reasons mentioned above are of particular relevance and are highlighted by Mutula when he states that the motivating factors include a need for "…the extension of access to higher education … within the framework of lifelong and open learning…" as well as the need to offer "…quality academic and professional programmes … encouraging [a] spirit of critical enquiry" (Mutula 2002, 101).

It is tempting to import ICT solutions directly from other more developed countries but if considerations are not made of local conditions these "solutions" could exacerbate existing problems. The most obvious example to highlight this is the limitation of bandwidth experienced in developing countries compared to the ubiquitous high bandwidth available in first world countries. High bandwidth technologies used in first world countries are inappropriate for a country that has a limit of 80mb on its international lines, where many users may need to use dial up connectivity and some may be reliant on satellite links.

As much as technological disparities need to be considered so too do cultural differences. Kanter (2000, 8) states "e-culture derives from basic principles of community: shared identity, sharing of knowledge, and mutual contributions" and later warns that "[t]he transition to the Internet can be hard … [s]uccess requires systemic change, a shift in the organizational way of life" (Kanter 2000, 72). Research at the University has addressed issues related to technology and has made great strides in dealing with institutional change particularly as the online learning initiative is driven by both a government and University executive imperative. However the student perspective can influence the outcome of such developments and as such it is also important to investigate the culture of learning from the student perspective. The purpose of this study is to address that gap in order to provide better, more responsive pedagogies to learners and facilitate improved and more flexible education.

Online efficacy in this study refers to the effectiveness, usefulness and responsiveness of the course content design and the technologies in mitigating learners' needs and expectations which culminate in learner satisfaction and a rewarding learning experience. The framework of this learning experience is the creation of a social presence (Swan 2003) that provides a community of learning (Lipman 1991) but accords the learner freedom to learn at his or her own time, pace and space.

In view of this, the study examines the level and type of interactivity that might influence learning outcomes and learner satisfaction of the course. Hence it explores notions of learners interactions with other learners, learner interactions with the course facilitator and learners interactions with course content (Swan 2003). Inter learner interaction, course facilitator and learner interaction and learner content interaction have been viewed as influential attributes of online learning that determine online learning efficacy (Bullen 1998). Such efficacy is measured through a longitudinal survey that explores attributes of efficient and effective online learning.

1.5   Potential beneficiaries

The first beneficiary would be the online learners themselves as this could assist them to understand the environment in which they are learning. The second beneficiary would be potential online learners as they would be more fully informed of the challenges inherent in these learning environments. The third potential beneficiary group is course facilitators and program designers as they could gain information on ways to improve the learning environment and better facilitate learner satisfaction and achievement. The fourth and final beneficiary would be the Ministry of Education and Skills Development as the study is intended to provide baseline data for rolling out online learning initiatives to the colleges of education in Botswana.

1.6   Limitations of the study

The study uses only a small sample of 33 participants therefore the sample size of the study limits any form of generalisability. As a result, only trends can be drawn from the research. The bandwidth problem that has plagued Botswana and other African countries hampered ease of use of real time data collection. In addition, the problematic power shortages and 'load shedding' in Southern Africa constantly led to unavailability of the internet making it impossible for the researcher to predetermine times in which to conduct observations of online discussions and to collect data.

Another very serious limitation has been lack of commitment by the participants to respond to the online survey questions e-mailed to the participants. The lack of personal face-to-face or telephonic contact posed a serious problem to the collection of data. I originally intended to use journals as an in-depth form of assessing participants' experiences with online pedagogies, however, these have not been used by many participants. This is a limitation to the study as valuable data from the participants' experiences has not been collected.

1.7   Conclusion

Notwithstanding these concerns much of what is documented here can be used in advising new local online learning developers of theoretical and practical issues to consider in the development of their own courses. The next chapter outlines the theoretical framework of this study underscoring the importance of theory in practice.

Chapter 2: Theoretical Framework

2.1   Introduction

This study is premised on the view that it is not the technology but the theory behind the educational pedagogy that facilitates greater efficacy of online learning environments. Similarly, that the success of any online learning programme depends on a solid epistemology to guide the design of the programme, content selection, pedagogy delivery style and the building of an efficient community of learning. Also, online efficacy and learner satisfaction necessarily have to be informed by a versatile theoretical framework. However, in interrogating most research studies meant to evaluate online efficacy there is an evident tendency to lean on an effectiveness comparative analysis of one form of instructional delivery to another (Fox 2000).

Due to the observations made above this study seeks to discuss determinants of online efficacy, learner satisfaction and achievement from the constructivist epistemology. There are several educational theories that are discussed to provide a firm background of educational development and how online learning has developed over the years. However, three learning theories have been identified to provide discourse in this investigation: critical realism, social cognitive theory, and social learning theory. These are all discussed against the backdrop of the constructivist world view.

2.2   Theoretical background

The last two decades have seen increased research in online learning particularly in the area of online social constructivist pedagogies (Beatty 2002; Dougiamas and Taylor 2002). However this surge in research on online learning has been largely descriptive and technology led instead of being theory led (Nichols 2003). This lack of balance has led to less authoritative theory driven discourse on online learning theories. A firm theoretical basis would accord researchers the latitude to critically evaluate the impact of online learning in contemporary educational epistemologies and the development of online learning. It is also critical to conceptualise learning through a set of philosophical tenets in order to give it depth and meaning. Gamache (2002, 286) lends this assertion credence as he points out that "all practice is rooted in some theoretical framework, if not explicitly, then implicitly. Since methods are based upon epistemology, and epistemology is based on ontology, educational practice is never value-free."

It is critical then that this research is situated within a theoretical framework that would assist in shedding greater light on the research questions and the findings of the research. Nichols (2003, 2) defines a theory as "a set of hypotheses that apply to all instances of a particular phenomenon, assisting in decision-making, philosophy of practice and effective implementation through practice. Theory provides a yard stick for evaluating practice, though it in turn may be adjusted by findings from practice that show the theory to be inadequate." Garrison (2000, 3) adds to this by stating that "it is theory that provides a coherent ordering of relevant variables and relationships to guide both practitioners and researchers."

Theory should therefore shed greater light on the phenomenon or phenomena under study and must present shared nomenclature. Furthermore, Biggs (1998) posits that though there's ample evidence on the value of technology in enhancing learning it would probably be more rewarding not only to evaluate learners' attitudes towards technology based learning but the philosophy behind it.

Anderson and Elloumi (2003, 33) alert us to the critical role that theory plays in focusing the purpose of educational research by stating that "theory allows — even forces — us to see the "big picture" and makes it possible for us to view our practice and our research from a broader perspective than that envisioned from the murky trenches of our practice." Likewise, Wilson (1997) argues that theory allows educational researchers to envision new perspectives, maximize efficiency of delivery, and provide innovative delivery for robust skills development. It is not the technology but the pedagogical design method that facilitates achievement in online learning (Schramm 1977; Clark 1983). Viewed in this light it is evident that satisfaction and achievement in online learning are more a result of pedagogical strategies than simply the type of technology used.

It is from this premise that Bonk and Reynolds (1997) argue that the technology becomes a vehicle for transmitting innovative, effective authentic activities that enable learners to establish congruence between new information and old in order to create meaningful knowledge. In view of this, online learning puts greater emphasis on the learner and the learning process (Anderson and Elloumi 2003) in the construction of new meaning. Online learning pedagogy must be grounded in a firm epistemology that bridges learner centred learning and innovative technology mediated instruction for effective self regulated life long skills development. According to Nichols (2003) online learning should be viewed as a 'means' of education and not as a 'mode' of education, allowing it to be used with various technological tools in varying contexts including face-to-face, distance and mixed delivery modes. Moreover, its development should be facilitated by developments in epistemological advancements as opposed to technological developments (Laurillard 2002).

Online learning has since the 1980's seen a significant upsurge in research studies targeting an evaluation of its efficacy and the literature presents a marked disjuncture in whether or not the studies present a holistic or a skewed picture of its efficacy. On the one hand detractors point out that the research has been over simplified and therefore inconclusive (Shulman 1987; Porter and Brophy 1988) while on the other hand purveyors believe that the studies are informed enough to shape and inform policy decisions in online learning (Thompson 1998). Due to the diverse nature of online learning the research on its efficacy is fraught with challenges such as: which theoretical framework to choose, proving that this epistemology does work, and overcoming challenges on quality assurance (Fox 2000).

The primary objective of developing an online course is to facilitate dynamic learning that is efficient, flexible, user friendly, highly interactive, cost effective and promotes independent acquisition of life long skills without the inherent restrictions of traditional campus education (Wang et al 2001). Dirckinck-Holmfeld, Sorensen, Ryberg and Buus (2004) argue that the theoretical underpinning of online learning environments is premised on pragmatism and the view that meaning is constructed through active involvement and discourse. Likewise, online learning is further informed by such learning theories as the social learning theory that

concerns itself with the building of communities of learning and the insightful design that facilitates the development of such communities (Wenger 1998; Wenger 2000). Learning communities become a repository of shared experiences, concepts, tool kits for learning and reflective construction of knowledge which in turn become the spring board for lifelong learning (Wenger 1998). The purpose of interactive online learning environments is to allow learners to learn in authentic, "cognitively motivating and socially enriched learning contexts" (Kumar 1996, 2). The success of any online learning programme, thus depends on a solid epistemology to guide the design of the programme, pedagogy delivery style and the building of an efficient community of learning. Online efficiency and learner satisfaction necessarily have to be informed by a versatile theoretical framework.

This research is grounded in the constructivist epistemology and works on the presumption that learners who are masters of their own learning and use their experiences in authentic activities have greater satisfaction in their learning and achieve better outcomes. Similarly, learners who have not yet attained self regulation skills will need to develop them in order to function successfully under such learning environments. In addition, those who have successfully developed self regulation are more likely to be satisfied with their learning and will achieve more to meet their life long learning needs as opposed to those who have not.

Hong, Lai and Holton (2003) argue that developers of online learning platforms and materials often tend to develop these along the lines of traditional instructivist methods of learning where learning is handed down by the "instructor" rather than using educational theories that allow learners to negotiate their own learning and to interact with peers. According to these authors, learners should be engaged in constructing their own knowledge rather than simply being exposed to the transmission of knowledge by the course facilitator Hong et al (2003). They further maintain that there is always a disparity between what the online learning platform and materials are intended to achieve and what they ultimately achieve. In trying to assess the relevance of the online learning platforms and materials and enhance access to and flexibility of a course, the developer needs to ascertain that the learning environments are what the students expect and want from their course facilitators and that the learning environments provide the levels of motivation needed to master the course content (Hong et al 2003). This would lead to greater achievement and satisfaction in the learning experiences.

Mixed feelings have been expressed as to the value of Information and Communication Technologies (ICTs) in facilitating increased learning achievement and outcomes as some maintain that there is no significant difference in outcomes of face to face delivered courses and online learning[1]. This is not to insinuate some kind of competition between the two forms of delivery as each offer advantages that are not available in the other mode e.g. the "any time" of online learning has a distinct advantage for learners who are employed and the accessibility of facilitators is a distinct advantage in face to face courses. The specific challenges for online learning include how to meet learner expectations and satisfy their needs and those of the course facilitator, and how to design online courses that provide a satisfying and effective learning environment (Johnson, Aragon, Shaik and Palma-Rivas 2000).

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[1] See the No significant difference website at http://www.nosignificantdifference.org/ for additional related resources.

As much as it is important to position oneself in an educational paradigm, when conducting research of this nature it is also important to understand that the manner in which the research is conducted will reflect the researchers 'world view'. This study is firmly positioned in the social constructivist world view and as such uses a research paradigm consistent with this paradigm. Section 2.3 explorers the research implications more thoroughly.

2.3 The critical realist pragmatic paradigm and its influence on the evaluation of online learning efficacy

The emergence of new learning technologies came at a time when the world of education was undergoing evolution and the search for less contestable educational theories. This called for alternative theories for learning that reflected congruence with current technological trends and created an immense challenge for educational developers. It is not surprising that the evaluation of online learning is a complex enterprise, particularly as online learning is a diverse field embodying: education, computer science, design, and media studies. Due to this complexity, researchers engaged in online learning evaluation often take divergent paths of evaluation depending on their discipline and area of interest (Phillips 2004). St. Pierre (2002, 25) argues that "Unfortunately, it is often the case that those who work within one theoretical framework find others unintelligible." Because of the convergence of disciplines in online learning no one paradigm adequately does justice to online learning evaluation research.

This study seeks to evaluate learner satisfaction and achievement in online learning by employing the critical realist-pragmatic paradigm (Bhaskar 1997). This borrows appropriate features from three other online learning evaluation research paradigms, namely:

1. the analytic-empirical-positivist paradigm – which has the underpinning assumption that the researched phenomenon can be reduced to statistical variables that can be tested using empirical and scientific means.

2. relativist-constructivist-interpretivist paradigm – focuses on qualitative descriptions of social activity in a specific context and does not place an emphasis on the generalisability of findings.

3. the critical theory-neomarxist-postmodern paradigm – seeks to facilitate change, and not just describe social interaction. It provides critical reflection (Phillips 2004).

"Critical realism was developed as an alternative to positivism (empiricism) and as an alternative to non-positivism, e.g. constructivism (relativism)… Critical realism can be seen as a specific form of realism. Its manifesto is to recognize the reality of the natural order and the events and discourses of the social world" (Carlsson 2005, 96). According to Carlsson (2003, 12) Bhaskar (1989) identifies three key components of the critical realism theory as "the real, the actual, and the empirical. The real domain consists of underlying structures and mechanisms, and relations; events and behavior; and experiences. The generative mechanisms residing in the real domain exist independently of, but capable of producing, patterns of events. Relations generate behaviors in the social world. The domain of the actual consists of these events and behaviors. Hence, the actual domain is the domain in which observed events or observed patterns of events occur. The domain of the empirical consists of what we experience; hence, it is the domain of experienced events." Critical realism also

suggests that there is a causal relationship between the social environment and experiences and that facts can be disputed maintaining that knowledge is socially constructed.

The notion of the real would then explain why it is critical for learners to form communities of learning such that they gain shared knowledge that they have constructed from real experiences, cultures and real contexts. Likewise, the notion of the domain of the actual would be where learners would use authentic tasks to develop life long skills and these would be developed from social contexts and interactions. In the domain of the empirical, skills developed from authentic tasks would have been commonly negotiated and agreed upon methods and truths that could be applied in different contexts.

However, the critical realist pragmatic paradigm has been accused of ignoring complexities of representation and values and "reproducing the language of pathologization that stigmatises certain social groups in much the same way as crude versions of positivism" (Smith 2000). This notwithstanding, the critical realist-pragmatic paradigm lends itself credence as it allows the researcher to employ a full range of data collection methods which ensures validity and it also recognises the weaknesses of the other three paradigms but creates a balance by acknowledging their strengths and factoring these in. The critical realist pragmatic paradigm incorporates the value of statistical empirical approaches, the value of descriptions of activities within social environments-constructivist-interpretivist- and the value of critical reflections-neomarxist-postmodern paradigm- thereby providing a more embodying paradigm to online learning. This eclectic approach to online learning recognises that no one paradigm can be touted as more effective and it further provides a balance between quantitative versus qualitative approaches to push the frontiers of development in online learning. A view shared and the methodology recommended by Reeves and Hedberg (2003).

This study does not provide generalisable findings due to the small size of participants but does identify local trends and issues that could be used to improve other online courses and lead to further research. This paradigm is used with the constructivist paradigm that views the development of higher cognitive skills as a product of social interaction as the learners, through collaboration and interaction, learn to reshape their knowledge (Vygotsky 1986). Other learning theories that have influenced this research are the Social Cognition Theory and the Theory of Reasoned Action.

"Critical realism is an emancipatory approach seeking social change though there are disagreements between critical realists as to whether the problem that needs changing is the social class system, patriarchy or other forms of structured social division such as those based on racism and other forms of cultural difference" (Jupp 2006, 257). Critical realism is accommodative of empiricism's strengths and idealism by challenging one's assumption of what is real. It further states that both empiricism and idealism have similar flaws namely that they have a 'flat ontology' in their inability to differentiate between sensation, impression and perceptions. It also finds flaws in these two's inability to accept the existence of a deeper meaning to social phenomena than just the observable (Jupp 2006). Critical realism draws strength from people's cultural values and experiences in portraying what is real.

2.4 How constructivism facilitates learner satisfaction and learning outcomes in online learning

Fallows and Bhanot (2005) maintain that technology based learning that is fundamentally driven by a sound educational philosophy is believed to be able to assist even the 'poor' and 'average' learners to perform and function like 'high' performers. Therefore, the challenge is adopting a philosophy that concerns itself primarily with the learners' actions. If learners are to learn desired outcomes in a reasonably effective manner then the facilitator's fundamental task is to get learners to engage in learning activities that are likely to result in achievement of such outcomes. It is helpful to remember that what the learner does is actually more important in determining what is learnt than what the facilitator does (Thomas Shuell 1986 cited in Biggs 1999).

The learner in a social constructivist learning environment must understand that learning is a social process and not an individuated experience (Lefrancois 2000; Rogoff, Goodman Turkanis and Bartlett 2001). Therefore the learner is able to fall back onto the learning repositories attained from the social dialogue and experiences gained. To buttress this argument Jones (1995, 225) posits "the social context is seen as crucial, and language is also seen as crucial and interrelated with action …; providing them with an additional tool used both to reflect on and direct behaviour." This view saw the move from more individualised competitive learning espoused by earlier theories of learning to a culturally sensitive and socially negotiated form of learning (Jones 1995).

In addition, constructivism is a world view that espouses cooperation, collaboration, discovery learning, cognitive apprenticeship and is less expository than direct instruction methods (Lefrancois 2000). Unlike previous learning theories such as behaviorism which used technology to teach content with an emphasis on performance, constructivism uses educational technology to facilitate participatory learning, collaboration and application of skills acquired in authentic problem solving contexts (De Villiers 2006). Though learning takes place in communities of learning, it is critical to ensure that learning tasks facilitate engagement of unique individual learning styles, experiences and contexts in order to ensure customised meaningful learning (Duffy and Jonassen 1992).

The constructivist view, based to a large extent on Piaget's theories, concentrates on interactive learning environments and discovery learning (Berg 2003). In addition, constructivism holds that "…knowledge has to be discovered, constructed, practiced, and validated by each learner; learning involves active struggling by the learner" (Duffy and Cunningham 1996, 174).

From the constructivist perspective technology should be used to focus on cognitive models for the construction of knowledge and the experiences learners bring to the learning environment. Social constructivists take this view further by maintaining that construction of knowledge occurs through collaborative social interaction Brown, Collins and Duguid (1998). Constructivism as a learning theory was further influenced by the work of psychologist Jerome Brunner and this philosophy has come to significantly influence online learning. Learners use personal experiences to construct new knowledge and skills. Each learner therefore has a unique representation of the knowledge, formed by constructing his or her

own solutions and interpretations to problems and ideas." Weller (2002, 65) further breaks down this conception of learning through constructivism by arguing that constructivism:

> emphasises a construction of knowledge, so the learner comes to an understanding of a concept through dialogue with others and the teacher.

> gives importance to the context of learning, so approaches which encourage learners to participate in a valid activity such as a project or research based courses are favored.

> collaborative activities are often placed at the heart of the course, since such activities encourage both of the above.

> shifts the focus of attention from the teacher to the learner. This makes the role of the facilitator a more facilitative one, rather than being the transmitter of knowledge. This has been called the transition to being a 'guide on the side instead of being a sage on stage'.

Lev Vygotsky, a German psychologist expanded on the ground breaking work of Jean Piaget. Jean Piaget's learning models of Assimilation and Adaptation paved way for the constructivist knowledge construction model as it underpinned knowledge construction by means of balancing cognitive structures with the learning environment and " the process of integrating reality into pre-existing cognitive structures" (Berg 2003, 15). Piaget (1932) further argued that learning occurred best where learning materials have relevance to the learners' experiences as the learner is better motivated to critically analyse material using existing cognitive structures to create his/her own reality.

It is Vygotsky's Zone of Proximal Development (ZPD) that sheds further light on learning and educational development. ZPD is defined as "…the distance between the actual developmental level (of the child) as determined through problem solving under adult guidance or in collaboration with more capable peers" (Ager 2000, 11). The role of the course facilitator, according to Vygotsky's ZPD, is to assist the learner by scaffolding learning. This could be through either asking carefully constructed questions that assist the learner in piecing together the pieces of the puzzle or through designing tasks that enable systematic progress from solving one problem using similar skills as used in the previous problem to solve an even tougher problem.

Another learning theory propounded by Vygotsky that paved the way for constructivist online learning methodologies was the social interactionism theory. Here the key assumptions were that learners learn best in socio-cultural contexts that enable them to construct their own knowledge and derive individual but collectively negotiated truths. Again, as opposed to behaviourists,

> Vygotsky took issue with the Piagetian view that from the time of their birth children learn independently by exploring their environment, and behaviourist view that adults are entirely responsible for shaping children's learning by judicious use of rewards and punishments (Williams 1997, 39).

The Vygotskian social interactionism theory expanded on cognitivism as it contends that learning is a process dependent on language and processes of cognition that assist learners in using their social-cultural experiences to construct knowledge. Unlike Piaget, Vygotsky believed that more knowledgeable people interacting with the novice learner guide the

learner to deconstruct complex problems and formulate problem solving skills that the learner can apply in various contexts (Williams 1997). This view augurs well with the perceived role of interaction; that is learner-learner, learner-course facilitator and learner-content interaction that this research argues to be fundamental to satisfaction and achievement in online learning. However, detractors of the efficacy of ICT in learning contend that ICTs deprive learners of the pivotal social interaction that social interactionism espouses. This notwithstanding, proponents of online learning present a convincing rebuttal by arguing that the internet presents a versatile learning environment through its asynchronous learning tools, and therefore presents a far more effective communication medium if judiciously used (Crook 1994; Crossley and Watson 2003).

Unlike his behaviorist counterparts, Vygotsky maintained that learning was a process of cognition involving a much more intricate causal relationship between social interactions and the individuals' cognitive skills development (Ubon 2005). In addition, Vygotsky (1997) observed that Piaget emphasised solitary learning as opposed to communal learning. Furthermore, Vygotsky contended that learners' cognitive skills and critical thinking skills are developed by interacting with their social environment (Tudge and Rogoff 1989; Rogoff 1990). This epistemology came to be known as social constructivism.

Literature on online learning uses both constructivism and social constructivism interchangeably, so this study will not deviate from this. Vygotsky also maintained cultural context and language played a fundamental role in learning as each individual had a unique set of experiences derived from his environment that enabled him/her to conceptualise the learning problem and make sense of the world around him/her (Ubon 2005). Thus the birth of Vygotsky's ZPD, that attests to a learner's independence in learning but maintains that there are other tasks that the learner requires the guidance of a more experienced tutor to execute, promotes the incorporation of collaboration and interaction in learning environments (Hao 2004).

The cognitive theories of learning are a departure from the notion of learning as passive to being active with learners using cognitive skills to process information (Williams and Burden 1997). Under constructivist learning tasks should be presented in a manner that recognises individual learners' unique experiences, learning styles and their different backgrounds and personal contexts. Pachler (2005, 197) argues that, "theories of cognitive psychology also allow us to understand the impact of applications and tools which help users process information, engage them in abstract thinking, allow them to make knowledge-construction processes transparent and help them to build classification systems." This is possible as proponents of this school of thought maintain that such generic software such as word processors, databases and spreadsheets, facilitate user creativity and critical thinking.

Constructivist models of learning further suggest key components such as networked knowledge construction, social construction of knowledge, context based authentic learning and scaffolded learning with interactions between learners and the course facilitator, Good and Brophy (1995). It is this interaction that then explains the influence of Vygotsky's ZPD on knowledge construction. Constructivism follows from Piagetian and Vygotskian theories of learning as most models of constructivism are grounded in "beliefs and assumptions that are common to many cognitive theories of learning and development" (Lefrancois 2000, 204).

The aforementioned argument is true as cognitivism emphasizes that learners derive multiple views/meaning from their experiences. The learner processes information and does not just receive it and knowledge building is a series of relationships among information pieces (Lefrancois 2000). Cognitivists view learners as "…active processors of information who initiate experiences that lead to learning, seek out information to solve problems, and reorganize what they already know to achieve new learning" (Woolfolk 1993, 239).

Constructivist online learning seeks to achieve learning outcomes that are a result of a process of engaging in authentic problem solving tasks that are aligned with learning objectives and whose assessment is a clear demonstration of achievement of the set objectives. Such alignment of learning tasks, objectives and assessment serves not only as testimony to learner achievement of learning objectives but also as a demonstration of the quality of learning and sign posts to learners what is to be learnt (Fallows and Bhanot, 2005).

Constructivist philosophies are employed to align and integrate quality of learning in online learning. Constructivism through its learner centred approach enhances quality of learning as learners use their local contexts and experiences which foster higher order thinking. "Technology should be used as a tool to enhance the experience and quality of learning of students" (Fallows and Bhanot 2005, 55). However, Stanley and Mackenzie (2000) remonstrate that the common tendency among course facilitators is to simply 'automate' the traditional face to face curricula that is largely informed by behaviorist theories without supporting it with a sound philosophy that would facilitate online efficacy. Jonassen, Peck, Wilson and Pfeiffer (1998, 55) suggest five (5) roles of technology in the learning process as the role:

1. To represent learners' ideas

2. To provide access to information necessary for knowledge construction (multiple perceptions)

3. To provide real world contexts that can support learning by doing

4. To act as a tool for collaboration between learners

5. To serve as intellectual partners that support reflection on the tasks being performed.

As constructivist learning environments promote learning principles such as collaboration, exploration, reflection, and self assessment, it is greatly suited to enabling the move away from technology just as a presentation medium but to viewing technology as an enabling learning medium that promotes these activities. This would also enhance the quality of learning and encourage self regulation and the development of critical thinking skills in learners.

Weller (2002) and Pachler (2005) suggest the success of constructivist online learning stems from the myriad of possibilities the internet lends to online learning. It exposes learners to a spectrum of perspectives and multiple resources thereby encouraging debates necessary for deeper understanding. Such learning encourages learners to develop critical thinking skills through active learning. In addition, well designed constructivist online learning environments should encourage and facilitate collaborative learning where the internet becomes a medium of communication for such collaboration.

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Weller (2002) also argues that collaboration promotes reflective learning as learners use the ZPD either for solving own problems or helping others. This leads to personal academic growth. Likewise, collaboration encourages active learning, development of communication skills, leadership, deeper understanding, multiple perspectives and construction of deeper negotiated meaning (Weller 2002). Consequently, Gary Alexander cited by Weller (2002, 69) argues that, "the job of the educator or instructional designer then is not simply to create materials in which concepts are clearly explained, but to create learning situations in which students find themselves actively engaging with concepts they are learning." Collaboration encourages learners to achieve more than they could have accomplished as individuals as learners use different perspectives to develop deeper understanding as they tutor others or exchange view points.

Another principle of a well designed constructivist online learning environment is problem based learning. Here learners are provided with an ill defined task where learners are to define the task through searching for appropriate information and to solve the problem. This mode of learning is beneficial as it provides learners with flexible approaches to learning as learners develop own problem solving skills. They also engage a variety of well thought out solutions to problems and become self motivated.

If handled well, this creates a strong sense of community of learning and enables learners to draw from a variety of experiences, contexts, and problem solving techniques (Weller 2002). Weller (ibid, 78) further argues that "the interactive nature of the net means that, unlike with many previous educational techniques, the educator can adapt the materials and offer support while the course is in progress, rather than just relying on the material embedded within the technology itself (as for example with a CDROM)."

Pachler (2005, 190), however, protests that "ICT can clearly be seen to posses a potential, for example, to liberate users from routine tasks and empower them to focus on creative and cognitive, rather than procedural aspects of writing or to make accessible vast amounts of information."

In addition, Resnik (2002) argues that the focus of constructivist online learning should be on strategies for learning the things one does not know as opposed to focusing on things one has to know. However, Pittard, Bannister and Dunn (2003, np) caution that the literature on the role of ICT in influencing learner satisfaction and achievement in online learning is in itself not conclusive and could sometimes be misleading as:

> While a study may be able to demonstrate an improvement in a pupil overtime, it is very difficult (and sometimes impossible) to determine whether the use of ICT was critical, or played a role in improved attainment because so many other factors will have played a part… Additionally, ICT provision and use is likely to be closely related to factors like quality of teaching and learning more generally, pupil characteristics, and quality of school leadership. For these reasons, isolating 'ICT' as a separate factor is often not meaningful or desirable, and understanding its links with other factors is a key facet of studying its impact (ibid).

Likewise, John and Sutherland (2004, 102) argue that "ICT alone does not enhance learning; rather it is the ways in which it is incorporated into the various learning activities that is of

fundamental importance." What has become evident is that course facilitators sometimes tend to use traditional modes of delivery in online learning where the innovation is compatible with their ideological and epistemological beliefs. For example, in behaviourist learning, learning is compartmentalised into linear series of steps with each covering an aspect of the subject under discussion or a given skill (John and Sutherland 2004). This promotes rote learning.

Furthermore, constructivist learning environments facilitate ownership of constructed knowledge and provide for intrinsic motivation as learning is investigative, self controlled and uses authentic problem solving processes (Sharpes 1999). This view is supported by Brunner in his cognitive learning theory as he asserts that learning is an active process of cognition in which the learner constructs knowledge using his/her experiences and that the instructor and the learner have to engage in dialogue (Brunner 1966). According to social constructivism knowledge construction occurs when there is communication and collaboration with other learners in a dialogical social context (Garrison 1993). Figure 2.1 illustrates these collaborative learning variables and the technologies that make constructivist learning environments more appealing in online learning and a detour from the more instructivist learning.

Figure 2.1:   Constructivism at a distance
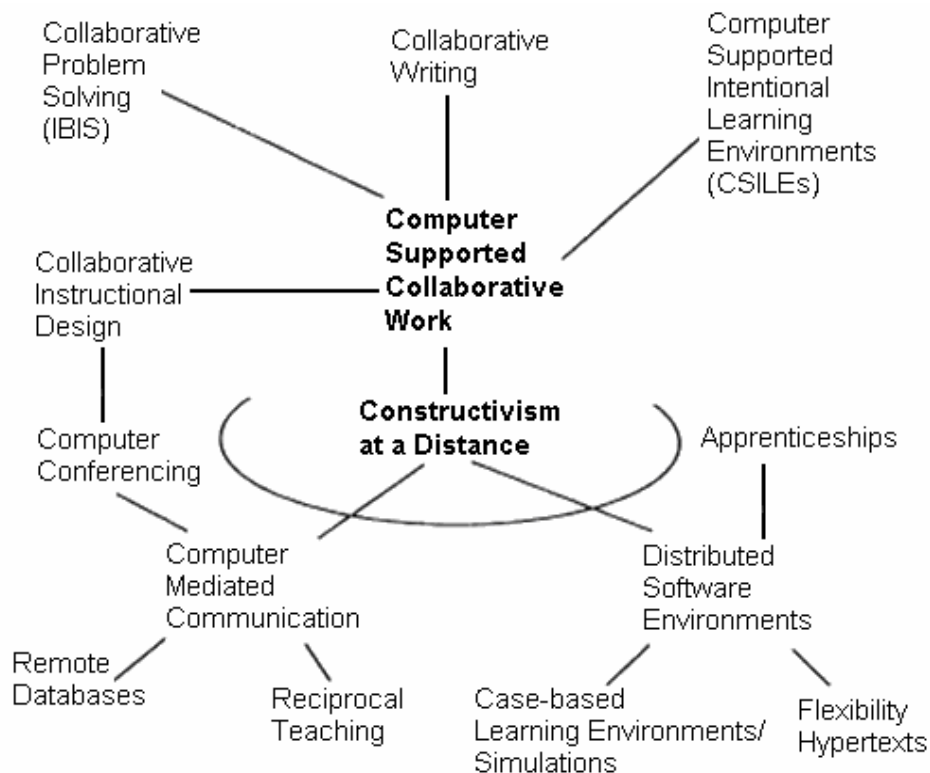
Redrawn from Jonassen, Davidson, Collins, Campbell & Haag (1995, 15).

Like Vygotsky, (Slavin 1990; 1995) argues that it is critical for learners to be engaged in collaborative learning as opposed to solitary learning where competition is encouraged at the detriment of more rewarding learning through shared knowledge and experiences. However

Slavin cautions that if it is not properly handled collaborative learning could marginalise weaker learners and water down achievement where marks are shared by a group. In support of this Berg contends:

> The incentive to help each other causes increase in learning, not the efficiency in the task structures gained by teams. Cooperative learning methods high in individual accountability of group members are more likely to produce greater learning (Berg 2003, 17).

Collaborative learning then becomes a critical variable of learning that bolsters self esteem, peer support, internal locus of control and self motivation (Dillenbourg 1999). Collaborative learning is defined by Dillenbourg (1999, 2) as "a situation in which two or more people learn or attempt to learn something together." As another variable of collaboration and interaction the course facilitator's role is critical. The role of the course facilitator is that of facilitation and the more open discourse between the facilitator and the learner the more the learner is likely to engage in participation. "The online instructor acts as an anchor, reassuring participants that support, reinforcement, and assessment is readily available" (Hofmann 2003, 3). Consequently the course facilitator must guide learners into questioning, experimenting, applying and building relationships between facts.

O'Connor (1998) provides a succinct definition of Social Constructivism in his work titled "Can we trace the efficacy of social constructivism?" His view is that learning is a collaborative venture in which learners reflect on their experiences and actions. These then become the tool kit for social construction of new knowledge and understanding of concepts. Taylor and Maor (2000) posit that it is through this social discourse that involves learners and the course facilitator that learners school themselves in a tradition of critical enquiry that nurtures higher cognitive skills and congruent skills transfer.

Anderson and Elloumi (2003, 8) point out that "Cognitivists see learning as an internal process that involves memory, thinking, reflection, abstraction, motivation, and metacognition." Accordingly, online learning design must facilitate learner interaction with the learning content and foster scaffolding of information for easier retention, analysis and application. In combining some tenets of constructivism and cognitivism Mezirow (1991, 223) came up with the transformative theory in which he views learning as a process of "reflectively transforming the beliefs, attitudes, opinions, and emotional reactions that constitute our meaning schemes or transforming our meaning perspectives."

Therefore, learning is an active process of collaboration, self regulation, reflection, contextual learning and authentic activities for transformational learning experiences. Constructivism's appeal emanates from its emphasis on learning as a social process of cognition and meaning making. Also that learning is an active construction of knowledge and meaning as opposed to rote memorization of facts (Lebow 1993; Jonassen 1998; Oliver 2000).

Learning is more effective if learners themselves are engaged in selecting what they learn and become active reflectors and assessors of their learning. This would increase retention, motivation and achievement which conversely increases satisfaction in the learning programme (McClanahan and McClanahan 2002; Burt 2004). Similarly, Coleman, Perry and Schwen (1997) maintain that effective learning occurs when the learner constructs new knowledge and reconciles new experiences with existing knowledge and beliefs.

Evidently, constructivism is a more holistic epistemology that encourages active learning where learners are engaged in negotiating assessment models of their learning and have an input in the types of assignment they are given. Therefore, "constructivist learning outcomes strive to apply real-world standards, and to assure that learning outcomes are applicable beyond a merely academic context" (Anderson and Elloumi 2003, 149).

This is possible as online learning's connectivity accords learners the opportunity to link with experts and other sources generally not available to traditional classroom set ups. It is then a case of how these technologies are used to enhance instructional delivery and increase learning achievement that determines their efficacy.

2.5 Other learning theories and their influence on online learning satisfaction and achievement

Behaviorism

Though behaviorism has become unpopular of late, with educationists gravitating towards contemporary educational world views such as social constructivism, behaviorism has played a significant role in shaping perspectives on the place of technology in educational practice. According to Burton, Moore and Magliaro (1996) behavioral psychology has provided ground breaking assumptions on the role of the learner, type of learning, learning as a process and instructional procedures.

Although behaviorist theories have been lambasted for presenting learning as a lineal, causal process of stimuli-sensory registering and behavior- operant responses Burton et al (1996) argue that some of its pioneering principles have been grossly misunderstood and misrepresented. They argue that this world view has paved way for contemporary ideologies on the role of educational technology in education. For example, they claim Skinner maintained that the learner "does not passively absorb knowledge from the world around him but must play an active role" (Burton et al 1996, 5).

According to Burton et al (1996) Skinner stated that learners learn through being actively involved, experiencing and engaging in exploratory learning. These became the pioneering principles of the role of technology in education and contemporary educational theories in general. Behaviorists of the time placed emphasis on "the active responding of the learner — the learner must be engaged in the behavior in order to learn and to validate that learning has occurred" (Burton et al 1996, 6).

Behaviorists define learning as a change in behavior resulting from experiences and that the association between behavior and experiences in context must be continuously reinforced if it is to result in significant learning. In support of this assertion Burton et al (1996, 6) state

> Essential to the strengthening responses with these associations is the
> repeated continuous pairing of the stimulus with response and the pairing. It
> is the construction of functional relationships, based on the contingencies of
> reinforcement, under which the learning takes place.

From this premise it is therefore critical that designers of online programs must focus on the needs of the individual to achieve learning in scaffolded sequences. Thus, "complex learning involves becoming competent in a given field by learning incremental behaviors which are ordered in these sequences, traditionally with very small steps, ranging from the most simple to more complex to the final goal" Burton et al (1996, 9). Further, they stress that "it is the role of the educator to control the environment so that the predominant contingent relationships are in line with the educational goal at hand" (ibid, 10). Problem solving in behavioral theories is a result of tactical trial and error experiences where learners develop skills on problem solving by observing and following cues that with time become recurrent. So, behaviorism has formed the basis of current ideologies in online learning though it has been snubbed for being too descriptive and lacking in insightful explanation of complex learning processes.

Shared Cognition Theory

Another theory that informs efficient and effective online learning is the Shared Cognition Theory which emphasis learning occurs in a physical and social context with the social context ensuring interaction do happen (Kumar 1996). The physical environment provides cultural stories, the 'atmosphere' while the social environment provides shared experiences. Knowledge construction is interactive, collaborative and contextual. This assists learners to acquire critical thinking that can be applied in other contexts dealing with authentic problem solving. The theory states that learners are able to learn from others through observation and not entirely through interaction. Critics of constructivism often accuse it of being "prone to seeking others of 'like mind', and with a sense of intellectual if not moral righteousness" (Gergen 1999, 235). However, counter arguments prevail in that purveyors of constructivism maintain that it makes no claim to foundations but offers no self-justification and therefore can not be accused of superiority (Gergen 1999).

Piaget's works on the structural stage theory led to the birth of constructivism as it emphasized cognitive development through active learning. However, the Piagetian theory of stage structure sees learning as devoid of contextual influence and such view is antithetical to the constructivist view of learning that posits "…Constructivism characterizes the acquisition of knowledge as a product of the individual's creativity in particular environments" (Demetriou 1992, 12). Therefore, knowledge construction and organization of such knowledge is influenced by the environmental conditions under which it is occasioned.

The major short coming of the Piagetian theory of structural stage theory is its view of learning as a lineal process that employs learning principles that are common to all. As a result this view has failed to account for the variance in knowledge acquisition by individual learners. This view also tended to present knowledge acquisition as a process of abstraction. Thus the Piagetian model has failed to shed light on knowledge and skills application and transfer with its persistence of common knowledge development structures as knowledge acquisition is viewed as a product of rote memorization. Similarly, detractors of the Piagetian model point out that "skills are neither applied in blanket form across contexts nor imposed on the person by experience in particular contexts. They are constructed in one context and then must be generalized through re-construction to other contexts", Fischer and Farrar

(1987, np). Thus skills generalization is much easier under simulated contexts and this view is the basis of constructivism.

Piaget viewed learning as a product of human physical action thus dependency on structural linear development. He observed that learning is an active process consisting of internal processes and not just a result of external cues (Good and Brophy 1995). The Piagetian model of cognitive development was greatly developed by Vygotsky who used his zone of proximal development to develop the concept of contextual social learning as opposed to Piaget's solitary learning. However, Piaget's work is critical in providing a foundation for authentic application of learning and meaningful learning (Good and Brophy 1995). On the other hand, "…the Skinnerian approach to instruction involves building stimulus-response associations by cueing learners to the nature of the response desired and then providing immediate feedback about the correctness of the response elicited, so that correct responses are reinforced and incorrect responses are extinguished" (Good and Brophy 1995, 158).

However, Albert Bandura's social cognitive theory states that human behaviour is a product of reciprocal social interactions involving cognitive, behavioural, and environmental influencers and it is not just shaped through reinforcement (Good and Brophy 1995; Lefrancois 2000). Good and Brophy (1995) also state that learning is better supported through modeling as this provides learners with cues to generalize and apply modeled skills to new contexts. Such modeling has to be systematic and multi dimensional. Cognitive theorists assisted the development of learning as a purposeful interaction of content, environment and the learner and not just mere stimulus-response association (Good and Brophy 1995). This notion ultimately supplanted the behaviourist view in educational development. Thus cognitive theorists provided a fertile ground for the emergence of a social learning theory that saw learning as a communal, interactive, skills based process of knowledge and skills acquisition. Knowledge acquisition then moved from a process of "…cognitive mediation…but as a constructive process in which learners proceed in their own ways to build unique representations of the content" (Good and Brophy 1995, 6-7). Constructed shared knowledge is then implemented differently as learners are unique individuals who organize and construct knowledge differently due to their various experiences.

2.6   Conclusion

Using an elective mixed method approach to research, the premise in this study is that learning in online environments will be satisfactory when learners are actively involved in constructing their knowledge in communities of learning that foster mutual interaction, self regulation and shared experiences, concepts, and tool kits for learning. In this research it is assumed that online efficacy leads to higher satisfaction and achievement in online learning.

The next chapter reviews the literature that focus on specific elements that foster learner satisfaction and achievement in online learning.

Chapter 3: Literature Review

3.1   Introduction

According to the Cambridge Dictionary (online at http://dictionary.cambridge.org/) efficacy is a method of achieving something or a method used to produce the intended result. In this study efficacy refers to the effectiveness, usefulness and responsiveness of the course content, design, method and the technologies used during the course to address learners' needs and expectations and ultimately culminate in learner satisfaction and a rewarding learning experience. In order to understand the issues more fully a literature review was conducted to establish what other researchers had found add to the efficacy of an online course and then see how they apply to a course in catering for students from the SADC area within the theoretical framework discussed in Chapter 2.

3.2   Definition of the term online learning

In reading the literature about online learning it is clear that different scholars have used different terms to describe this kind of activity. Terms such as e-learning, web based learning, technology supported learning, distributed learning, virtual learning are all used with little variation in meaning or emphasis. One common theme in the definitions of these terms is the idea that technology (e.g. a networked computer or other mobile electronic device) is used to assist learners access content, engage in social discourse with peers and course facilitators, become the centre of their own learning, define their own areas of interest and develop self directed purposeful learning. In this research I will use the term online learning to define these types of activities supported by the use of the Internet and other electronic communication technology.

3.3   What constitutes online learning's appeal?

Roberts and Dryer (2005) as well as King and Doerfert (1996) argue that online learning has provided a wide range of innovative ways of facilitating learning including easier access of resources and individual learning guidance. More specifically, one of the key benefits of this type of learning for this research is outlined by Hedge and Hayward (2004, 136) who maintain that such benefits do not only lie in "…its associated modes of learning and teaching, but also in the different opportunities it offers to wider communities of learners than can be served by universities bound by physical bricks and mortar." In addition, online learning's flexibility facilitates situated learning, "…since learners can complete online courses while working on the job or in their own space, and can contextualize the learning" (Anderson and Ellioumi 2003, 5) and there is an increased appeal for online learning for those who cannot engage in face-to-face courses (Roberts and Dryer 2005; King and Doerfert 1996).

As the use of Information and Communication Technologies (ICTs) has grown and spread into many areas of human endeavor including the home, school rooms, libraries, work place and entertainment, technologically supported learning environments are becoming universally

accessible (Loke 2003). Fears that technology would disenfranchise a number of learners who either did not have economic resources to purchase the technology, were unskilled in its use, or had some physical difficulties have likewise proven over rated as the technology, if used sympathetically, can address most of these problems.

In addition, research on online learning has demonstrated that online learning has the potential to improve all sectors of education due to its use of internet communication protocols and the delivery of a myriad of media to address different learning styles (Anderson and Elloumi 2003). Learners can have access to material, ideas and contact with people not available in more traditional environments.

Mostly it is argued that learning should not be viewed as a solitary endeavour but as a social process requiring community collaboration and relationship building among learners if it is to be effective (Rogoff, Goodman Turkanis and Bartlett 2001). This is possible as online learning can transcend barriers of time, space and place and provide learners with tools for sharing ideas and building knowledge which in turn encourages transformative life long learning (Tagg 2004). Ebert-May, Brewer and Allred (1997) as well as Magnussen, Ishida and Itona (2000) maintain that this view of learning is facilitated by the constructivist learning philosophy that has resulted in a paradigm shift that has seen focus shifting from the instructor onto the learner to which studies cite such benefits as: increased motivation, greater retention of content, creation of critical thinking skills and improved learning outcomes.

This largely favourable argument should be embraced with caution. For instance, some argue that learners coming from instructor centred learning backgrounds often lack the skills necessary to be active learners and as a result are often frustrated and unmotivated (Marbach-Ad, Seal and Sokolove 2001). Other Scholars like O'Neil, Singh and O'Donoghue (2004) argue that technological interventions should not be adopted unless higher learning institutions ensure that learners and facilitators alike have easy ubiquitous access to the technology as well as the skills to use the systems. Likewise, course facilitators must be empowered to provide an enabling environment for quality online instruction. The course facilitators must be provided with:

> sufficient time and resources to ensure that online courses are suitably
> developed and implemented to meet the needs of students. Alongside this,
> the transition into new teaching styles must be managed effectively to ensure
> that lecturers are supported through and beyond the evolutionary period
> (O'Neill, Singh and O'Donoghue 2004, 319).

Furthermore, program evaluation, monetary support and constant retraining of course facilitators are necessary to keep up to date with the ever shifting nature of online learning. Likewise, for online learning to be successful learners need to familiarize themselves with the environments and the theories behind the type of learning in order for them to fully equip themselves with the skills necessary to use this type of environment for the first time. These activities should be theory driven.

3.4 What constitutes online learning efficacy and learner satisfaction?

Online learning has gained popularity and continues to grow rapidly through the higher learning sector of education as it accords learners access to a greater variety of information and resources. For example, the course facilitator could provide learners with a course outline, time table, course materials, resources, assessment instruments, assignments and notes online. It also encourages interaction with the course facilitator and among learners. A well designed course will require collaboration amongst learners to tap into, and build individual and collective strengths. It should also encourage constant reflection and shared decision making among learners (Reeves, Herrington and Oliver 2002). The course facilitator needs to provide helpful, supportive and timely feed back to encourage smooth progress in learning. An effective online learning course should encourage the creation of a community of learners who are encouraged to be resourceful in solving authentic problems.

In addition, as constructivists view learning as an act of collaboration, learning is viewed by these scholars as a dynamic, social interaction that promotes building of relationships and occurs in communities (Labissiere and Reynolds 2004). The web through its synchronous and asynchronous communication options allows for this social dynamism that lends learners a wide range of resources that the course facilitator could not possibly provide.

Furthermore, learners learn how to be selective when accessing large quantities of information in the web and that knowing how to access relevant information quickly is part of literacy (Reeves, Herrington and Oliver 2002). Therefore, the interactive nature of online learning encourages learners to be involved and take charge of their learning. In providing impetus to this view Thomas Reeves, Herrington and Oliver (2002, 569) argue that, "interactive activities are characterised by forms of learner control and active engagement where learners can take and make decisions and learn through the consequences of their actions."

Moreover, the use of the internet with online learning has provided fast and robust interactive tools for learner and facilitator interaction at both synchronous and asynchronous levels hitherto unfathomable. Online learning is also viewed as being able to promote equity of distribution of the course facilitator's attention per student and to redirect the course facilitator's and the learners' attention on the content and structure of responses (Anderson 2004).

In addition, research has revealed that online learning facilitates additional means for the course facilitator to keep in touch with learners and demonstrate not only that s/he cares about the learners' learning needs and styles but that s/he is willing to communicate with them (McComb 1994). Proponents of online learning further argue that used in the social constructivist dispensation this form of learning fosters lifelong learning that goes beyond equipping learners with tools for purposeful learning in schools but that it "... takes, as one of its principal aims, equipping people with skills and competencies to continue their own 'self-education' beyond the end of formal schooling" (Candy 1991, 15).

3.5 Online learning environments and social interactions that facilitate learner satisfaction and achievement

"Purely online learning is essentially the use of e-Learning tools in a distance education mode using the Web as the sole medium for all student learning and contact" (Nichols 2003, 2). Ubon (2005) claims interaction with asynchronous delivery is social and must be supported by effective online learning course design for it to provide constructive learning experiences, where learners interact and collaborate effectively the learning experience is devoid of feelings of aloneness, there is enthusiasm, enhanced acquisition of knowledge and increased sense of belonging (Ubon 2005). To clarify this view Ubon (2005) further argues that there are three essential elements to establishing effective online learning. These are:

> social factors, such as identity, trust, and personal relationships, act as a precondition for effective social interaction in OLCs [online learning communications]. They play an important part in helping people work enthusiastically as community members, and thus increasing a sense of belonging and the social cohesion of the community (Ubon 2005, 67).

Identity provides grounds for trust in online learning environments and literature has revealed that though this is so, creating a sense of identity in online learning takes longer as compared to face to face interactions. Another ingredient of effective online learning environments is the creation of trust among learners. It is argued that trust like identity is essential in online learning though this too requires a longer time to establish but that geographical distance has no bearing on trust (Ubon 2005). Lastly, personal relationships in online learning are crucial as learners need to provide cohesion in the interaction and create a buffer for relational conflicts.

A qualitative measure of online interactive activities shows that interactivity can increase learners' performance as it leads to increased self confidence, increased locus of control and motivation in online learning (Burt 2004). Research on online learning also reveals that asynchronous interactions facilitate greater in-depth communication as opposed to traditional face to face interactions and that learners tend to appreciate more working at their own pace (Reeves and Hedberg 2003). It also reveals that there is no significant difference between learning outcomes in online learning and traditional courses (Becker, Maunsaiyat 2004).

3.6 How online learning environments support improved learning outcomes

Online learning is flexible, usable and allows the learner to be rid of the geographical constraints, space, pace, time and expenses generally associated with traditional face to face classroom tuition (Adeoye and Wentling 2007). Many corporate organizations are increasingly turning to online learning for in-service training as this has proven to be a more cost effective means of training than the traditional classroom tuition. Furthermore, proponents of online learning have argued that because online learning allows for flexibility of access, collapses time, collapses geographical space and allows learners to learn from the comfort of their own homes, it is more attractive to working people and people with other social commitments.

Online learning depends on authentic learning tasks and through the use technology based learning learners are able to engage in learning that reflects their experiences. Such learning

environments must be supported by technologies that foster intellectual freedom and self directed learning (Billington 1996). Furthermore, online learning environments allow learners high levels of interactivity in which learners test new knowledge against their experiences and use such experience to built new knowledge to solve problems in either their professional or personal lives for life long learning (Samans, nd).

The flexibility provided by online learning environments should not only facilitate collaboration and interaction but should develop epistemic agency in learners for interrogative knowledge building (Muukkonen 2005, Lakkala and Hakkarainen 2005). To provide a working structure for online learning and its capacity for flexible learning Collis has suggested a shared framework for using networked learning to ensure flexible 'distance' learning. Some of these alternative frameworks (Adapted from Collis 1997) are:

- **general**: enrolling, reading the syllabus, reading course material
- **lectures**: attending lectures and presentations
- **group discussions**: participating in group discussions and seminar-style sessions
- **learning events**: field trips, practical activities, guest lectures
- **communication**: private communication between instructors and classmates
- **self-study**: supervised practica, unsupervised reading and small
- **individual projects**: major course assignments
- **group projects**: course assignment completed collaboratively
- **testing**: assessment activities.

It is envisaged that if such frameworks are utilised in designing online learning environments effective and efficient learning can be achieved. These could also help in evaluating the effectiveness of a programme in meeting learners' needs and envisaged learning outcomes. In expanding this view of effective online learning many scholars such as, Cunningham, Duffy and Knuth (1993), Savery and Duffy (1995), Grabinger (1996) as well as Lebow (1993) argued and presented their views as to the pedagogical goals underpinning successful constructivist online learning environments and some of these are that learning environments must:

- maintain a buffer between the learner and the potentially damaging effects of instructional practices
- provide a context for learning that supports both autonomy and relatedness;
- embed the reasons for learning into the learning activity itself;
- support self-regulated learning by promoting skills and attitudes that enable the learner to assume increasing responsibility for the developmental restructuring process and
- strengthen the learner's tendency to engage in intentional learning processes, especially by encouraging the strategic exploration of errors
  (Adapted from Lebow 1993).

Online learning creates a paradigm shift with emphasis on context of learning as opposed to content to be learnt. This is so as multimedia content can be manipulated to illustrate and explain highly complex concepts in a much easily comprehensible manner than when using the traditional classroom form of interaction. Consequently, institutions of higher learning should demonstrate their commitment to making a culture of lifelong learning through online learning's repertoire of tools that facilitate self agency in learning a reality (Stevely 2003).

3.7   Issues in online learning environments and how they impact on learning outcomes

As most higher learning institutions move towards active or learner centred learning using technology assisted learning or online learning, certain dividends have been observed. For example, learners who are familiar with such learning environments site an array of benefits such as: improved grades, improved retention, better performance and improved critical thinking skills (Burt 2004). Despite all these benefits there are also challenges that learners often encounter.

Firstly, there is the problem of familiarity with self directed, student centred learning. Burt (2004) points out that in the developing world especially in Africa, most students are not familiar with such learning environments as they have been exposed to course facilitator-centred learning. Secondly, learners have to be self motivated, focused and be goal oriented in their studies. This requires maturity and discipline especially as the learner is required to work individually and with a group.

Thirdly, learners are faced with the challenge of reconciling prior learning and knowledge with new learning and knowledge. Learners sometimes view their diverse life experiences not as a rich platform for collaborative work but as a hurdle to successful learning experience. Forth, there are challenges with using the technology and technology related problems. Learners who are "technophobic" find it a daunting experience to learn online.

Other challenges include the hardware and software (Olaniran 2007). These could prove to be a problem especially in developing countries such as Botswana where access to robust technology is still a challenge. Some program are said to be efficient in that they run on low bandwidth which for the Botswana context might be laudable but studies have revealed generally that "it's almost always true that a participant's experience is enhanced proportionate with the increase in bandwidth" (Hofmann 2003, 3).

Another challenge to learners of online learning could be technology or pedagogical implementation issues. Effective use of online learning could be hampered by universities' seeming lack of commitment to providing theory supported technology for online learning. Although universities invest so much of their resources on provision of top notch technology in a bid to make technology a vehicle for quality world class education, they rarely invest in technology that creates 'effective learning environments' but use online learning as learning 'technology initiatives rather than change initiatives' (Hofmann 2003). As a result online learning initiatives are sometimes just a replacement of traditional face to face classroom pedagogy without effective implementation of opportunities the technology can bring.

Learner isolation: delayed feedback and time management problems could also pose challenges in the effective use of online learning. Literature on online learning reveals some lack of learner satisfaction in online learning courses and this has been attributed to factors such as: feelings of isolation, poor time management problems, restricted access to materials, lack of contact with other learners, and with course facilitators (Olaniran 2007). These have been viewed to have a negative influence on learners' perceptions and often result in learners' apprehension and dissatisfaction with online learning (Middleton 1997). Lack of

timely and helpful feedback from the facilitators is another possible source of learners' dissatisfaction.

Likewise, pedagogical design for reflective, self directed, cooperative learners could also pose a challenge to learner satisfaction with online learning. In online learning learners are encouraged to engage in reflective interaction which is characteristic of asynchronous learning networks as opposed to traditional classroom interactions where interactions are often spontaneous and lack reflection (Rovai 2004). The challenge here is that such interaction must not just occur but has to be intentionally woven into the pedagogical process and be design driven (Berge 1999).

Therefore, learners coming from a traditional instructor led learning system should be orientated into being self directed learners which often does not occur. Also, a careful balance of individual work, group work and meticulously designed class discussions that are steered by the course facilitator is imperative if self-directed learning and that sense of community of learning in the learners are to be nurtured (Rovai 2004).

Another challenge that sometimes prevails in online learning interactions is that of flaming. Learners sometimes become argumentative thereby unintentionally digressing from the crux of issues under discussion (Sproull and Kiesler 1991) or they take offence to public comments when in actual fact no offence was intended (Siegel, Dubrovsky, Kiesler and McGuire 1986; Berge 1999; Rovai 2004). This could lead to alienation and animosity if left unchecked by the course facilitator or where the course facilitator unwittingly supports such comments that seem to bring disquiet in the interactions. Rovai (2004) advises that for there to be continued sense of community of learning the course facilitator's comments must be non evaluative but objective. Any criticisms should be left for one on one interaction with the individual learner or if these are to be made public they have to be balanced with positive feedback to avoid any sense of alienation.

However, this balance is often lacking in online learning interactions. Berge (1999) also advises that in order to encourage a sense of learning community, asynchronous learning platforms such as the discussion forum could be used to send messages of empathy and self-disclosure. The more these are sent the more learners feel a sense of togetherness and belonging.

Learner diversity could pose yet another challenge to effective use of and hamper learner satisfaction with online learning. Online learning is sometimes viewed as challenging as it involves a number of learners with differing backgrounds, learning styles, and creativity.

Chat sessions could also pose challenges to learner satisfaction. This is so as literature on online learning has also revealed that real time – chat, discussions can often be chaotic, uncoordinated and sometimes the communication scrolls out of view before the learner has time to view it all. It also sometimes requires the learner to think "on his/her feet" or else the train of thought and logic is lost (Reed 2000). That notwithstanding, online real time discussion has the benefit of making conversations permanent and thereby allowing the learner and others to revisit such conversations at a later date. Another challenge is to provide learning environments that facilitate self motivation as literature reveals that learner

satisfaction in online learning is high among learners who are self motivated than those that are less motivated (Dembo and Eaton 2000; Eom, Ashill and Wen 2006; Eom 2006).

Quality Assurance issues in the programs provided by universities have also posed serious challenges to online learning acceptance and learner satisfaction. To begin with, the concept of what quality entails in online learning is foggy and some literature has tried to define it as appropriate faculty training to design and run the programs and responsive support to learners (Thompson 2005). Other issues have to do with whether quality in online learning programs is:

- process inclined or outcome inclined, uses generalities in assessment or specific measurable outcome indicators,
- based on assessment that is in congruence with institutional visions, a measure of continued upholding of the status quo or a process of continuous quest to improve, evolve and revolutionise the programs for unparalleled delivery
- a shared dream by faculties and the administrations of institutions to ensure continued quality of programs
- a measure of online best practices that are derived from institutional visions (Thompson 2005).

To further highlight the general skepticism that undercuts acceptance of online learning with greater enthusiasm, Parker (2003, 385) points out that:

> the admirable attempts to define quality standards and best practices for online education have done little to assuage the skepticism of representatives in the academy, who are more accustomed to face to face delivery directed to bounded communities.

In addition, some scholars such as Thompson (2005) argue that what has been passed on as industry benchmarks on quality in online learning has actually fallen short of providing irreproachable performance indicators for online programs. This in itself has proven inadequate to establish the extent and ramifications of online learning in today's world.

Although a lot of research has been undertaken on the area of what goes on in online environments there is still need to assess how to ensure institutionally negotiated best practices that are informed by the cultural dimensions or the context in which the programs are run. As online learning is a relatively new phenomenon course facilitators are bound to lean towards established traditional methods of delivery when delivering online tuition. This would hamper creative and intuitive delivery that could result in learner discomfort with such learning environments (Su, Bonk, Magjuka, Liu and Lee 2005).

Another challenge that often faces effective use of online learning is that of balancing institutional motivation cost with quality. Counter arguments on online learning are that online learning policies are fundamentally driven by economic issues from the perspective of universities and employment institutions (Hedge and Hayward 2004). Universities opt for online learning as a response to debilitating costs of running face to face courses. These demand availability of physical infrastructure, staff, and all forms of logistics for absorbing the ever increasing demand for higher education.

Also, on the part of employers, employers would rather have their employees working than breaking off work for considerable times to earn certificates, diplomas or degrees. It is more profitable for employers to have their employees engaged in online learning as this does not take them from their jobs and dividends from undertaking such courses enable employees to plough back knowledge gained into improving their performance at work hence increased productivity (Hedge and Hayward 2004).

Physical contact in learning is also viewed as a challenge to easy acceptance of online learning. Other detractors of the benefits of online learning and self regulated learning maintain that the human contact that they perceive as a major psychological factor in learning is lacking in online learning. As a result they proclaim that technology supported learning cannot sustain the critical 'qualities and multidimensionality' that traditional face to face interaction embodies (O'Neill, Singh and O'Donoghue 2004).

Another argument is that "…whilst measurable skills can be taught effectively in an online Learning environment, online students lack sufficient immersion and interaction to develop qualitative characteristics such as interpersonal skills - these are still better developed in a high quality traditional setting" (O'Neill, Singh and O'Donoghue 2004, 318). However, such protestations overlook the fundamental principle that if education is to be responsive and empowering it has to provide life long skills that transcend classroom education and reintegrates school leavers into the productive society especially in the context of global dynamics in higher education.

3.8 How online interaction facilitates learner satisfaction and achievement

Various explanations have been presented as to what online interaction represents. Some scholars such as Shale and Garrison (1990, 1) argue that it is "education at its most fundamental form", while Palloff and Pratt (1999, 5) state that the "keys to the learning process are the interactions among students themselves, the interactions between faculty and students, and the collaboration in learning that results from these interactions." A growing body of literature in online learning points to the view that increased learner – facilitator and learner – learner interaction manifests itself in reduced sense of isolation by the learner. This is corroborated by scholars such as Su, Bonk, Magjuka, Liu and Lee, (2005).

The literature also suggests that this leads to increased learner course satisfaction and improved leaning outcomes in online learning (Su et al 2005). Acker and McCain cited by King and Doerfert (1996, 11) have also argued that "…interaction is central to the social expectations of education in the broadest sense and is in itself a primary goal of the larger educational process and that feedback between learner and teacher is necessary for education to develop and improve." In online learning interaction is used to: allow learners locus of control, facilitate ease of use of program where learners have input in what they learn, allow various forms of discourse, and encourage purposeful learning (Anderson and Ellioumi 2003).

However, various inconsistencies exist in the definition of what interaction is in online learning with some scholars using the terms interaction and interactivity interchangeably. However the underlying consensus is that, learners learn better when they work with learning

groups as opposed to learning in isolation. They acquire interpersonal skills that help them have a greater self esteem and that could assist in creating increased self efficacy. These would in turn boost intrinsic motivation necessary in self directed learning (Burt 2004). Self efficacy in this context refers to:

> People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performance. It is not with the skills one has but with judgments of what one can do with whatever skills one possesses (Bandura 1986, 391)

Self efficacy is critical in self regulated learning as it is assumed that there is a causal relationship between the belief by the learner that s/he has the capability to execute the requisite task effectively and perceived outcomes and satisfaction. Therefore, self efficacy is perceived to be a precursor to learning satisfaction.

In addition, when learners interact with each other in developing and constructing knowledge they draw dividends from challenges and reinforcement of those ideas and concepts by their peers. "Interactivity …utilizes direct human feedback to stimulate the reflection by students on their learning" (Rodrigues 2002, 137). Furthermore, interactivity maximizes learning leading to learners being able to manipulate concepts learnt. Bailey (2002) lends credence to this assertion by maintaining that online learning through asynchronous delivery provides learners with more time to think about their comments and responses thus producing higher quality interaction. Therefore, it is crucial to understand the scope of the interactivity and its influence on promoting and maximizing learning in order to give learners locus of control in the learning process.

Though interaction is seen by many scholars as a significant component of effective online learning, its significance has not been unequivocally supported by empirical evidence (Gunawardena 1995; Ubon 2005). Learners are better able to engage in self directed learning and collaborative learning when there is an enabling environment of marked social presence by both learners and the course facilitator is present. Learners should share a common goal to be able to pull together into a community of learning. "The development of social presence and a sense of online community becomes key to promoting collaborative learning and knowledge building" (Gunawardena 1995, 164).

The course facilitator in a constructivist oriented online learning environment should be flexible and adaptive depending on the various areas of emphasis in the tasks undertaken if the learning is not to be riddled with controversy. The Challenge is for the course facilitator to make him/herself accessible to learners through using online learning discussion forums. These would assist him/her to demonstrate his/her personal pedagogical style and enthusiasm for learning. It would further provide learners with a forum to voice their views as a result motivating them to participate, and to be self directed learners (Reed 2000).

In addition, the course facilitator motivates, guides, and allows learners to self regulate their learning rather focusing on learners achieving instructional objectives of the learning (Huynh 2005). The course facilitator also provides learners with feedback which is meant to inform, motivate, improve performance, direct learners efforts and act as reinforcement. Eom, Ashill and Wen (2006, 220) argue that feedback can "improve learner affective responses, increase cognitive skills and knowledge, and activate metacognition." The primary role of the course

facilitator then is to facilitate and maintain meaningful discourse in the interaction among learners. The course facilitator is tasked with:

> facilitating discourse (identifying areas of agreement and disagreement, seeking to reach consensus and understanding, encouraging, acknowledging, and reinforcing student contributions, setting the climate for learning, drawing in participants and prompting discussion, and assessing the efficacy of the process), and … direct instruction (presenting content and questions , focusing the discussion on specific issues, summarizing discussion, confirming understanding, diagnosing misperceptions, injecting knowledge from diverse sources, and responding to technical concerns) (Swan 2004, 7).

First, a good facilitator should provide both verbal and non verbal immediacy that provide feedback, motivation, reinforcement, spur on discussions and demonstrate willingness to assist learners or just openness with learners (Andersen and Anderson 1982; Gorham 1988). Secondly, the facilitator could act as an expert learner providing guidance to novice learners especially in discussion forums where learners pose questions that require expert input. Here the facilitator has to be careful not to dominate discussions and should allow learners to provide own solutions most of the time. Thirdly, the facilitator could act as a tutor especially in small group discussions where learners are engaged in authentic tasks. In this case the facilitator spurs on discussions, prompting, seeking learners to provide alternative views, support or clarify views etcetera (Barrows 1992). This approach will nurture critical thinking, and foster independent and self directed learning necessary for life long learning.

In the constructivist online learning environment there is divergence from a didactic role to a more facilitative role by the course instructor providing learners with free reign on course interaction and learners learn from their experiences and errors (Edmundson 2007). The course facilitator facilitates or guides the novice learners on where to find information through the World Wide Web, how to find the information, what information to look for and how to use such information. This requires skills of critical analysis and reflection from the learner in a social constructivist learning environment. To ensure these the course facilitator initiates sustained productive discourse that engages learners in a community of inquiry. Unlike in the didactic behaviourist paradigm, the course facilitator has to focus discussions on specific topics, maintain appropriate netiquette and confirm understanding of concepts under discussion without predetermining the path learners must follow in the course (Shea, Swan, Li and Pickett 2005).

Interactivity refers to a spectrum of relational concepts such as: how the task is designed to allow collaboration, collaboration among learners that promote socially negotiated diverse views of a concept and the interplay between the learner and the software/hardware that promotes self-regulated and rewarding learning (Rodrigues 2002). A natural assumption exists in that interactivity in online learning leads to critical independent learning. Both constructivists and social constructivist argue that it is a process in which learners engage in an activity "that challenges existing concepts, encourages linkages to existing concepts, or generates new ideas" (Rodrigues 2002, 135). The learner is expected to show understanding of concepts and articulate those after engaging in social discourse with peers on the problem and then redefining his/her views to present an interrogated, comprehensive and mutually negotiated truth. "Therefore, interactivity when interpreted as an activity between people, is a powerful vehicle for learning" (Rodrigues 2002, 136).

Though interaction in online learning environments covers diverse variables, this research will only concentrate on learner – learner, learner – course facilitator and learner content interactions. "These three forms of interaction in online courses are recognized as important and critical constructs determining the performance of Web-based course quality" (Eom, Ashill and Wen 2006, 220-221). Literature on learning achievement and outcomes and interaction at these three levels reveals that learners perceive there to be greater learning when they interact more with their peers and the course facilitator (Picciano 1998). Learners are also able to articulate their learning experiences and provide sign posts of where they stand in terms of comprehension of content. It is further assumed from the literature that a high level of existence of these three types of interactions in an online learning environment will lead to high levels of learner attainment, satisfaction and outcomes.

Interaction among learners must be facilitated by the interface design, type of tasks that promote collaboration, reflection, a community of learning and space for social interaction if it is to promote a sense of community of learning. This will also do away with perceived sense of isolation. Anderson and Ellioumi (2003) maintain interaction between the learner and the course facilitator must enable various levels of interaction, timely responses, integrated assessment, feedback and use of emoticons to promote netiquette and allay fears of being misconstrued. In addition:

> learning strategies should be selected to motivate learners, facilitate deep processing, build the whole person, cater for individual differences, promote meaningful learning, encourage interaction, provide feedback, facilitate contextual learning, and provide support during the learning process (Anderson and Ellioumi 2003, 6).

Lastly the interaction with content should ensure authentic tasks that reflect sensitivity to cultural and environmental dimensions to learning. It also has to be accommodative of learners varying learning styles, pace, space and should not allow lineal content presentation but should allow ease of navigation of the content (Swan 2003). Karen Swan further argues that online program designers and course facilitators have to ensure that the design of the interaction is such that it provides the following:

- Clear goals and expectations for learners
- Multiple representations of course content
- Frequent opportunities for active learning
- Frequent and constructive feedback
- Flexibility and choice in satisfying course objectives, and
- Instructor guidance and support
  (Swan 2003, 6).

Literature reveals that by increasing the level of interaction among learners and with the course facilitator this could motivate, foster learner locus of control, enhance learning, and build a community of learning. This in itself is highly likely to translate into improved learner appreciation of the learning program. Again, increase in both synchronous and asynchronous communication in a learning program leads to learner satisfaction which is one of the key indicators of effective online learning (Palloff and Pratt 1999; Harasim 2002; Northrup 2002).

Also studies have linked learner satisfaction, perceptions and learning outcomes with online course effectiveness (Fulford and Zhang 1993). Studies also reveal that where there is greater communication between learners and the course facilitator learners tend to have greater satisfaction with the program. Likewise, where there is less interaction with the course facilitator learners tend to depend more on themselves and generally feel isolated and lose interest in the course (Garrison 1993). However, where learners learn in communities of learning with the course facilitator providing mentorship there tends to be greater satisfaction with the course than where learners collaborate in sparse communication among themselves (Jung, Choi, Lim and Leem 2002). Consequently, with increased learner-learner and course facilitator interaction online learning experiences tend to foster a positive attitude towards networked learning (Hao 2004).

3.9 The different types of interaction that facilitate learner satisfaction and achievement

There are basically four types of online learning interactions that this study investigates namely: (1) learner-course facilitator, (2) learner-learner, (3) learner-content interaction and (4) learner-interface interaction (Moore 1989).

The learner-course facilitator interaction establishes a conducive environment for effective learning as the course facilitator provides guidance, support, feedback and mentorship in the learning process. The second type of interaction, learner-learner interaction, occurs among learners as a group or as a community of learning without the course facilitator. Literature has revealed that this form of interaction is the most valued by learners as it provides opportunities for sharing experiences. Collaboration among learners increases the acquisition of critical cognitive skills and interpersonal skills that are central to learning online (Slavin 1995). It must be noted that though these types of interactions are different they are interrelated and that both the learner and the course facilitator are involved in learning as they interact.

The other form of interaction is the learner-content interaction which is defined as, "the process of intellectually interacting with content that results in changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind" (Moore 1989, 2). This view is shared by Su et al (2005). Research in online learning also views this type of interaction as problematic as different forms of content would require different forms of interaction therefore being difficult to generalize.

The fourth form of interaction, learner-interface interaction, deals with how the technology provides the interactivity necessary for the other three forms of online learning interaction mentioned in order for effective and pleasurable learning to occur. In addition, some scholars such as Hillman, Willis and Gunawardena (1994) argue that for learners who have a background of the traditional face to face classroom tuition this type of interaction poses a great challenge as they have to adapt to the technology.

Online learning encourages dialogue through synchronous learning systems that include real-time interactive tools such as chat, white-board, two-way voice, and application sharing to enhance interactivity in the online learning process. The benefit of using synchronous delivery

is that learners and the course facilitator can engage in discourses that are timelier than in asynchronous delivery (Bailey 2002). It also facilitates discourse through the use of the asynchronous learning mode that is viewed by proponents of online learning as facilitative of critical thinking which is seen as both the product and process of technology assisted learning. Here both learners and course facilitator engage in assessment of the learning process and heuristic models of assessment are used in order for learners to actively engage in self questioning, self critique, and provide a dynamic community of learning as depicted in Figure 3.1.

Figure 3.1:   The four online interactions critical to learner satisfaction and improved learning outcomes
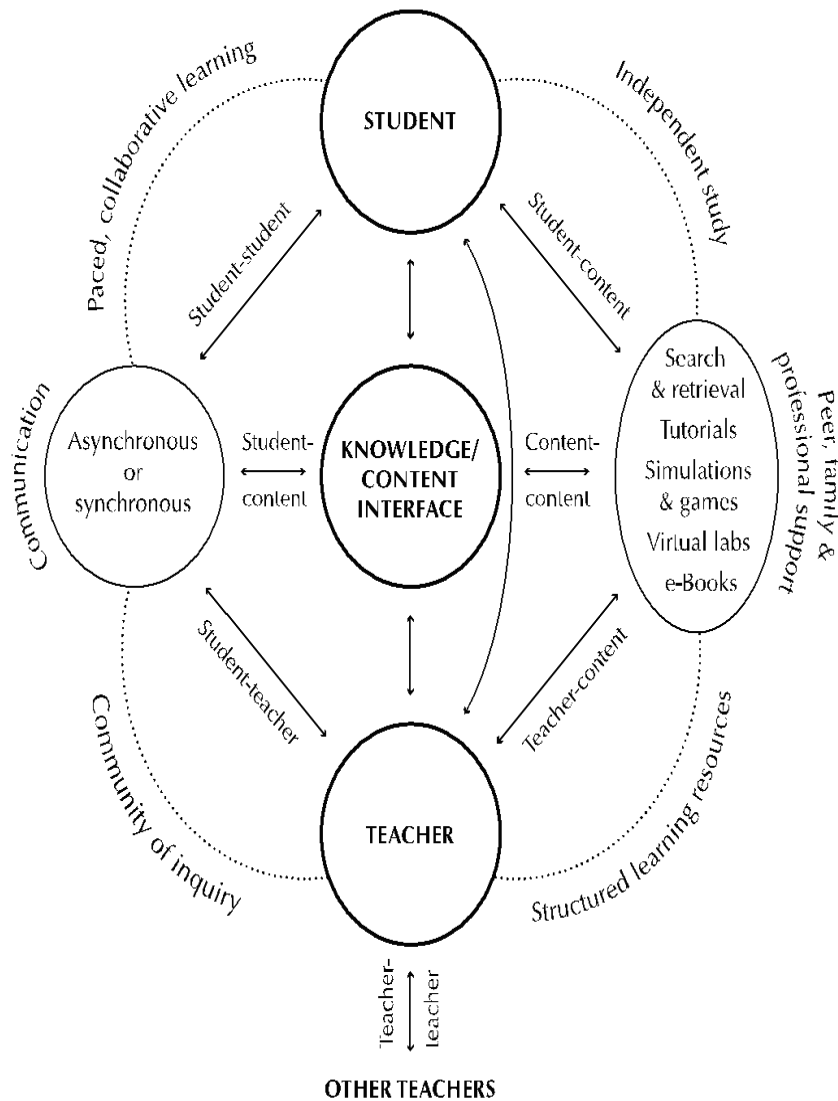
Adapted from Anderson and Ellioumi (2003, 49).

In this illustration there are other forms of interaction but this research has not discussed these as they are outside the scope of this research. The learning model illustrates independent learning where though the learner has locus of control in the learning process, the learner is not isolated. The learner is guided by the course facilitator, assisted by peers, colleagues at work and family in the learning process. Independent learning in this model is facilitated through delivery modes such as drills, tutorials, simulations and printed texts. Learners engage in questioning, imitation, reflection, application, observation, immersion and role play to develop multiple skills (Prensky 2000). In support of this Anderson and Ellioumi (2002, np) argues that the internet offers hitherto unfathomable opportunities for interactive learning delivery through which:

> Sufficient levels of deep and meaningful learning can be developed, as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at very high levels. The other two may be offered at minimal levels or even eliminated without degrading the educational experience.

3.10   Human computer interface principles and their impact on learning outcomes

Hao (2004) maintains that technology in itself is not interactive but that the effectiveness of such interactivity is a product of a good design. Therefore it is imperative to understand what theories rule e-learning interactivity or the principles behind a good design that allows for efficient interactivity. A good design is based on good Human Computer Interface principles (HCI). HCI refers to the relationship between people and computers. It covers a range of disciplines and looks at how computers affect our lives. The free encyclopedia, argues, "A basic goal of HCI is to improve the interaction between users and computers by making computers more user friendly and receptive to the user's needs" (Wikipedia 2006, np).

HCI deals with what the human mind models and what the computer can achieve in putting these models into reality and "…the human cognitive models of what they want to achieve…" forms the basis of HCI (Wikipedia 2006, np). Therefore, HCI "…focuses in part on cognitive processes, especially in terms of the capabilities of users and how these affect users' ability to carry out specific tasks with computer systems" (Berg 2003, 61). One must ensure that graphics used in the design do not unnecessarily delay the upload of information on the net as this would constitute poor interface. In view of this, researchers are constantly researching on better interfaces at two different but coordinated levels of graphics interface and web interface in order to come up with better interaction and theories of such interactions.

When systems help users realize their goals and intentions they promote the human value of autonomy (Friedman 1997). Furthermore, if everything is in its proper place and has an obvious function people know what to do intuitively. So when designing online materials they have to conform to the above stated design principles of usability and user centredness. These concepts will assist the designer to help the user to access information, learn how to use it easily and quickly and also be able to use the information to achieve the desired goals. The system interface should provide explicit instructions that the user can follow with ease. It is also crucial that the course designer should interrogate the causal relationship between HCI and improved learning and learner satisfaction. Similarly, there is a relational parallel between

HCI and learning in that HCI deals with "…time to learn, speed of performance, rate of errors by users, subjective satisfaction, and retention over time" (Berg 2003, 61).

If the interface allows the user to be in control of his actions and does not direct the user on the action to take then the interface is effective. The manipulation of the system and the interaction between program and the user must feel natural for the user. Such program must also provide the user with feedback. This feedback must be able to assist the user to continue with the task with the assurance that the commands initiated are being executed by the program. A well designed interface allows the learner to be attentive, motivated and be able to achieve goals without "confusion and fatigue" (Adeoye and Wentling 2007).

Diversity and cultural sensitivity

Skillfully designed interfaces will factor in the diversity of the end users in order to avoid variations in behaviour and culture that may either confuse or annoy the user (Onibere, Morgan, Busang and Mpoeleng 2000). This would be through being mindful of offensive icons, colors and the way communication occurs in given cultures. There is a marked difference in the way communication is conducted in collectivist cultures as compared to individualistic cultures. Successful curriculum design for online learning must inculcate cultural diversity of the end users for it to be effective and efficient. For effective online learning, program designers should avoid the easier path of designing learning platforms that seem to view learners as homogeneous but must be cognizant of learners' multiculturalism. This would facilitate the design of instructional programs that are responsive to learners' learning styles (Henderson 1996).

Another measure of effectiveness of an interface is its consistency such as the same term is used to describe an activity throughout the course, or the consistent use of same icons to represent a short cut.

Easy recovery of errors is yet another measure of a good interface as users should be able to reverse action fairly easily without destroying files of their work (Stephanidis 2001). HCI best practices in conjunction with the constructivist paradigm should be used to enhance learner appreciation of online learning environments and improving learning outcomes.

3.11   How learning styles impact on learner satisfaction and learning outcomes

Learning style refers to the way in which each individual perceives, absorbs, processes, retains and recalls information (James and Gardner 1995). A lot of research has been done to establish the relationship between learning styles and learners' achievement and outcomes. The underpinning outcome of such research is that each learner has a unique learning style that is influenced by both biological and geographical backgrounds. Studies in this domain further point out that, "The basic premise of learning style research is that different students learn differently and students experience higher level of satisfaction and learning outcomes when there is a fit between a learner's learning style and a teaching style" (Eom et al 2006, 218). In addition, "learning styles generally refer to learning dispositions that students adopt in educational environments" (Berg 2003, 18). Though many scholars such as James and Gardner (1995) argue that learning styles can influence achievement and learning outcomes,

research in this area has proved to be inconclusive as other scholars such as (Freeman 1995; Day, Raven and Newman 1998) argue to the contrary.

The course facilitator also needs to understand the cultural background of the learners as this might influence their learning styles and how they process information (Jones 2005). This view is also shared by Bennett (2003) who contends that where a course facilitator is not cognisant of the cultural diversity of the learners misunderstandings can occur as the facilitator could inadvertently undermine the learners' cognitive strengths and academic achievements.

On the other hand, the learners must be in control of the learning process in order to be self regulating. In this way the learner is the master of his/her own learning strategies. This enables the learner to be actively involved in the learning process as s/he is able to asses best learning practices depending on his/her abilities to attain satisfaction (Wilson 1997).

Likewise, as culture influences beliefs, attitudes and perceptions to learning, it might have a significant influence on collaborative community of learning in an online learning environment (Bhatti and Eyas 2006). Therefore, the course facilitator must familiarise him/herself with the cultural composition of learners as "knowing each student's culture is essential for providing successful learning opportunities. Understanding learning differences will help educators facilitate structure, and validate successful learning for every student" (Guild 2001, 14). The above notwithstanding, the success and effectiveness of an online learning environment depends on the understanding that learning styles have a bearing on achievement and attitude to online learning. It is therefore, fundamental that learning activities should be informed by: an informed assessment of each learner's entry point or knowledge, authentic interactive tasks, flexible study plans, built in continuous assessment and content that assists learners to achieve critical reflective, analytical thinking (Twigg 2001). With this knowledge in mind the course facilitator could design activities that are accommodative of each learner's learning style in order to make learners more 'comfortable' in their shared learning experiences.

3.12   What constitutes learner satisfaction?

Online learning satisfaction is defined as the degree to which a learning program meets learners' perceived personal needs, and facilitates the ease with which learners execute tasks effectively and adequately (Goodhue and Straub 1991). Due to increased competition in the provision of high quality online learning, institutions have gravitated towards satisfying the needs of learners and as a result the hype has been to treat the online learner as a customer. Thus the inclination to strive to satisfy the needs of the online learner as opposed to satisfying the online learner's educational lifelong needs. Consequently, institutions have had to struggle with creating balanced program for learners who wish to study independently and those who wish to study in communities. However, Spangehl (2002, 5) cautions that "what education strives to satisfy is not the student, but the student's lifelong need for knowledge and skills."

However, the efficacy of the influence of online learning's revolutionary technologies on learner knowledge development can not be dealt justice if learner satisfaction on online

learning environments is not evaluated. Under social constructivism the learner is viewed as an active 'conceptualiser' who constructs his knowledge in a community of learning where knowledge is acquired through collaboration and reliance on shared personal experiences (Taylor and Maor 2000). Learning then occurs through collaborative mutual interactions among the learners and with the course facilitator in an environment of reciprocal understanding that creates critical cognitive skills within the learners. Thus, learners engage in critical reflective mutually constructed knowledge.

In this research for me, as the researcher, to establish the level of online efficacy and learner satisfaction in online learning there is need for the research to concentrate on evaluation of growth in reflective thinking and affective support learners receive from the course facilitator. There is also the need to evaluate the content relevance and interpretation. This would establish whether learner satisfaction increases in relation to course content relevance to learners' professional lives or not. It will also have to establish the relational benefits of learners' expectations of cognitive support from their course facilitator and the course outcomes.

Studies also reveal that there is a positive relationship between the extent of interaction in online learning and the degree of satisfaction by learners (Picciano 2002; Hostetter and Busch 2006). Where the interactivity encourages metacognitive development and greater independence or self regulation there is a greater perception of learner satisfaction in the online learning environment. Self regulation in this context means that the learner is conscious of skills possessed and views the acquisition of such skills as a 'systematic and controllable process' (Zimmerman 1990). The learner is also in charge of his/her learning and shoulders the responsibility for his/her achievement (Mahoney 2004). Zimmerman and Schunk (2001, 1) extend this definition by stating that "self regulation refers to the self directed process through which learners transform their mental abilities into task related academic skills.

Though learners are eventually responsible for the level of effectiveness of their learning experiences, the course facilitator has the duty of ensuring that the program facilitates: greater attention to content, relevance of content to learners' needs, confidence building towards establishing locus of control, and the consequences of learner activity and learning (Bailey 2002). Where there is effective and reinforced learning there are positive learning consequences or higher satisfaction in the learning process. This is according to Thorndike's Law of Effect that states that "...if a stimulus is followed by a response that is followed by a satisfier, then the stimulus-response connection will be strengthened" (Smith and Ragan 1999, 263). This then means that where there is increased learner-learner interaction and learner course facilitator interaction learner satisfaction is highly likely to be improved. Through these two types of interactions the learner receives feed back which might be motivating or otherwise and this determines the learners' level of satisfaction in the course.

Similarly, learners' level of satisfaction could be enhanced by responsive and effective course design principles. To ensure the two work in synch to facilitate improved learning outcomes Thompson (2005) suggests the course designer should pose the following questions as a strategy for evaluating the course design effectiveness:
• What design factors are associated with positive student learning outcomes?
• What is the role of dialogue and community in eLearning?

- How do the need for and effect of interaction and community differ in relation to different types and levels of content?
- Different student populations?
- What support needs are characteristic of online students in general?
  (Thompson 2005, 5).

These questions would assist the course designer in designing a learning program that is easy to use, is responsive and accommodative to a diverse populace of online learners with diverse learning needs. Carefully integrated into the design of the course such factors could facilitate greater acceptance and satisfaction by learners.

Chapter 4: Methodology

4.1   Introduction

This chapter discusses the research methods used, data collection procedures instruments used to collect data and ethical considerations.

The form of this research is exploratory and descriptive as the interactions take place among learners from a multi-cultural environment. The main aim of the research is to produce an in-depth, holistic case study that in Yin's (1984) view would provide sufficient environmental descriptions to facilitate transfer of the case based on 'conceptual applicability' to similar contexts.

Qualitative methodologies are used to evaluate online efficacy through investigating the impact of interactions on learner achievement and satisfaction. Johnson (1995) contends that these methodologies have, of late, been viewed to be powerful tools for enriching deeper understanding of online learning pedagogies. Strauss and Corbin (1990, 17) present a broad definition of the phenomenological inquiry as "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification."

The qualitative inquiry paradigm seeks to investigate a phenomenon within its natural setting thereby providing a deeper understanding of the problem. It is also sometimes used to provide greater insight into areas that have been widely researched to gain new perspectives especially where statistical findings have been seen to be insufficient in representing the various nuggets of the social phenomena (Strauss and Corbin 1990).

In addition, the qualitative inquiry paradigm is viewed by social scientists such as (Cronbach 1975; Lincoln and Guba 1985; Strauss and Corbin 1990; Eisner 1991) as more representative of the experiences of the research participants. As a result research participants are better able to comprehend the findings of the research as opposed to the logical experimental inquiry paradigm that ignores the effects of social interactions that might not be quantifiable (Cronbach 1975). However, Patton (1987) cautions against the desire by researchers to present one methodology as superior to the other but proposes using a mixed methods approach that is context determined.

4.2   Case study research method

A case study is an investigation of an individual, group or community to answer specific questions using a range of evidence derived from the case context. It could be a single case or multiple cases (Gillham 2000). Instead of concentrating on objective evidence the case study research is subjective and seeks to find out "the underlying reasons – in peoples' feelings or perceptions, or their experiences of what is going on" (Gillham 2000, 7). Gillham goes on to argue that "a research investigation is not neutral; it has its own dynamic and there will be effects (on individuals or institutions) precisely because there is someone there

asking questions, clarifying procedures, collecting data. Recognizing this is part of doing good research. Ignoring it is bad 'science' (Gillham 2000, 7).

The case study research method uses qualitative data collection methods to collate data which in turn enables a researcher to describe and derive meaning out of what is going on in a given context. Gillham (2000, 11) provides key tenets of the case study research as being:

1. To carry out an investigation where other methods – such as experiments – are either not practicable or not ethically justifiable.

2. To investigate situations where little is known about what is there or what is going on. More formal research may come later.

3. To explore complexities that are beyond the scope of more 'controlled' approaches.

4. To 'get under the skin' of a group or organization to find out what really happens – the informal reality which can only be perceived from the inside.

5. To view the case from inside out: to see it from the perspective of those involved.

6. To carry out research into the processes leading to results (for example how reading standards were improved in a school) rather into the 'significance' of the results themselves.

The case study research has in it other research methods such as: interviews, observations, and literature/document analysis. Evidence derived from the case context is key to testing assumptions and findings that may confirm or challenge previously held convictions (Stake 1994). This research used online interviews through questionnaires, Life-World accounts by participants and one on one interviews for the course facilitator and expert reviews.

This research employed the critical case study method to help understand the complex issue of the interrelatedness between learner satisfaction and outcomes within an internet based learning environment as case studies are said to provide a detailed contextual analysis of a few events or conditions and their relationships (Yin 2002). Yin (2002) defines the case study research method, "as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (Yin 1984, 23).

In addition, a case study permits 'the investigation of complex interrelationships' that cover learners' learning experience as a process (Sturman 1997; Mertens 1998). Data in the form of journal entries and life-worlds completed by participants, online discussion board postings, research papers, participant presentations, reports on online course access patterns, and information from summative online course interviews can be interrogated to establish patterns of technology use, learning preferences, and perceived benefits or limitations of the online environment.

4.3 Framework of Analysis

Though there are various models of analysis used in the evaluation of online learning there are basically two distinct categories for such models, primarily the objectivist models and the cognitive constructivist models of online learning evaluation (Huang, Luce and Lu, 2005). This

study employed the latter as discussed in Chapter 2. The analysis of this research was further guided by two cognitive constructivist models of learning: the 'User Satisfaction Theory' and the 'User Value Theory' to provide an insightful and balanced evaluation of the online learning learner satisfaction construct.

It is common practice for evaluators of online learning programs to use user satisfaction measures in terms of 'User Satisfaction Theory' (Bailey and Pearson 1983) as a primary and lone evaluation tool. However, this approach of itself has proven to be less informative to practitioners as it only provides insight into learner satisfaction but fails to provide similar insights into what learners view as valuable (Levy 2006).

Learner perceived value, termed 'Value Theory' by (Allport, Vernon and Lindzey 1951), refers to a solemn belief about the worth learners attribute to an online learning program (Levy 2006). Rokeach (1973, 5) defines Value as "...an enduring belief that a specific mode of conduct or end-state of existence is personal or socially preferable to an opposite or converse mode of conduct or end-state of existence." In critiquing Rokeach's concept of user value, Feather (1975, 4) refines the perception of user value to be "...beliefs about the desirables and therefore, involve knowledge about the means or ends considered to be desirable."

In the context of this discussion learner satisfaction will refer to the perceived performance levels of learners that is a culmination of their learning experiences in an online course (Ives, Olson and Baroudi 1983; Galletta 1989; Levy 2006).

The benefits of the user satisfaction theory emanate from the construct's potential to have variables generated that could be individually measured or assessed (Levy 2006). The low correlations between perceived user satisfaction and user behavior is potentially useful in judging the effectiveness of online learning environments.

Likewise, Ives, Olson and Baroudi (1983) argue that the popularity of the User Satisfaction construct rests in its ability to allow for evaluation of learner behavior issues that impact on perceived satisfaction with online learning and the evaluation of effectives of online learning environments. It measures learners' attitudes and perceptions which is in congruence with the work of social cognitive theorists.

Social Cognitive theories have the assumption that "...attitudes must be accessible to influence perception, judgment, and behavior. The focus of these approaches is on identifying the circumstances in which attitudes are most likely to become accessible and hence influence behavior" (Melone 1990, 84). Therefore, learners' perception of the level of accommodativeness of a learning environment is a strong determinant of the level of satisfaction and achievement in online learning. It is the balance between the significance of social presence and the value learners attribute to a learning program that this research views as significant to perceived learner satisfaction and achievement (Arbaugh 2002).

Relying on previous research, a framework for analyzing the research data was designed. This was designed under a six (6) dimension framework with eighteen (18) associated variables as outlined in Figure 4.1 below. The six dimensions employed in analyzing the research data are the learner dimension, course facilitator dimension, course dimension, technology dimension, design dimension, and environment dimension Sun et al (2007). [See

also Arbaugh and Duray (2002), Piccoli, Ahmad and Ives (2001), Stokes (2001), Thurmond, Wambach, and Connors (2002)].

Online efficacy (effectiveness, usefulness and responsiveness of the course design and technologies in mitigating learners' needs and expectations) which is predicted to be a significant influencer in learner satisfaction and a rewarding learning experience is explored through the eighteen variables which are assumed to have a critical relationship with learner satisfaction and achievement in online learning.

Figure 4.1:   Dimensions and variables perceived as critical factors influencing learner satisfaction and achievement

Variables	Dimensions					
	Learner	Course facilitator	Course	Technology	Design	Environmental
Learners' needs and expectations	x					
Learner attitude towards computers	x					
Learner online learning self-efficacy	x					
Perceived clarity of learning goals	x					
Course facilitator provision of timely and helpful feedback.		x				
Perceived relevance and authenticity of course activities			x			
Course activities and learner motivation			x			
Diversity of assessment			x			
Online course flexibility			x			
Online course quality			x			
Technology reliability and quality				x		
Perceived usefulness of course					x	
Perceived ease of use					x	
Learners perceived interaction with others						x
Learner perceived interaction with course content						x
Learner perceived interaction with course facilitator						x
Perceived community of learning						x
Perceived cultural and geographic influence.						x

Learner dimension

Arbaugh and Duray (2002); Piccoli et al (2001); Hong, Lai and Holton (2003), all suggest that learners' attitude towards the use of Information and Communication Technologies (ICT) as critical to learner satisfaction and achievement in online learning. It is assumed that greater responsiveness to the use of ICTs in learning results in greater learner satisfaction and achievement. In addition, learners' attitudes towards the use of ICTs in online learning has a direct effect on learner motivation. This research assumes that a more positive attitude will lead to greater satisfaction and achievement.

Attitude also has fundamental impact on learners' self-efficacy and the satisfaction with the use of ICTs in influencing learner performance in online learning.

These are analyzed by looking at:-
- Learners' needs and expectations
- Learner attitude towards computers
- Learner online learning self-efficacy
- Perceived clarity of learning goals

Course facilitator dimension

Past research has also revealed that timely provision of helpful feedback by the course facilitator impacts significantly on learner satisfaction and achievement in online learning (McSporran 2004). Therefore, a course facilitator who provides helpful and timely feedback to learners' queries facilitates greater confidence and satisfaction in learners towards the online course.

The course facilitator dimension is analyzed on this one feature:
- Course facilitator's provision of timely and helpful feedback.

Course dimension

As online learning provides flexibility of use in terms of learning space, time, cooperative learning (in the constructivist learning environment), access to infinite resources and enhanced participation, learner satisfaction with online learning courses are thought to increase with the quality of course design (Sun et al 2007). This is critical for greater self regulation and increased critical thinking necessary for problem solving by the learners Piccoli et al (2001).

The course dimension is analyzed by reviewing
- Relevance and authenticity of course activities
- Course activities and learner motivation
- Course flexibility
- Course quality
- Perceived clarity of learning goals

Technology dimension

Researchers such as Sun et al (2007) have indicated that the greater the quality of ICTs the greater the learner satisfaction with online learning. The interactivity provided by the use of asynchronous platforms such as discussion forum enhances learner appreciation of the technology thereby increasing learner satisfaction with the course Piccoli et al (2001).

Here the variables considered were
- Reliability and quality

Design dimension

Where an ICT learning environment factors in cultural issues, differing learning styles, and ensures ease of use, and perceived usefulness of the pedagogy by the learners, there are greater opportunities for increased learner satisfaction with the learning environment (Anderson and Ellioumi 2003). The Technology Acceptance Model (Davis 1989) demonstrates this aptly as it maintains that where learners have a higher usefulness perception of an online system they are most likely to experience higher levels of satisfaction with the learning system. These are analysed by reviewing the
- Perceived usefulness of course
- Perceived ease of use

Environmental dimension

When a course facilitator ensures learners have greater access to prompt and helpful feedback as well as diverse assessment criteria with built in continuous assessment there is likely to be high learner satisfaction and achievement with the learning environment (Thurmond et al 2002). Likewise, a learning environment that facilitates greater learner interaction with others, learner – content interaction and learner course facilitator interaction leads to improved self regulation and problem solving skills among learners thereby increasing learner satisfaction and achievement (Arbaugh 2004). In addition, Sun et al (2007, 7) argue that because online learning requires greater concentration as opposed to traditional face to face delivery, it is important that the learning environment should "…improve frequency, quality, and promptness of interactions which could affect learner satisfaction." This research therefore, seeks to establish perceived learner satisfaction with the online course through investigating the critical variables of online course interactions by reviewing.
- Learners perceived interaction with others
- Learner perceived interaction with course content
- Learner perceived interaction with course facilitator
- Perceived community of learning
- Perceived cultural and geographic influence

These dimensions fit with Aldridge and Rowley's concept that satisfaction is not the same as quality, as "quality is a general attitude whereas satisfaction is linked to specific transactions" (Aldridge and Rowley 1998, 200).

4.4　　　Instruments of data collection

Due to the small size of the research group no attempt is made to use "…formal statistical significance or sample size techniques to infer that the results of this study represented larger populations" (Picciano 2002, 28). Only descriptive analyses of the various data and the themes derived there-from were used to highlight possible trends. Pearson's correlation was used to test internal correlation of participants' responses; where no internal correlation is identified the only assumption made is that participants did not score those variables in the same way. Thus a multiple methods approach that combined: Life-World narratives, online interviews, grades analysis, e-mail and discussion forums analysis was employed. This allowed for identification of trends that could be used to inform future designs of online courses. Yin (2003, 97) emphasizes the significance of employing the eclectic approach to data collection as he argues that:

> …the need to use multiple sources of evidence far exceeds that in other research strategies, such as experiments, surveys, or histories. Experiments, for instance, are largely limited to the measurement and recording of actual behavior in a laboratory and generally do not include the systematic use of survey or verbal information. Surveys tend to be the opposite, emphasizing verbal information but not the direct measurement or recording of individual behavior. Finally, histories are limited to events in the 'dead' past and therefore seldom have any contemporary sources of evidence, such as direct observations of a phenomenon or interviews with key actors.

Yin (2003, 98) further argues that the use of the eclectic approach in case studies is critical as it enables the researcher in social research to "…address a broader range of historical, attitudinal, and behavioral issues…" and to be able to triangulate sources of evidence to provide authenticity or validity and accuracy of evidence. This view is also shared by Patton (1987). However, Yin cautions that the eclectic approach to data source evidence could be taxing on the researcher as it is time consuming, laborious and requires the researcher to be very cautious as improper application of the multiple method may not yield the intended multi perspective to the research issues being addressed.

The research used Life-World narratives to provide background information on the participants and to provide more in-depth understanding of the participants. This helped shed light on preferred learning styles, attitude towards online learning and general achievement in the course. In addition to these, an analysis of e-mail communication was conducted to shed greater light on type of interaction the participants were engaged in and its implication on general achievement and satisfaction with the course. Likewise, the content of the discussion forum interactions was analysed to provide insight into participants' level of interaction, attitudes and satisfaction with the interaction. Finally, online interviews were conducted with participants to evaluate their perception, attitudes and satisfaction with the course. Added to these were the one on one in-depth interview with the course facilitator and educational experts. The convergence of these elements is depicted in Figure 4.2 below showing how they lead to evidence of conclusions drawn.

Figure 4.2:   The use of multiple sources triangulation used in this research
            (Adapted from Yin (2003))

Convergence of Evidence
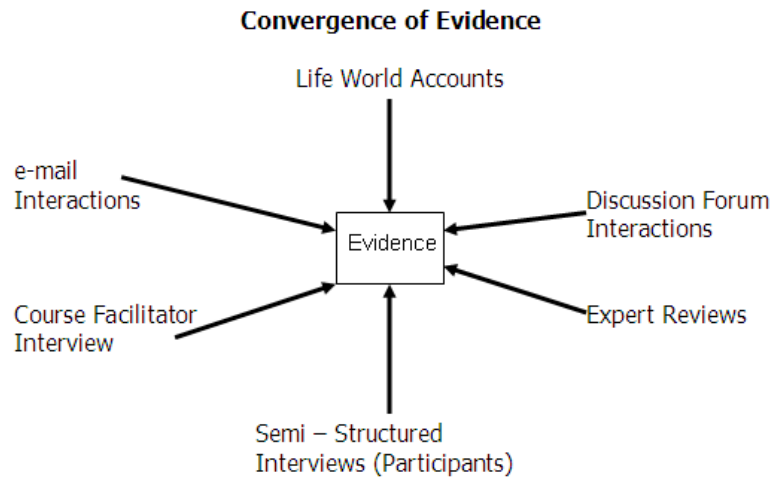
Initial contact

As the course is run wholly online with many learners in distant locations, data was collected online. With the assistance of the course coordinator, invitations to participate were emailed the learners and this forum was used to introduce them to the research objectives and obtain informed consent. The data collection started at the beginning of the second semester in January 2008[2] and ended at the end of September 2008. Unobtrusive 'observations' of participants' interactions were made with the researcher remaining in the 'shadows' to avoid interfering as recommended by Glesne and Peshkin (1992).

Online interviews

Informal, semi structured interviews were conducted with the participants. During the interviews emerging themes were integrated as data was collected and analysed.

Discussion forum

Discussion forum transcripts were analysed for collaboration, interaction, reflection, and levels in learner – learner, learner - content as well as learner - course facilitator interactions to determine their impact on learning outcomes.

Email communications

Email used for initial introductions, informed consent and personal interviews so that participant confidentiality could be maintained for sensitive information.

Course Grades

Where possible, learners' course grades were analysed to determine progress in the learning process and ascertain the formal level of achievement.

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[2] The academic year in Botswana follows the British model and is different to the South African year.

Expert Review

This course was not available to public scrutiny, but expert opinion was sought from the e-learning experts at the University of Botswana. The course facilitator was also interviewed and could also be seen as an "expert" as this course has been run for several years.

Course facilitator

The course facilitator, as the educational practioner, was able to indicate if the group participating in this study was similar to groups from other years and give additional insight in the difficulties of running a wholly online course in the region from both a technical and social perspective.

4.5   Ethical considerations

All ethical procedures were followed to ensure participants' confidentiality. Permission to conduct the research was obtained from the Ministry of Education (Appendix A), the University of Botswana (Appendix B), as well as the Faculty of Human Sciences at the University of KwaZulu-Natal (see minutes of the Higher Degrees Committee meeting held on Tuesday 13 November 2007). The course facilitator indicated his willingness to participate in the research and has been helpful in accessing the discussion forum for observations.

The researcher was introduced by the course facilitator to the research participants through the discussion forum and the purpose of the research was outlined through the same platform. Participants were asked to sign a consent form (Appendix C) that stated that participation was voluntary and that they were free to withdraw from the research at any point. Information gathered through the study will be kept confidential and will not be used to harm the standing of participants in any way. The research findings will be made available to the public and the University to use in improving online learning.

Chapter 5: Data Collection and Analysis

5.1   Introduction

This chapter discusses the process of data collection and analysis. There were three primary sources of information; the participants, the course facilitator and, in order to get a broader understanding of online learning in Botswana, the acting director of e-learning at the University of Botswana.

Participant information was obtained from analysis of the online discussion forum, the questionnaire (Appendix D), the email interview (Appendix E) as well as course records. Problems arose in that some of the participants preferred email communication to the discussion forum, so all interactions were not kept on record. In the questionnaire a pilot questionnaire was administered among a few participants and then more questions added (none deleted) for the final run. Two of the participants who completed the pilot questionnaire did not fill in the final one thus their entries show missing values for those questions that appeared in the second questionnaire and not the first. Very few participants responded to the email interview, but where information is available it is recorded below.

Course facilitator and the acting director of e-learning at the University of Botswana were interviewed separately and themed summaries of those interviews are also presented.

5.2   The course

The course selected for use in this case study is the Postgraduate Diploma in Information and Communication Technologies for Telecommunications. The course is part of a group of courses hosted by different universities, each student registers with their "home" institution but the course administration is coordinated by the University of Dar Salaam. The online learning management system, chosen was KEWL, developed by the University of the Western Cape to be responsive to bandwidth problems in Africa.

This course was considered ideal as a case study as it is offered wholly online and uses the communication technologies it explores to facilitate the learning that takes place. The course outline states the topics to be covered are Network Protocols and Standards, Communication Systems, Modulation and Multiplexing, Switching, Radio Technology, Broadcast Communications, Wireless Communications and Modern Data Communications. At the end of the course participants should be able to describe the technical systems used to place a telephone call, send an email, and browse the World Wide Web; explain the network architectures of major telecommunications platforms; discuss the standards used in the Information and communications technologies; explain the technical factors influencing convergence of ICTs and link the technical aspects of ICT with Policy and Regulation.

Students are given a list of four books as required readings and additional course information is available on the KEWL site. Participants are assessed through continuous assessment (60%), which comprises of class discussions, a group project and an individual project, and an examination which counts 40% of the final mark. Guidelines are also given about the type of contributions required in the discussion forum.

5.3   The course participants

Initial contact was made with course participants via email. Of the 37 learners only 33 were willing to give informed consent as a result the 4 non consenting course participants are excluded from this study.

At the beginning of the course, as an initial introductory process, learners were asked to introduce themselves on the discussion forum and give some indication of their home background and expectations for the course. It was hoped that the students would get to know one another through this forum and that the responses would provide demographic details for the research as well as giving an insight into the motivational factors influencing their studies. Unfortunately the responses were minimal but additional demographic information was obtained from the post course questionnaires (Appendix D), email interview (Appendix E) and course records. Additional information was obtained from analysis of online discussions.

5.3.1   The participant demographics

The participants of this course form a heterogeneous multi-cultural group of learners from across the Southern African Development Community (SADC) region.

Gender:
There were twice as many male participants than female participants, but as this course is essential a technical course gender bias in enrolment is not unexpected.

Table 5.1:   Gender distribution of participants

	Frequency	Percentage
Male	22	66.67
Female	11	33.33
Total (excluding 4 non-participants)	33	100.00

Geographical distribution:
There were more participants from South Africa (36.36%) than any other country. Angola and Nigeria had equal proportions (15.15%) while Ethiopia (6.06%) and Botswana (3.03%) had the least.

Table 5.2:   Geographical distribution of participants

	Frequency	Percentage
Angola	5	15.15
Botswana	1	3.03
Ethiopia	2	6.06
Mozambique	3	9.09
Nigeria	5	15.15
South Africa	12	36.36
Zambia	5	15.15
Total (excluding 4 non-participants)	**33**	**100.00**

In the light of the Botswana Government's focus on ICT and their commitment to develop the ICT industry, the low enrollment as highlighted in Figure 5.1 is a concern. Reasons for this require further investigations.

Figure 5.1:   Geographical distribution of participants
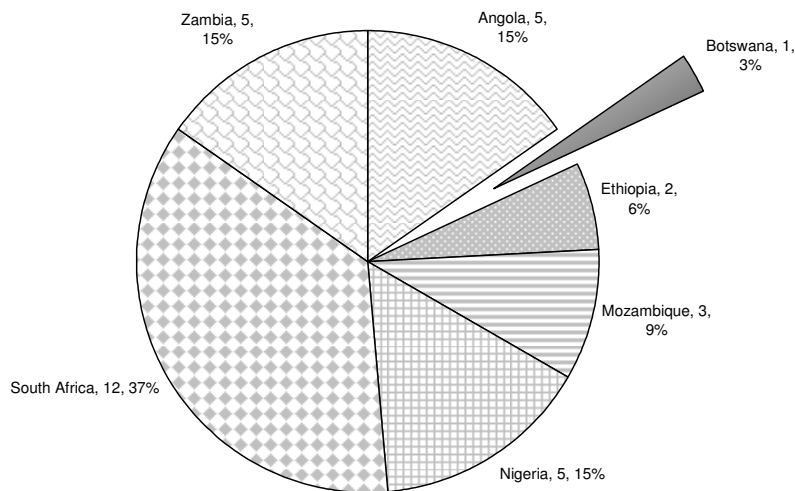
5.3.2   Participant's marks

As final assessment is often used to understand "success" rate it was intended that each participant's marks would form a portion of the assessment of the course as a whole. Unfortunately as the course is a single unit of a number of elective units at different institutions and are audited by those institutions, the continuous assessment marks and final marks were not reliably available to this research. However the un-audited exam marks were and are presented here.

Table 5.3   Examination mark descriptive statistics

	Whole Sample	Female	Male
Number Valid	33	11	22
Number Missing	0	0	0
Mean	56.697	60.72727	54.68182
Std. Deviation	11.95953	11.86668	11.75296
Variance	143.03	140.8182	138.132
Range	57	46	52
Minimum	28	39	28
Maximum	85	85	80

As can be seen the marks between the two genders are relatively similar with the Female Students having a higher Mean Score, but the Standard Deviation is similar.

Figure 5.2:   Examination Mark Histogram

Mean =56.70
Std. Dev. =11.96
N =33
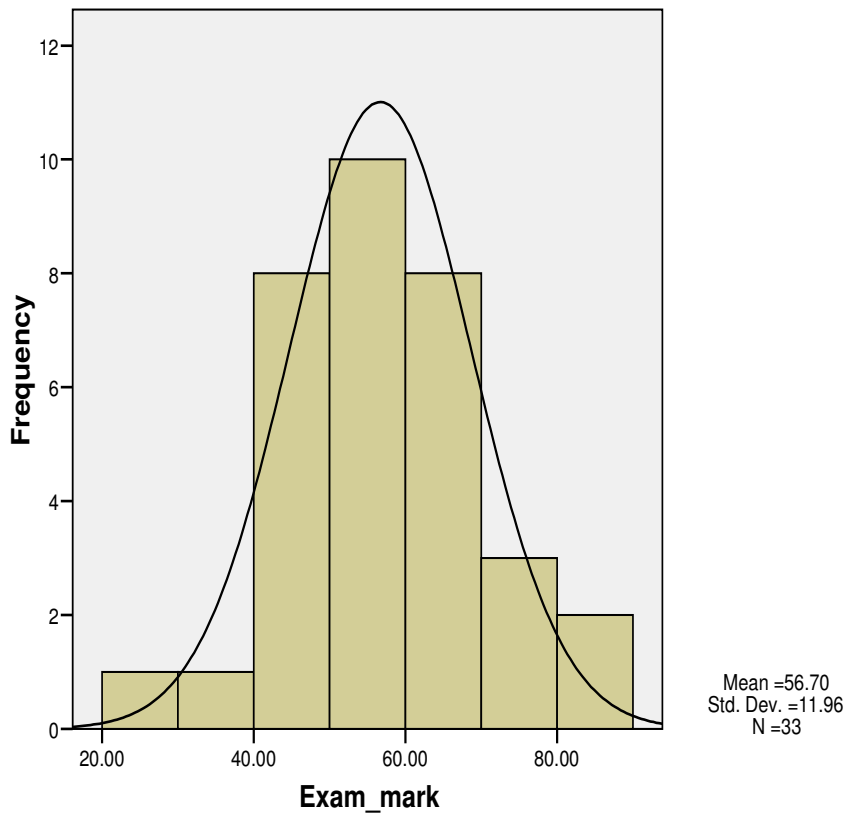
The Stem and Leaf plot below shows the varied range of marks according to gender of participants.

Figure 5.3: **Stem and Leaf plot of gender analysis of exam mark**
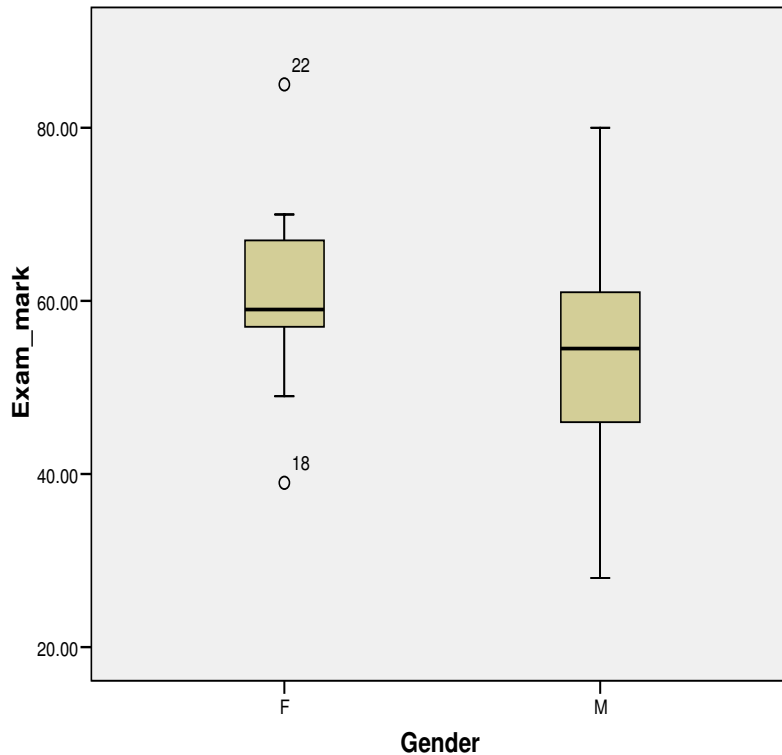
The reason for difference between the two is not clear, but it could be influenced by the difference in sample size of each group. Due to the small sample size it is not possible to make any statistical generalization, but it can be argued here that there is no gender bias in successful completion of the course but there is a probable bias in gender enrollment.

The rest of the analysis of participants' views of this course is divided into the dimensions outlined in Chapter 4 and taking cognizance of the data collection problems outlined in the introduction of this chapter.

5.3.3   The learner dimension

Questions 1, 2, 3, 23 and 27 of the questionnaire relate specifically to the learner dimension of analysis, other information was sourced from the discussion forum and email interviews.

Participants' expectations.
Those that responded to the request for information about expectations via the email interview mostly suggested that they did the course to better understand the telecommunications policies and regulations in Africa and improve their job prospects.

- *"To find a better paying job and help my parents"*

- *"…to get better understanding of the telecommunications industry in order to open opportunities for a better job in the regulatory body of the country"*

- *"…to get better understanding of the telecommunications industry and to be more marketable"*

- *"I would be able to grow stronger in my understanding of the industry and how other people are doing it in other parts of Africa*

- *"…to master skills on ICT and policy regulations and to network with other policy regulators across SADC"*

Only one person mentioned level of study

> *"I did not expect it to be as tedious as it is. I think the course is more elaborate and deeper than I thought"*

Educational needs

Question 23 of the questionnaire targets participants' attitude to education needs. Note that this question "I felt that my educational needs were not being met" was phrased in the negative (any statistical analysis on this reverses the scale with Strongly Agree being scored 1 and Strongly Disagree taking the score of 5).

Table 5.4:   Educational needs <u>not</u> being met (Q23)

	Frequency	Percentage
Strongly Agree	0	0.00
Agree	1	3.03
Neutral	11	33.33
Disagree	13	39.39
Strongly Disagree	6	18.18
Not answered	2	6.06
Total (excluding 4 non-participants)	33	100.00

Only one person had an unfavorable response, 11 feeling neutral about this and the majority (19) felt their educational needs were being met.

Learner attitude to computers

Learner attitude to computers was represented by the participants' perceived computer expertise and prior experience with online learning.

<u>Computer Expertise</u>

In the post course questionnaire participants were asked to rate their computer expertise (Question 27) as level of comfort with technology could influence one's online learning self-efficacy. Only 6.06% of respondents felt their computer expertise was weak, and others were positive about their skills.

Table 5.5:   Perceived computer expertise (Q27)

	Frequency	Percentage
Weak	2	6.06
Average	0	0.00
Fairly Good	5	15.15
Good	17	51.52
Excellent	9	27.27
Total (excluding 4 non-participants)	33	100.00

These results are not unexpected as the course is directed at people with experience in, or wishing to develop knowledge of, telecommunications. Thus a certain level of prior interest in computers could reasonably be expected.

Prior experience with online learning:
Prior experience with online learning (Question 1) was considered important as previous experiences could influence respondent's expectations; however, only one participant had studied online previously and therefore this could not be analyzed as an influencing factor among this group.

Table 5.6:   Prior experience with online learning (Q1)

	Frequency	Percentage
None	32	96.67
One	1	3.03
Total (excluding 4 non-participants)	33	100.00

As so few participants were experienced in online learning, an induction to the online learning system (KEWL) could have influenced the self-efficacy of these respondents. Question 2 and 3 addressed this issue, with question 2 finding out if the participant had an introductory session and question 3 asking them to rate its usefulness.

Table 5.7:   Induction to the online learning system (Q2)

	Frequency	Percentage
Yes	26	78.79
No	7	21.21
Total (excluding 4 non-participants)	33	100.00

Question 3 "Did you find the orientation helpful to your course work?" elicited the following responses:

Table 5.8: Usefulness of induction (Q3)

	Frequency	Percentage
Not at all useful	2	6.06
Not very useful	0	0.0
A little useful	0	0.0
Useful	16	48.48
Very useful	9	27.27
Not applicable	6	18.18
Total (excluding 4 non-participants)	33	100.00

It is curious that 7 respondents stated they did not attend an induction course but only 6 recorded an answer of "not applicable." The respondent, who did not have an induction course but rated its usefulness, stated the course was "not at all useful." However, most who did receive prior training on the system found it either useful (16) or very useful (9) and only one of the people who did not find it useful had attended the course.

From the questionnaire responses in this dimension it is evident that learners' had the necessary skills to work computers in an online environment, were able to access prior training for the KEWL system and felt that their educational needs were being met.

5.3.4   Course Facilitator Dimension

The course facilitator dimension (seen as interaction between student and facilitator) was interrogated by Questions 7, 9, 11 and 28 of the questionnaire. These questions looked at how comfortable the participants felt about communication with, and responses from, the facilitator.

Table 5.9: I felt I was encouraged to ask questions (Q7)

	Frequency	Percentage[3]
Most negative response (Not at all)	2	6.06
Negative (A little)	1	3.03
Neutral (Fairly)	7	21.21
Positive (Quite a lot)	9	27.27
Most Positive (A lot)	12	36.26
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

The participants generally felt that questions were acceptable and the facilitator would encourage them to do so.

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[3]   In tables where the percentages total 99.99% the numbers would need to be rounded to 6 decimal places to get a total of 100%.

Table 5.10:   I felt that it was hard to get help when I had a question (Q9)

	Frequency	Percentage
Most negative response (Strongly Agree)	0	0.0
Negative (Agree)	8	24.24
Neutral (Neutral)	6	18.18
Positive (Disagree)	6	18.18
Most Positive (Strongly Disagree)	11	33.33
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Although a disturbing number of respondents felt that it was difficult to get help (nearly one quarter of the sample) the majority felt that assistance was available to them. The timing and quality of the feedback may have contributed to the negativity of some of the responses as outline below:

Table 5.11:   I felt that I received timely feedback (Q11)

	Frequency	Percentage
Most negative response (Never)	1	3.03
Negative (Almost never)	5	15.15
Neutral (Sometimes)	10	30.30
Positive (Fairly often)	5	15.15
Most Positive (Very often)	10	30.30
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

While the neutral to positive responses to this question are greater than the negative responses, it does indicate that there could be improvement in the timing of the feedback. This also relates to a theme discussed under the Facilitator's interview regarding time.

Table 5.12:   How did you find interaction with the course facilitator (Q28)

	Frequency	Percentage
Most negative response (Not helpful)	0	0.00
Negative (not very helpful)	14	42.42
Neutral (Helpful)	10	30.30
Positive (Fairly helpful)	3	9.09
Most Positive (Very helpful)	6	18.18
Not answered	0	0.0
Total (excluding 4 non-participants)	33	99.99

Here the responses are of more concern in that the trend seems to be more negative than positive, suggesting the *quality* of feedback needs to be improved.

While recognizing that the sample size of the respondents is too small to draw any generalizations a Pearson 1-tailed correlation analysis shows a "significant" correlation between responses for questions 7, 9 and 11 and none for question 28. This indicates that

the respondents did not feel the freedom to ask questions, the timely responses or the ability to get speedy helpful assistance was the same as the quality of response.

Table 5.13:   Correlation of responses for the Facilitator – learner interactions

		Q7 encouraged to ask	Q9 hard to get help	Q11 timely feedback	Q28 helpful interaction
Q7 - encouraged to ask	Pearson Correlation	1	.652(**)	.801(**)	.079
	Sig. (1-tailed)		.000	.000	.336
	N	31	31	31	31
Q9 – hard to get help	Pearson Correlation	.652(**)	1	.844(**)	-.243
	Sig. (1-tailed)	.000		.000	.094
	N	31	31	31	31
Q11 – timely feedback	Pearson Correlation	.801(**)	.844(**)	1	-.004
	Sig. (1-tailed)	.000	.000		.492
	N	31	31	31	31
Q28 – helpful interaction	Pearson Correlation	.079	-.243	-.004	1
	Sig. (1-tailed)	.336	.094	.492	
	N	31	31	31	33

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

Generally in the interpretation of the "facilitator – learner" interaction, from the questionnaire responses there could be room for improvement. From the email interviews the participants expressed varying views about their interactions with the course facilitator with some emphatically stating that they did not receive helpful assistance from the course facilitator while others were more positive pointing out that they often had very helpful assistance. In analysis of the discussion forum postings it was clear what discussion did occur was between learners and the facilitator only using the forum to post activities. Thus I believe the contrast in responses for this dimension could be explain by the fact that learners mostly got learning activities from the discussion forum and went away to do the tasks at their own pace only to return to the discussion forum to paste the answers on the date of submission. Questions were asked "privately" via e-mail thus excluding other participants from exploring both the question and answer. A more sustainable use of discussion forum or the use of listserv technologies could improve participants' perceptions of this dimension especially if the facilitator could take the role of fellow learner posing and answering questions with the learners themselves.

5.3.5   Course Dimension

The course dimension is analyzed by reviewing, general satisfaction with the course, the level and perceived depth of learning as well as investigating if the respondents perceived it as having contributed to their stated expectation of improving their work prospects. The base line question asks if the respondents were satisfied with this course (Q4), note that the scale on the questionnaire is presented in reverse order and changed here to assist comparisons.

Table 5.14:   Overall I was satisfied with this course (Q4)

	Frequency	Percentage
Most negative response (Strongly Disagree)	1	3.03
Negative (Disagree)	1	3.03
Neutral (Neutral)	2	6.06
Positive (Agree)	22	66.67
Most Positive (Strongly Agree)	5	15.15
Not answered	2	6.06
Total (excluding 4 non-participants)	33	100.00

While a small percentage of respondents indicate they were disappointed with the course, by far the larger majority state they were satisfied with the course in general.

Question 5 initiates the investigation into how much the respondents feel they have learnt, with the hypothesis that there would be a correlation between satisfaction and perceived depth of learning.

Table 5.15:   Overall, I learned a great deal on this course (Q5)

	Frequency	Percentage
Most negative response (Strongly Disagree)	1	3.03
Negative (Disagree)	0	0.00
Neutral (Neutral)	2	6.06
Positive (Agree)	19	57.58
Most Positive (Strongly Agree)	9	27.27
Not answered	2	6.06
Total (excluding 4 non-participants)	33	100.00

Unsurprisingly the Pearson 1-tailed correlation analysis shows a "significant" correlation between responses for these two questions (Q4 and Q5).

Table 5.16:   Correlation of responses for depth of learning and satisfaction

		Q4 Satisfaction rating	Q5 Learnt a great deal
Q4 Satisfaction rating	Pearson Correlation	1	.826(**)
	Sig. (1-tailed)		.000
	N	31	31
Q5 Learnt a great deal	Pearson Correlation	.826(**)	1
	Sig. (1-tailed)	.000	
	N	31	31

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

What is of interest and demonstrated in the bar chart below is that respondents were slightly more positive in their perception of depth of learning than they were in their satisfaction with the course. This is in line with Aldridge and Rowley's (1998) contention that certain transactions influence perceived satisfaction.

Figure 5.4:   Satisfaction and depth of learning bar chart
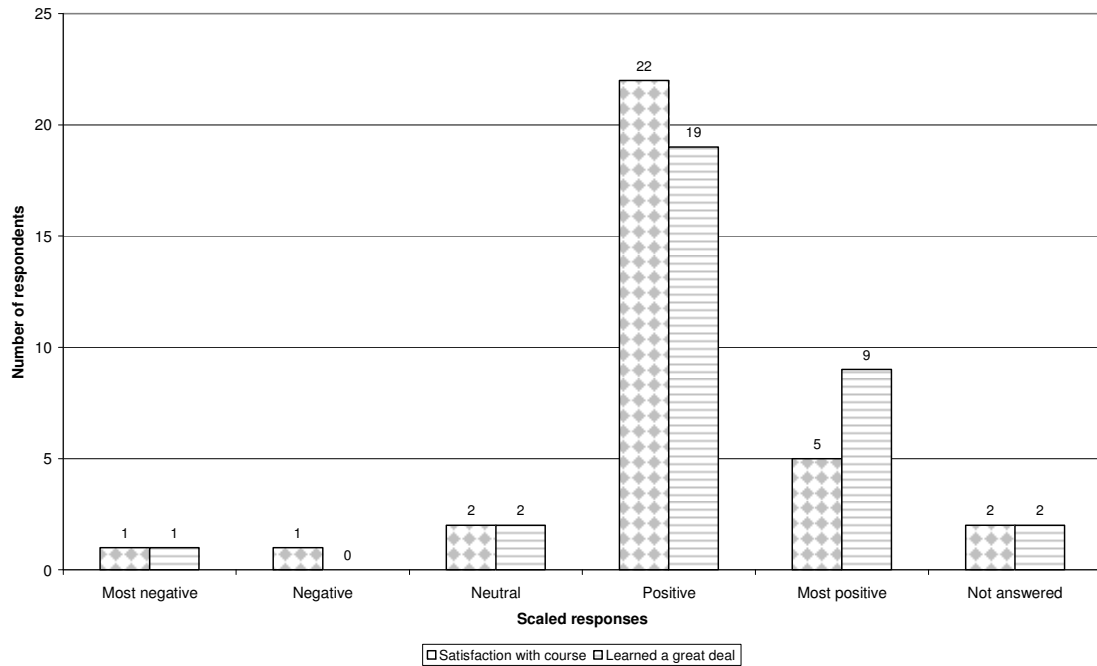
The converse of depth of learning was tested by asking the respondents about their perceptions of the ease of the course (Q33) and if they felt the course resulted in only modest learning (Q17). Question 33 was difficult to scale appropriately as a course that is too easy it is not desirable, but neither is a course that is too difficult. Comparisons on this scale are therefore likely to be inaccurate.

Table 5.17:   Did you find grasp of the course content easy? (Q33)

	Frequency	Percentage
Never	0	0.00
Almost never	1	3.03
Sometimes	13	39.39
Fairly often	16	48.48
Very often	3	9.09
Not answered	0	0.00
Total (excluding 4 non-participants)	33	99.99

Most respondents felt the content was occasionally easy and no respondents indicated a strong response in either direction. Question 17 was thought to be aligned with question 33.

Table 5.18:   I felt the course resulted in only modest learning (Q17)

	Frequency	Percentage
Strongly Agree	2	6.06
Agree	4	12.12
Neutral	11	33.33
Disagree	10	30.30
Strongly disagree	4	12.12
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

While there is some commonality in the responses as seen in the bar chart below, they show no correlation in the Pearson 1-tailed test. Furthermore, the results of these would not be meaningful as it is not possible to accurately quantify the desirability of any response in question 33.

Figure 5.5:   Comparison of responses to questions 33 and 17
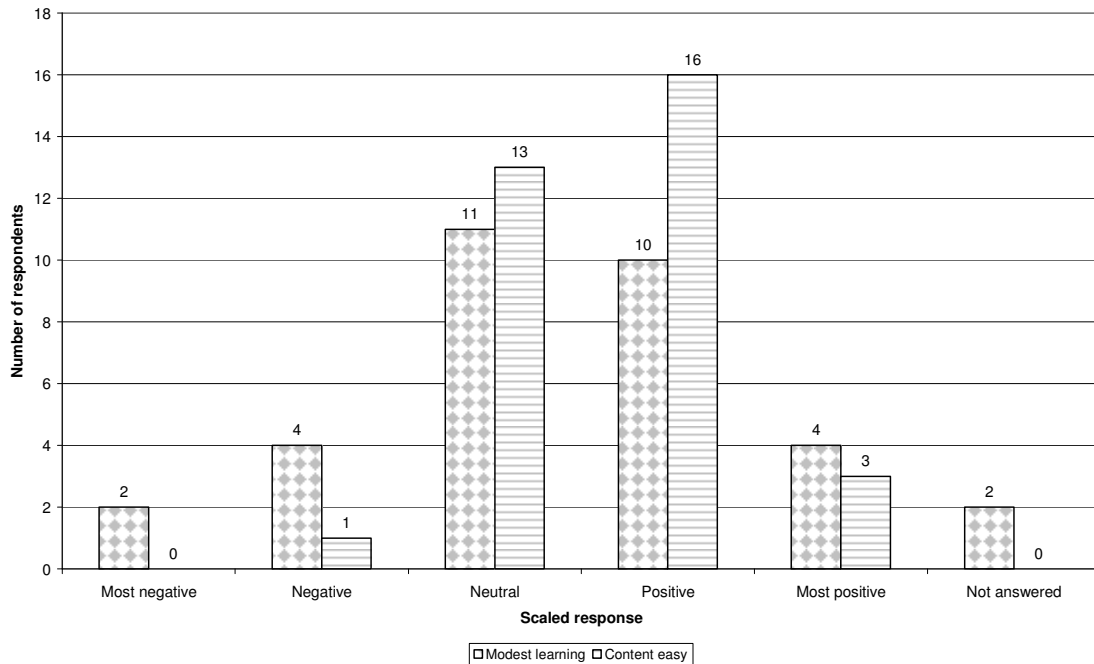
Of more interest however, is the correlation between question 17 (modest learning) and question 5 (learnt a great deal). The Pearson 1-tailed test shows an insignificant negative correlation which is supported by the bar chart depicting a slight tendency for a positive skew on the "learnt a great deal" variable.

Table 5.19:   Correlation of responses for depth of learning as represented by Q17 and Q5

		Q17 Modest learning	Q5 learnt a great deal
Q17 Modest learning	Pearson Correlation	1	-.011
	Sig. (1-tailed)		.476
	N	31	31
Q5 Learnt a great deal	Pearson Correlation	-.011	1
	Sig. (1-tailed)	.476	
	N	31	31

Figure 5.6:   Comparison of responses to question 17 (modest learning) and question 5 (learnt a great deal)
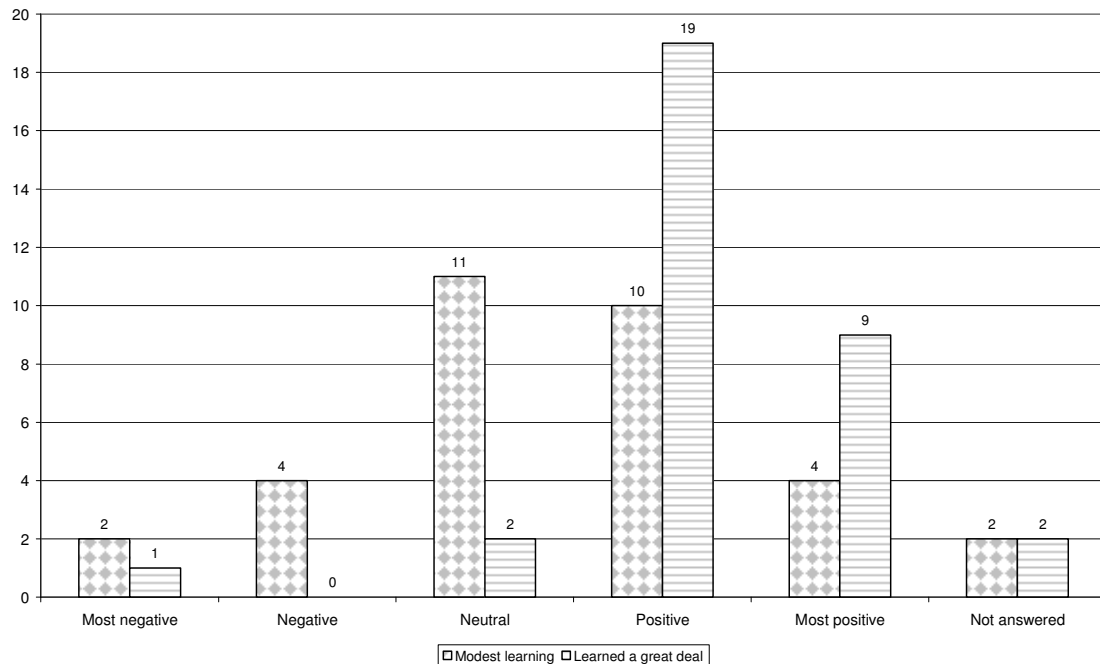
In retrospect the combination of the two questions relating to lack of depth of learning were probably ill phrased and question 17 should be discarded as a reliable indicator of participant's perceptions. The final question asked on this dimension related to respondents' perceptions of the course adding value to their professional lives (Q34).

Table 5.20:   Have the skills gained in the course improved your professional performance? (Q34)

	Frequency	Percentage
Most negative response (Not at all)	0	0.00
Negative (A little)	1	3.03
Neutral (Fairly)	3	9.09
Positive (Quite a lot)	23	69.70
Most Positive (A lot)	6	18.18
Not answered	0	0.00
Total (excluding 4 non-participants)	33	100.00

Here, it is clear the overwhelming majority considered their professional abilities were improved by the course. There is also a direct correlation between the responses for this question and the answers obtained for question 5 (learnt a great deal) and question 4 (satisfaction rating), indicating that the respondents gave similar ratings for the three questions.

Table 5.21: Correlation of responses for depth of learning, skills improvement and perceived satisfaction

		Q5 Learnt a great deal	Q34 Improved professional skills	Q4 Satisfaction rating
Q5 Learnt a great deal	Pearson Correlation	1	.621(**)	.826(**)
	Sig. (1-tailed)		.000	.000
	N	31	31	31
Q34 Improved professional skills	Pearson Correlation	.621(**)	1	.565(**)
	Sig. (1-tailed)	.000		.000
	N	31	33	31
Q4 Satisfaction rating	Pearson Correlation	.826(**)	.565(**)	1
	Sig. (1-tailed)	.000	.000	
	N	31	31	31

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

Discarding questions 17 and 33, allows the presumption that in general the respondents were satisfied with the course content and their level of skills development.

Course activities
Questions related to course activities looked at group work and peer review exercises

Table 5.22: Did you find group work rewarding? (Q29)

	Frequency	Percentage
Most negative response (Not at all)	1	3.03
Negative (A little)	7	21.21
Neutral (Fairly)	5	15.15
Positive (Quite a lot)	6	18.18
Most Positive (A lot)	14	42.42
Not answered	0	0.00
Total (excluding 4 non-participants)	33	99.99

The majority of respondents found group work rewarding which is encouraging as for many students group work can be a frustrating exercise and more so when the groups are not located in the same geographical area.

Table 5.23:   Did the use of peer reviews help you understand the course better? (Q30)

	Frequency	Percentage
Most negative response (Not at all)	3	9.09
Negative (A little)	3	9.09
Neutral (Fairly)	6	18.18
Positive (Quite a lot)	11	33.33
Most Positive (A lot)	10	30.30
Not answered	0	0.00
Total (excluding 4 non-participants)	33	100.00

Not surprisingly these two variables show a significant correlation, thus respondents had similar perceptions about group work and assistance of peer review work.

Table 5.24:   Correlation of responses for depth of learning, skills improvement and perceived satisfaction

		Q29 group work	Q30 peer reviews
Q29 group work	Pearson Correlation	1	.804(**)
	Sig. (1-tailed)		.000
	N	33	33
Q30 peer reviews	Pearson Correlation	.804(**)	1
	Sig. (1-tailed)	.000	
	N	33	33

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

<u>Learner motivation</u>

Learner motivation is analyzed by question 21 and 25 where respondents rated opportunities for learning and the promotion of a desire to learn.

Table 5.25:   I felt that I was given ample opportunities to learn (Q21)

	Frequency	Percentage
Most negative response (Never)	0	0.00
Negative (Almost never)	4	12.12
Neutral (Sometimes)	6	18.18
Positive (Fairly often)	6	18.18
Most Positive (Very often)	15	45.45
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Table 5.26:   I felt that the course did _not_ promote a desire to learn (Q25)

	Frequency	Percentage
Most negative response (Very often)	4	12.12
Negative (Fairly often)	2	6.06
Neutral (Sometimes)	14	42.42
Positive (Almost never)	6	18.18
Most Positive (Never)	5	15.15
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Interestingly there is an insignificant negative correlation between these two dimensions indicating that opportunities for learning are not scored in the same way as desire for learning.

Table 5.27:   Correlation of responses for opportunities and desire for learning

		Q21 opportunities to learn	Q25 desire to learn
Q21 opportunities to learn	Pearson Correlation	1	-.005
	Sig. (1-tailed)		.490
	N	31	31
Q25 desire to learn	Pearson Correlation	-.005	1
	Sig. (1-tailed)	.490	
	N	31	31

The most significant difference between these two variables is clearly evident in the figure below where it shows that the largest number of respondents felt neutral about a desire to learn, but most felt "most positive" about opportunities to learn.

Figure 5.7:   Comparison of opportunities and desire to learn

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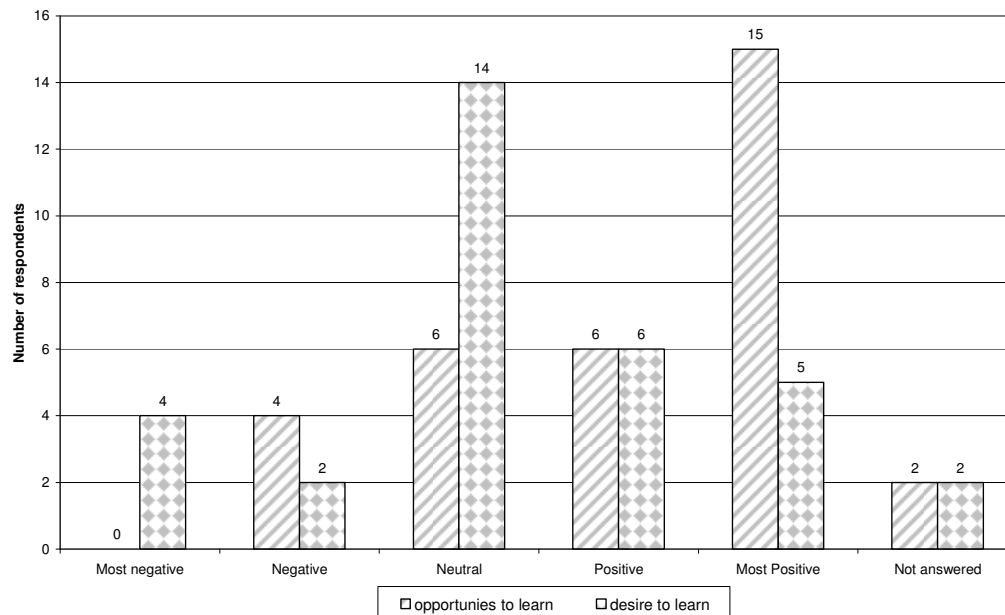
5.3.6 Environmental Dimension

The environmental dimension was intended to measure the participants' sense of a community of learning looking at learners perceived interaction with each other, the course content as well as cultural and geographic influences.

Question 6 - Learners care, Question 8 – interconnectedness, Question 10 - community of learning, Question 12 - sense of family, Question 13 - vulnerability in exposing gaps in knowledge, Question 14 – feeling of isolation, Question 15 - freedom to speak, Question 16 – trust, Question 18 – reliance on others, Question 19 - peer support, Question 20 – dependency, Question 22 - uncertainty of others, and Question 24 – confidence of support were all meant to interrogate this dimension.

Question 20 – "I felt that members of the course depended on me" – is difficult to scale as a certain amount of interdependence is acceptable, but on either extreme of the scale it becomes less desirable.

Table 5.28:   I felt that members of the course depended on me (Q20)

	Frequency	Percentage
A lot	1	3.30
Quite a lot	3	9.09
Fairly	9	27.27
A little	3	9.09
Not at all	15	45.45
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

The extreme value of "not at all" although not a majority is large and of concern as a moderate level of inter-dependency between online learners can facilitate a sense of community and facilitate collaborative learning.

Related to the question of dependency a more positive measure of inter-relatedness is interrogated by question 18 – "I felt that I could rely on others in the course." Reliance in this sense indicates that others could or would be available to one if necessary.

Table 5.29:   I felt that I could rely on others in the course (Q18)

	Frequency	Percentage
Most negative (Strongly Disagree)	2	6.06
Negative (Disagree)	9	27.27
Neutral	9	27.27
Positive (Agree)	10	30.30
Most Positive (Strongly Agree)	1	3.03
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Here the scores are relatively evenly spaced on the positive and negative scales, indicating there was some ambivalence amongst participants on this issue. When compared with

Question 6 (caring) we find that the majority felt that there was a "fairly" caring attitude but there were more positive responses than negative.

Table 5.30:   I felt that students in the course cared about each other (Q6)

	Frequency	Percentage
Most negative (Not at all)	1	3.03
Negative (A little)	2	6.06
Fairly (Neutral)	18	54.55
Quite a lot (Positive)	6	18.18
A lot (Most Positive)	4	12.12
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

This skewed response becomes more pronounced in the respondents' answers to question 8 (connectedness), with the majority of respondents (75.75%) responding on the positive scale.

Table 5.31:   I felt connected to others in the course (Q8)

	Frequency	Percentage
Most negative (Strongly Disagree)	0	0.00
Negative (Disagree)	3	9.09
Neutral	3	9.09
Positive (Agree)	11	33.33
Most Positive (Strongly Agree)	14	42.42
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

This response is also reflected in question 10 where most of the respondents indicated that they did feel "a spirit of community of learning" and question 12 which asks the more emotional question related to feeling like a "family."

Table 5.32:   I did <u>not</u> feel a spirit of community of learning (Q10)

	Frequency	Percentage
Most negative (Strongly Agree)	0	0.00
Negative (Agree)	4	12.12
Neutral	7	21.21
Positive (Disagree)	16	48.48
Most Positive (Strongly disagree)	4	12.12
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Table 5.33:   I felt the course was like a family (Q12)

	Frequency	Percentage
Most negative (Never)	2	6.06
Negative (Almost never)	2	6.06
Neutral (Sometimes)	8	24.24
Positive (Fairly often)	6	18.18
Most Positive (Very often)	13	39.39
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Table 5.34:   Correlation of responses for perceptions of family, community, connection caring and reliance

		Q12_family	Q10_community	Q8_connection	Q6_caring	Q18_Rely
Q12_family	Pearson Correlation	1	.619(**)	.854(**)	.432(**)	.472(**)
	Sig. (1-tailed)		.000	.000	.008	.004
	N	31	31	31	31	31
Q10_community	Pearson Correlation	.619(**)	1	.697(**)	.441(**)	.024
	Sig. (1-tailed)	.000		.000	.007	.449
	N	31	31	31	31	31
Q8_connection	Pearson Correlation	.854(**)	.697(**)	1	.431(**)	.412(*)
	Sig. (1-tailed)	.000	.000		.008	.011
	N	31	31	31	31	31
Q6_caring	Pearson Correlation	.432(**)	.441(**)	.431(**)	1	.228
	Sig. (1-tailed)	.008	.007	.008		.108
	N	31	31	31	31	31
Q18_Rely	Pearson Correlation	.472(**)	.024	.412(*)	.228	1
	Sig. (1-tailed)	.004	.449	.011	.108	
	N	31	31	31	31	31

** Correlation is significant at the 0.01 level (1-tailed).
 * Correlation is significant at the 0.05 level (1-tailed).

Q18 does not correlate with Q10 (feeling of community) nor does it correlate with Q6 (concept of caring for one another). This suggests that these participants did not see the attribute of being able to rely on one another in the same way the felt about the community spirit or caring for one another.

Another area thought to influence this environmental dimension was related to feelings of vulnerability. Question 13, 14, 15 looked at that in terms of reluctance to expose gaps in one's knowledge (13), reluctance to speak (Q15) and feelings of isolation (Q14).

Table 5.35:   I felt uneasy about exposing gaps in my understanding? (Q13)

	Frequency	Percentage
Most negative (Very often)	1	3.03
Negative (Fairly often)	2	6.06
Neutral (Sometimes)	8	24.24
Positive (Almost never)	9	27.27
Most Positive (Never)	9	27.27
Not answered	4	12.12
Total (excluding 4 non-participants)	33	99.99

Note that the 4 not answered is not an error as participants 6 and 16 did not answer this question in addition to the usual two.

Table 5.36:   I felt reluctant to speak openly (Q15)

	Frequency	Percentage
Most negative (Very often)	1	3.03
Negative (Fairly often)	0	0.00
Neutral (Sometimes)	4	12.12
Positive (Almost never)	11	33.33
Most Positive (Never)	15	45.45
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Table 5.37:   I felt isolated in the course (Q14)

	Frequency	Percentage
Most negative (Very often)	1	3.03
Negative (Fairly often)	7	21.21
Neutral (Sometimes)	8	24.24
Positive (Almost never)	5	15.15
Most Positive (Never)	10	30.30
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

As the following table shows there is a correlation between the responses given for questions 13 and 15, as well as between feelings of isolation (Q14) and reluctance to speak openly (Q15). But feelings of isolation do not correlate with feelings about exposing ones gaps in understanding.

Table 5.38: Correlation of responses for feelings of isolation, reluctance to speak openly and unease about exposing gaps in understanding

		Q13 uneasy about exposing gaps	Q15 reluctance to speak openly	Q14 feeling of isolation
Q13 uneasy about exposing gaps	Pearson Correlation	1	.605(**)	.306
	Sig. (1-tailed)		.000	.053
	N	29	29	29
Q15 reluctance to speak openly	Pearson Correlation	.605(**)	1	.508(**)
	Sig. (1-tailed)	.000		.002
	N	29	31	31
Q14 feeling of isolation	Pearson Correlation	.306	.508(**)	1
	Sig. (1-tailed)	.053	.002	
	N	29	31	31

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

It is not surprising that feelings of helplessness (Q31) correlate with feelings of isolation (Q14); while the majority state they only felt helpless 'sometimes' these variable is skewed towards the negative with more respondents stating they felt helpless "fairly often" than those that stated they "almost never" felt this way.

Table 5.39: Did you ever feel helpless when working on your own? (Q31)

	Frequency	Percentage
Most negative (Very often)	0	0.00
Negative (Fairly often)	8	24.24
Neutral (Sometimes)	22	66.67
Positive (Almost never)	3	9.09
Most Positive (Never)	0	0.00
Not answered	0	0.00
Total (excluding 4 non-participants)	33	100.00

Table 5.40: Correlation of responses for feelings of isolation and helplessness

		Q14 feeling of isolation	Q31 feeling of helplessness
Q14 feeling of isolation	Pearson Correlation	1	.517(**)
	Sig. (1-tailed)		.001
	N	31	31
Q31 feeling of helplessness	Pearson Correlation	.517(**)	1
	Sig. (1-tailed)	.001	
	N	31	33

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

Trust between peers is understood to be an important element in online learning; this was interrogated by questions 16, 19, 22 and 24

Table 5.41:   I trusted others in the course (Q16)

	Frequency	Percentage
Most negative (Not at all)	1	3.03
Negative (A little)	1	3.03
Neutral (Fairly)	8	24.24
Positive (Quite a lot)	16	48.48
Most Positive (A lot)	5	15.15
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Table 5.42:   I felt that other students did not help me learn (Q19)

	Frequency	Percentage
Most negative (Strongly agree)	0	0.00
Negative (Agree)	1	3.03
Neutral	2	6.06
Positive (Disagree)	12	36.36
Most Positive (Strongly disagree)	16	48.48
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Table 5.43:   I felt uncertain about others in the course (Q22)

	Frequency	Percentage
Most negative (Very often)	1	3.03
Negative (Fairly often)	1	3.03
Neutral (Sometimes)	7	21.21
Positive (Almost Never)	13	39.39
Most Positive (Never)	9	27.27
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

Table 5.44:   I felt confident that others would support me (Q24)

	Frequency	Percentage
Most negative (Not at all confident)	1	3.03
Negative (Not confident)	5	15.15
Neutral (Confident)	19	57.58
Positive (Fairly confident)	3	9.09
Most Positive (Very confident)	3	9.09
Not answered	2	6.06
Total (excluding 4 non-participants)	33	100.00

Table 5.45: **Correlation of responses for feelings of trust between participants**

		Q16 Trust others	Q19 Help learn	Q22 Uncertain about others	Q24 Confident of support
Q16 Trust others	Pearson Correlation	1	.495(**)	-.106	.565(**)
	Sig. (1-tailed)		.002	.285	.000
	N	31	31	31	31
Q19 Help learn	Pearson Correlation	.495(**)	1	.366(*)	.355(*)
	Sig. (1-tailed)	.002		.022	.025
	N	31	31	31	31
Q22 Uncertain about others	Pearson Correlation	-.106	.366(*)	1	.084
	Sig. (1-tailed)	.285	.022		.327
	N	31	31	31	31
Q24 Confident of support	Pearson Correlation	.565(**)	.355(*)	.084	1
	Sig. (1-tailed)	.000	.025	.327	
	N	31	31	31	31

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

It is interesting that the variable of trust of others (Q16) and feelings of uncertainty (Q22) show a negative correlation, as well as that the scores for confidence of support (Q24) and uncertain about others (Q22) are not significantly similar. It appears that the respondents score trust of others in a similar way to assistance in learning (Q19), as well as feeling confident about the support of others (Q24). However, feelings of uncertainty about others' (Q22) is not perceived in the same way. The bar chart below shows that all the questions were positively scored except for the "neutral" score for confidence of support, but as the question gave the option of 'confident' for the neutral assessment this could be seen as a positive response.

Figure 5.8: **Comparison of responses related to trust**
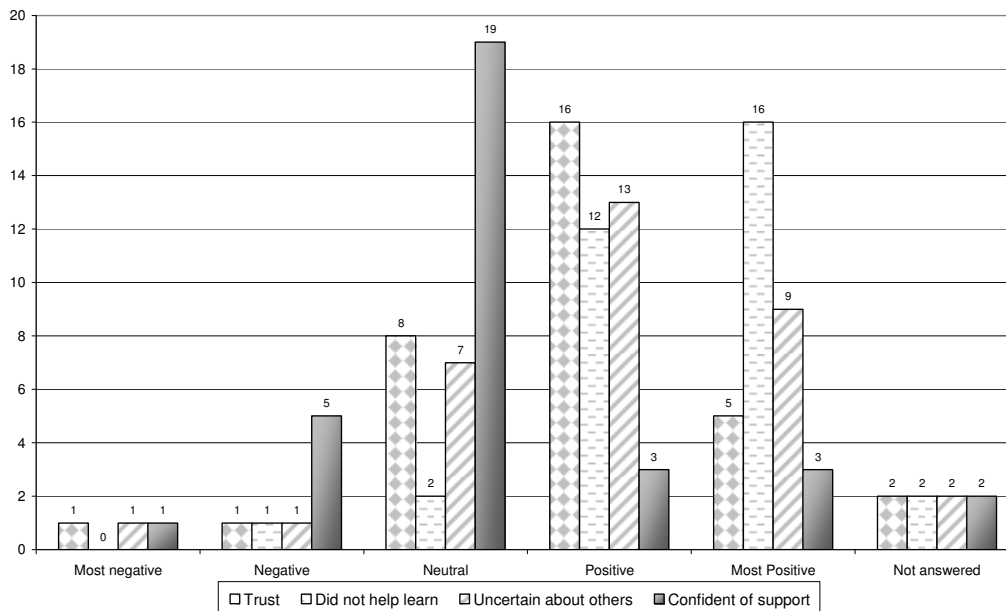
A final summation of learner-learner interaction was asked in question 32 where respondents were asked to state if they ever discussed the challenges they faced with their peers.

Table 5.46: **Did you ever discuss the challenges you faced in the course with your peers? (Q32)**

	Frequency	Percentage
Most negative (Never)	0	0.00
Negative (Almost never)	2	6.06
Neutral (Sometimes)	5	15.15
Positive (Fairly often)	6	18.18
Most Positive (Very often)	20	60.61
Not answered	0	0.00
Total (excluding 4 non-participants)	33	100.00

The willingness to share difficulties and challenges indicates that communication did take place during the course and that a feeling of mutual support existed between participants.

5.3.7 Design Dimension

This dimension was analyzed by interrogating the perceived usefulness of the course and ease of use, however, usefulness of the course has been covered in the course dimension looking at educational needs, course satisfaction, depth of learning and skills gained. Ease of use is also related to computer expertise and induction into the system. A final question in this dimension was Q26:

Table 5.47: **How rewarding was the course to you? (Q26)**

	Frequency	Percentage
Most negative (Not at all)	1	3.03
Negative (A little)	1	3.03
Fairly (Neutral)	6	18.18
Quite a lot (Positive)	12	36.36
A lot (Most Positive)	11	33.33
Not answered	2	6.06
Total (excluding 4 non-participants)	33	99.99

The majority of respondents found the course rewarding, which is also backed up by those that answered the email interview question "would you recommend this course to others", where all respondents stated "*yes*" and some stating they had done so already.

5.3.8 Technology Dimension

The general opinion is that it is not the media that dictates the value of a course, but if the media is not reliable it can lead to feelings of frustrations. This dimension was interrogated in the questionnaire by question 35, with the majority of respondents giving a positive rating.

Table 5.48:   Was the technology reliable? (Q35)

	Frequency	Percentage
Most negative (Never)	0	0.00
Negative (Almost never)	2	6.06
Neutral (Sometimes)	5	15.15
Positive (Fairly often)	12	36.36
Most Positive (Very often)	14	42.42
Not answered	0	0.00
Total (excluding 4 non-participants)	33	100.00

However, this positive rating should also be compared to statements from the course facilitator and in light of the analysis of the use of the discussion forum in KEWL which is discussed below as a different source of data.

5.3.9   Discussion Forum Entries Analysis

Course Introductions

The participants were all requested to introduce themselves and provide information about themselves. The introductions were less personal but more formal presenting information on the participant's academic background, profession and where they study. The participants were generally guarded. This could be because the Introduction itself was not an interactive guided procedure that sought to draw valuable information about each participant's values, interests, extroverted or introverted. However, all of the participants in their introduction stated their perceived value of the course and how it would add value to their professional lives. For example:

> "Hi course mates! I am…I had my first degree English and Literary Studies.I enrolled for this course via the University of Jos hoping to have a knowledge of the world Information and communication Technology with the help of you **all**. Thanks."

Another said:

> "…this course is vital to my legal profession in so many ways but most imoprtantly (sic) in the legal aspect of it."

Yet another participant posited:

> "I believe that this course and progamme as a whole will create a knowledge based telecoms sector, where the exchange of knowledge from regulators, service…"

In the discussion forum, participants were required to interrogate each other's discussion contributions to activities in the discussion forum that are to be discussed. At the end of the discussion forum window a drop down menu was provided so readers could rate the message. The rating options were 1- Perfect Answer, 2 – Some Good Information, 3 – Helpful Enough, 4 – Not Very Helpful, 5 – Way off the Topic.

In most cases the readers left the rating unattended so no accurate data could be extracted for the perceived usefulness of discussion postings. The reasons for the rating not being used are not evident and further investigation should take place if there is an intention to continue displaying this option.

For example one participant in responding to another's contribution put it like this:

> *"Hullo. I am called... In reference to your post about Analog and digital signals; You stated that the media for analog only is Fibre optic and that for transmiting Digital signals only is Twisted Pair and Coaxial cable. I think vice versa is true. Fibre Optic is best for digital transmissions However transmitting analogue signal over optical fiber is possible but only limited to a very narrow range of application, mainly in what is called 'radio frequency over fiber*
>
> **Copper telephone wires/ traditional telephone wires**
>
> *At one time, all the cable used for telephone wires was made of copper and this type of line can only carry analogue signals. Therefore telephone calls are analog transmissions through copper wire. A specific example is coaxial cable carrying analog signals.*
>
> *What have you got to say about this?"*
>
> | Select a Rating... ▼ |
> |---|

No readers selected a rating

Another example of readers failing to rate a message is:

> *"Hullo … This is …your coursemate. You didnt categorise the other media like infra red, Micro wave, ISDN, cellular, Twisted pair. Which signals do these carry?*
>
> | Select a Rating... ▼ |
> |---|

Frequency and Interactions by Participants in the discussion Forum

The discussion postings reveal that learners in the course did not respond to each other's queries or postings as frequently as desirable in an online course. This tended to reduce level of interaction among learners and with the course facilitator. For example the figure below

shows a sample of a discussion forum for this course. Here under "author" are the codes for the learners, under "replies" are the number of times the message or posting sent by the author have been replied to, under "views" are the number of times the message or posting has been viewed or opened and under "last post" is the date since posting and the code for the person who last viewed the posting. For the posting done by participant 1, there are 8 viewers but zero replies. For participants 5 and 9 there are 15 viewings and 23 viewings respectively yet they both have 1 response/feedback each.

Figure 5.9:   Sample discussion forum page

Status	Read	Type	Topic/Conversation	Author	Replies	Views	Last Post
🔓	✉	📝	learning activity 3.1	1	0	8	159 days ago 7 📄
🔓	✉	🤝	TR 502: Learning activity 3.2	2	0	3	168 days ago 9 📄
🔓	✉	🤝	TR 502: Learning activity 3.1	3	0	8	168 days ago 1 📄
	✉	👆	assignment	4	0	6	176 days ago 6 📄
🔓	✉	📊	LEARNING ACTIVITY 3.1	5	1	15	277 days ago 5 📄
🔓	✉		TR502 Learning Activity 3.1	6	1	7	49 days ago 1 📄
🔓	✉		TR502 Learning Activity 3.1	7	0	6	284 days ago 4 📄
🔓	✉	❓	learning activity 3.1	8	0	11	288 days ago 10 📄
🔓	✉	❓	DISCUSSION 3.1	9	1	23	277 days ago 5 📄

Page 1 of 4: **1 2 3 4**

Start a New Topic

This situation presents a very glaring picture of weak interactions among the participants. The reasons for this are not apparent but should be viewed in the light of the sense of community expressed in questionnaire responses, the feelings of technological reliability and the facilitators comments about accessing the KEWL site.

Course facilitator interactions

In the discussion forum entries there was very little evidence of the course facilitator's interactions with the learners except for posting learning tasks and assignments. The

participants generally communicated with the course facilitator directly by e-mail if they had a query or wanted to ask something.

<u>Cognitive input and depth of understanding of tasks</u>

The responses to tasks or assignments posted in the discussion forum revealed that participants research well and displayed a suitable depth of understanding in their submissions. The submissions were referenced to show research and serve as a guide for others to access relevant resources.

<u>Course design effectiveness</u>

The KEWL system was easy to use and loaded relatively quickly (especially when compared with accessing other learning systems from Botswana). The participants had access to a discussion forum, e-mail and a chat room, however the chat room was never put to use. Most participants seldom accessed their student e-mail boxes preferring to use their private email addresses. This became evident when the researcher sent e-mail invitations to the group to request for permission to involve them in this research; most of those who responded gave the researcher personal e-mail addresses as their preferred contact address. Reasons for the underutilization of the various KEWL communication platforms need to be investigated further.

<u>Discussion of forum use</u>

The discussion forum data revealed that the quality of messages posted were well thought out and researched as these were generally responses to course activities or tasks. The messages reflected high levels of critical thinking. However, the messages lacked robust social interaction and inter personal relationships. As a result the messages failed to present a satisfactory level of social interaction and participants mostly interacted with the course facilitator directly through e-mail and not through the discussion forum.

Reasons for the infrequent interactions in the discussion forum were not clear, they could be a result of perceived 'overload' by learners as these were also professional full-time workers, or as the course materials, course activities and tasks were not changed regularly, participants did not have to access the system regularly only visiting the site to extract the course activities and deposit answers to the tasks on the deadline dates. This made it difficult to examine and evaluate levels of interactions in the discussion forum. Participants viewed participation in the discussion forum as additional work. Consequently, the participants did not have any scores for participation in discussions. If participation in the course was imperative and woven into the course design and the course facilitator ensured he prompted and guided discussions, then participation would have been robust. This could also have helped participants feeling less isolated and creating inclusiveness. Another major challenge was how to assess participation in the discussion forum especially for learners who live in different time zones and how to motivate learners to participate in discussions.

In future, learners in online learning need to be provided with orientation on the significance of participation in discussion forums to build communities of learning and that the courses should have enjoyable interactive activities that require moderate daily inputs. The course facilitator could consider a weekly chat session which could be guided to provide the course facilitator with critical information on the social, academic challenges, motivation levels, and also information on learners who seem not to be coping. This might also help in building a sense of a caring community of learning among participants.

5.3.10   Conclusion to participant data

Variables 1-4 studied the relationship between the *learner dimension and perceived learner satisfaction in the online learning course*. From the survey findings it is evident that learners' needs and expectations have a positive impact on perceived learner satisfaction with online learning. Participants' perceived self efficacy on executing tasks efficiently online revealed that participants felt they were very capable. It is presumed that the participants' attitude towards computers had a significant impact on their perceived ability to work with computers. This could be attributable to the fact that these participants work with computers in their daily execution of their work and also that it is the high value that they attach to the course that drives them.

However, the significance of previous online learning experience was not possible to ascertain.

The *Course Facilitator Dimension* studied *the relationship between the Course Facilitator interaction and perceived learner satisfaction*. Variable 5 revealed that the course facilitator's attitude and response time to learners played an important role in learner satisfaction. The course facilitator's support to learners also shows significance in online learner satisfaction. When asked whether they felt they received timely and helpful feedback from the course facilitator the 15 of the 33 participants – stated that they very often or fairly often received timely and helpful feedback while 10 said they sometimes did. The rest (6), who were a minority said they felt they did not get timely and helpful feedback. This dimension was an attempt at answering RQ 2.

Variables 6 to 10 studied the relationship *between learner perceived significance of course activities' relevance and authenticity, course activities and learner motivation, diversity of assessment, online course flexibility, online course quality and perceived learner satisfaction on online learning*. A majority of participants stated that they were satisfied with the course and that the course was effective as they learnt a lot from it and acquired a useful skills. The participants also stated that the course had a positive influence on their professional lives and they were happy with the way it was structured thus revealing strong course quality. However, upon being asked if thy felt the course did not promote a desire to learn, the majority of the participants felt that the course did not promote the desire to learn. This variance might be attributable to an un-accommodative course design that left learners

generally feeling isolated and lonely most of the time and not necessarily course quality. This was also an attempt at answering RQ2 and RQ3.

Variable 11 studied the relationship between *technology reliability and quality and perceived online learner satisfaction*. The majority of the participants felt that the technology was reliable and of good quality. Only a minority (7) out of 33 viewed it as less reliable. This could be attributable to poor bandwidth or other related factors that have been mentioned to hamper efficient use of ICTs in education particularly in Africa.

These findings conform to the Information Systems Effectiveness Theory (Delone & McLean 1992). Variable 11 revealed the participants thought the quality of the technology supported effective learning. This is contradictory in some ways to previous research (Eom et al., 2006) that reveal that issues of poor upload time, and bandwidth have a negative impact on learner satisfaction with online learning especially in Africa where the online technologies have not yet shown significant maturity. Other issues that were expected to have a significant influence on learner satisfaction were issues of load shedding especially in Southern Africa. The region has been hit by shortage of electricity. However, given the tendency to bypass the learning management system the expressed views of these participants to technology reliability may differ from others (such as the course facilitator) and other online learners who have had access to first world bandwidth options. Further research is required.

In attempting to answer RQ 2 - Variables 12 to 13 studied *the relationship between participants' perceived usefulness of course, perceived ease of use of the program and perceived online learning satisfaction*. The majority of the participants viewed the course as very useful. This notwithstanding, the majority also felt that the learning program was not always ease to use. When asked whether they sometimes felt helpless when working on their own most stated that they sometimes felt so. Twenty two said sometimes while 8 said fairly often and only 3 said they almost never felt helpless working on their own.

Likewise, on being asked whether they ever felt isolated in the course 3 of the participants stated that they mostly felt a part of the group while 22 said sometimes and 8 said they fairly often felt isolated. This is contradictory to the assertion that the course quality was strong, that they were satisfied with their interaction with the course facilitator and that they learnt a lot from the course. This could be attributed to the quality of interactions between the learners and the course facilitator and lack of community of learning in the course. Another explanation could be that most of these participants rarely came online to engage in community of learning but only came online to post their assignments or other tasks as they are full time employees.

Variables 14 to 18 which assisted in answering question 3 studied the *relationship between learners perceived interaction with others, learner perceived interaction with course content, learner perceived interaction with course facilitator and perceived cultural and geographic influence*.

Ten of the participants felt that members of the course cared about each other and 25 of the participants also felt 'fairly' connected with others in the course. A minority (3) of the

participants felt alone. This number could be attributable to the seemingly weak link between learners and the course facilitator and the infrequent participation by participants in the discussion forum tasks. Twenty participants felt that there was a spirit of community of learning while 7 were neutral leaving only 4 who felt no spirit of community of learning.

The results indicate that though there is a high level of expressed satisfaction with the course the level of an enjoyable learning experience could be improved. In the light of Cyert and March's (1963, 126) assertion that "…an information system which meets the needs of its users will reinforce satisfaction with that system. If the system does not provide the needed information, the user will become dissatisfied." It shows that there are other possibilities such as the users bypassing the system and using more accessible technologies, or users deriving satisfaction from other unexpected transactions. This conforms to Levy's (2006) assertion that more insightful evaluation of learner satisfaction with online learning must involve an evaluation not just of learner satisfaction levels but also what the learners hold as valuable and the systems' effectiveness.

5.4 Course Facilitator's Interview

The course facilitator was interviewed with the guiding questions outlined in Appendix F. The responses obtained from the interview with the course facilitator were analyzed according to the dimensions and variables outlined in Chapter 4.

5.4.1 Learner dimension

Learners' needs and expectations:-
Participants enroll in the course in order to be more informed on the world telecommunications and its regulations.

Learner attitude towards computers
Learners were expected to possess an above average computer competence as the course is run for professionals in the telecommunications industry - prior competence in the use of computers had no significance in learner satisfaction as all were already competent.

Learner online learning self-efficacy
The course facilitator stated that it was difficult to assess the level of learner satisfaction as no feedback study had been conducted, but that any dissatisfaction was usually broadcast in the discussion forum.

Perceived clarity of learning goals
A clear course outline with assessment procedures was available to students online. In addition, meaningful learning tasks that addressed real situations were used and these were viewed to be effective as they guided learning.

5.4.2 Course facilitator dimension

Initially the course facilitator dimension was intended to look at responsiveness and feedback to students. However, the interview with the course facilitator showed that it was more complicated than simply responding to submissions.

> "As a course facilitator I thought it would be plain sailing that I wouldn't have so much problems with time to go online to address student's queries. You think it's easy but it's not as easy as you think."

Time was a real challenge for the facilitator as he is employed on full time basis at the University of Botswana and this course is not considered part of his University activities. As a result he had to juggle his time carefully between the two conflicting roles. It also emerged that the different time zones between countries posed a major challenge as learners and the course facilitator could not be online at the same. This affected prompt feedback from both the course facilitator and other learners in most cases. This was better illustrated in the course facilitator's observation that:

> "Time. Remember I am employed in a full time job and I have to cater for this course outside my normal hours.

Administrative challenges were also an unexpected theme. This course is administered by individual participating universities, which poses challenges such as not being able to trace whether learners dropped out of the course and if this is due to course difficulty, technical problems or personal reasons. The course facilitator is unable to have such information to evaluate course effectiveness. For example, on being asked if any of the learners ever dropped from the course due to its difficulty the course facilitator responded:

> "This is difficult to answer. Dropping out is difficult to determine in my situation as students don't register with me. They register with their mother institutions. The students belong to those institutions. Whoever has access to my course I assume they are registered. How many do drop out that can only be determined by the mother institutions."

The administration of comprehensive records of the learners' performance and progress were also problematic. The course facilitator observes that:

> "There should be a central place where all marks are placed and who ever wants the marks must contact the person responsible. This is what is supposed to be but its currently not being used. We have the University of Dar Salaam being the coordinator but people by pass the coordinator. You have students say from Ethiopia writing to me asking for marks. That should not happen. If they have a query they should contact the coordinator."

5.4.3 Course dimension

Relevance and authenticity of course activities

An African thing – the facilitator revealed that the course was designed primarily to fill up the void that existed as there had not been any telecommunications regulatory course in Africa previously. The course was designed to meet challenges in the telecommunications industry from the African perspective.

A project in its own right – KEWL was also designed as an independent project as it was especially suited to African challenges in the use of ICTs such as poor bandwidth and it was to be evaluated regularly with course facilitators reporting its inadequacies to the designers for review. This has not been done so far.

Opportunity for collaboration – the course was viewed as a golden opportunity for collaboration among African universities on the use of ICTs in learning. The collaboration would also provide opportunities for growth by participating universities. The course facilitator posited:

> *"As an institution we saw an opportunity for collaboration with other African institutions. In today's world especially in the academic world this is crucial as you gauge yourself standards wise and see what other people are doing .You share ideas."*

Course activities and learner motivation

Use of the discussion forum – learners were encouraged to interact extensively through the discussion forum and ask questions using this medium. However, after the initial course the facilitator suggested that learners tended to cut corners in interacting online and this posed challenges as little collaborative learning occurred:

> *"The guys who started this course were very keen and as time went by another culture started developing. The continuous assessment we give to students; students began to pick it from the past courses and would interact directly less and less."*

Course flexibility

A bridging course – the course was viewed as a bridging course as it allowed learners to use their experiences to help construct new knowledge in ICT. This is in congruence with constructivist critical realism world view on effective learning.

Knowledge scaffolding – the course took learners from the known to the unknown.

> *"It starts by introducing issues that they know until it gets to the topic that everybody is interested in, ICT and telecommunications without going into the nitty-gritties of the engineering world."*

Authentic Tasks – effective learning involved using local experiences and these were viewed as facilitating enjoyable learning and motivation.

Course quality

According to the facilitator the course met high quality standards set by up the University.

5.4.4   Technology dimension

Reliability and quality

The facilitator noted that bandwidth was a problem that could impact negatively on the course. Although the learning management system was intended to address this problem he stated:

> "Another issue is the bandwidth as you would spend endless time trying to
> log in. Learners go on line only when they can and if you pose something [a
> question] online they are not there. They won't see it. They will only see it
> say after two months when they decide to dump responses to the activities.
> For this course we knew that this was likely to happen that's why we
> designed three kinds of assessments: assignments, tests and scores for
> participation."

Time Zones: It also emerged that due to the different time zones some learners would be behind while others would be ahead and this made synchronized tasks and communication difficult.

5.4.5   Design dimension

Perceived usefulness of course

Useful learning – According to the facilitator this was demonstrated by learners who at the start of the course assisted in their various fields without really possessing the nomenclature or the appropriate skills but ultimately used skills gained from the course to improve service delivery.

Perceived ease of use

The KEWL system is not difficult to use except for the technological dimensions mentioned earlier. However the facilitator pointed out learners without a mathematics background found the course difficult while engineers found the course easy and also that course difficulty could also be affected by the load of work that individual learners took.

5.4.6   Environmental dimension

Learners perceived interaction with others

Infrequent online participation – this emerged as one of the challenges that hampered collaborative learning as learners did not make full use of the benefits of communities of learning online.

Authentic tasks raised in the discussion forum were intended to encourage active participation.

> "Discussion forum ensures interactions and it enables links among learners."
> "Discussion also acts more like a chat."

Learner perceived interaction with course content

No general problems with course content were reported by the facilitator except for those without mathematical backgrounds.

Filling gaps in learning – it was revealed that themes and issues emerging from the discussion forum were often used as examination items. That helped in filling gaps in learning that might not have been adequately addressed during discussions. The course facilitator pointed out that:

> "The final questions are generally derived from the discussion forum and course activities; e.g. if I find that an issue in the discussion forum hasn't been adequately addressed I put it in the final questions."

Learner perceived interaction with course facilitator

The time challenges faced by the facilitator both in terms of his work load and the difference in time zones may have negatively impacted on the perceived interaction, although the facilitator encouraged questioning.

Perceived community of learning

The facilitator stated that the discussion forum, although used less frequently than desired, provided an opportunity for learners who were professionals in a given area to provide expert advice to others when issues were raised thereby facilitating collaboration and support to others.

Perceived cultural and geographic influence

According to the facilitator culture difference did not play a significant role in influencing learner satisfaction.

However, geographical location did in terms of time differences.

Gender differences – though this had previously been a factor the course has put in place mechanisms to accommodate learners from both sexes even though it is still an issue in terms of the gender enrolment. However, the facilitator was of the opinion that gender had not proven to have any significant value in influencing learner satisfaction in the course.

Diversity of assessment

Continuous assessment was build into the course to allow those who participated more and constructively to accrue more marks.

Frequent variation of assessment – questions were changed frequently in order to avoid learners picking past course materials and later posting answers on discussion forum just to meet deadlines without having engaged in active discussions.

5.5   Interview with the acting director of the Centre for Academic Development

Although the interview with the acting director at the Centre for Academic Development did not shed any light on the course under-review, it did give a broad outline on difficulties and plans for e-learning at the University of Botswana – the institution that is perceived as having pioneered elearning in Botswana. Questions asked were guided by the outline in Appendix G.

Support departments - When the UBel initiative was started in 2001 a few departments were selected for training. These were the departments of Educational Technology, Environmental Science, and the Library. The Educational Technology department was viewed as the vehicle for change while the Library department was viewed as a critical source of information necessary for rolling out online learning at the university.

> *"Since this was based more on interest and since the Library is a critical*
> *information source it was felt that the library needed to have trained*
> *personnel to provide support to staff. The Educational Technology*
> *Department was trained as they are viewed to be agents of change."*

Orientation of first year students - There are two general courses that are offered to both first and second year students. These are: GEC 121 which introduces students to ICT and GEC122 which orientates students in ICT use and research skills.

Enhancing learning and teaching – When UBel was started its objectives were to create a flexible 'any time any where' learning environment that would enhance both teaching and learning. It also aimed at providing multi modal delivery learning environments.

UBel policy and Maitlamo policy – The University of Botswana's e-learning policy was derived from UB's vision to make UB a centre of excellence locally and internationally. This policy had been informed by the national policy on the use of ICTs for development called Maitlamo. When asked about the objectives of UBel the director pointed out that:

> *"This was drawn from the UB's vision of having UB as a centre for excellence*
> *both locally and internationally. ICTs were viewed as a driving force for*
> *learning and drawing from the national policy on the use of ICTs in education*
> *- Maitlamo (by which the Botswana government intends to have all citizens*
> *being able to have access to and use of ICTs for development). The policy*
> *advocates for flexible learning environments which is the direction UB intends*
> *to take."*

UB's enrolment – UB's enrollment was projected to be 15 000 but due to an increased demand for tertiary education and the consequent mushrooming of tertiary institutions in Botswana less students enrolled at UB. The current enrollment stands at between 10 000 and 11 000 students.

Lack of e-learning policy – E-learning at UB was rolled out to those departments that showed interest but it was never intended as a mandatory policy requirement that all departments must have a given percentage of the department offering courses online. Therefore, this created challenges to create interest among disinterested departments. The director stated that:

> *"Its difficult to say as e-learning has been viewed as voluntary. It is not a policy per se that mandates learners or staff to use it.*
> *Out of over 8800 courses there are over 3000 online courses which shows great uptake of e-learning courses."*

Initiatives used to ensure e-learning uptake – One of such initiatives is the use of SMART classes which encourage group discussion to ensure an enjoyable learning and teaching experience. The other initiative was the use of video conferencing which allowed lecturers to be able to facilitate learning in real time even when they were not at UB. Both lecturers and students have been trained in the effective use of SMART classes.

Attitude of learners and lecturers towards e-learning – There was evident positive attitude by both lecturers and learners towards online learning. For example, over subscription in the use of the SMART classes and lecturers engaging in online assessment of their courses such as for PS101, which had over 700 students. On this issue the director maintained that the attitudes were:

> *"Very positive because it is also supported now that in June 2008 a Learning and Teaching policy was submitted to us which guided lecturers on what to do next year. There were twelve attributes in this policy that had to be demonstrated. One of these is Information Literacy in ICT, Collaboration and project approach. This calls for us to be ready to support lecturers in whatever endeavour they come up with. This requires innovative ways to support students in acquiring necessary skills that a graduate student has to have."*

Online assessment challenges – As assessment was viewed as a very critical part of evaluating the learning experiences the department was challenged to come up with processes and procedures for assisting lectures develop quality online assessments. This was even more of a challenge given the limited number of technology resources required to execute this. On this the director pointed out that:

> *"The challenges we face are student computer ratio. With faculties with labs there has to be cooperation between IT technicians, lectures, the e-learning support staff and the students themselves so that the assessments could be conducted much more*

effectively. So procedures and processes on how to conduct these are still being piloted."

Technological challenges – Providing appropriate technology was viewed as a serious challenge as Africa has its own limitation when using technology and also because technology often gets obsolete quickly. The findings revealed:

> *"Appropriate technology acquired. As you know technology becomes absolute so easily. Lecturers as they interact with the international community come across technologies they would love to see here. Lecturers should be able to teach their classes where ever they are; for example, through media streaming. There were also challenges of budget to actually develop quality online courses."*

Manpower challenges – This proved to be a grave challenge as there were only 18 members of staff in the department proving support to the entire university with a staff population of over 800.

Collaborations with other universities – The UBel initiative emphasized on establishing research collaborative links with international universities and also providing up to date collaborative information and training in e-learning. It was revealed that:

> *"Yes based on internationalization policy we do have online collaborations with other universities; e.g. for the Masters in Project Management we collaborate with the University of Missouri. This will be a fully online program starting 2009."*

Developing capacity for e-learning delivery – The study revealed that UB through its vision of being a centre for excellence wished to enhance teaching and learning both in the conventional and open distance learning by providing effective and efficient learning environments. The open and distance learning multi mode delivery was viewed to be more lucrative due to the projected increase in the transition from secondary to tertiary education. This would also be more useful in providing appropriate courses to the working community. The director articulated this move by saying:

> *"We intend to deliver learning for both conventional and open distance learners seamlessly - we will be a centre of excellence. However, what we are doing is to develop capacity for ICT delivery in what ever format. We are looking at our next generation of students and we intend to have next generation work platforms which means that the ICT literacy and uptake within lecturers and students has to be beefed up. The platforms, the technologies have to be updated to actually be looking at mobile learning. Our plans are that in NDP 10 the Educational Technology Unit will be enhanced. We will also be extending and expanding the multi modal deliveries. Use of ICT is a fundamental factor in terms of university becoming a centre of excellence."*

Bandwidth challenges – UB faces a serious challenge of providing adequate bandwidth for both administrative and e-learning services. Although UB got its internet services from two different sources – satellite and fibre optic – bandwidth still poses challenges to efficient delivery of online learning services. This became clearer as the director lamented:

> *"Clearly there are bottle necks not from the UB but from the service providers. One, bandwidth is very expensive; we tend to get what we can afford within the limited budget. Secondly, once the bandwidth gets here it gets used for several services.*

Online learning becomes one of those services so there is competition for bandwidth. If we can ensure that proper bandwidth is allocated for e-learning experiences. However, there are those administrative processes which are aligned with teaching that need bandwidth. Student registration, so our IT division needs bandwidth. We also use video conferencing a lot. Lecturers video conference with external students. So bandwidth is very critical to deliver courses in real time with quality audio and video."

Electricity reticulation challenges – UB so far has not had any major up sets with electricity provision notwithstanding the challenges facing Southern Africa in providing equitable electricity. It was revealed that UB's Information and Technology department working with the Botswana Power Corporation have managed to come up with a working structure on the reticulation of electricity to the institution. However, as a back up UB was looking into acquiring a generator for around Botswana Pula 15 million in future.

"Our IT division is working on that given financial constraints. However, with regards to electricity we have efficient power reticulations notwithstanding the load-shedding problems. The university wishes to provide a back up system - a back up generator which would cost around 15 million."

Cultural challenges – Upon being asked whether there were any challenges in providing online learning at UB that were a result of culture the director pointed out that changing from the traditional lecturer method especially by the 'older' members of staff was their major challenge.

"Yes. Changing from the traditional to ICT enhanced teaching and learning has its challenges as especially older lecturers tend to embrace e-learning slowly. They pose some resistance to it but this is not so much of a problem though."

Using the framework for analysis as outlined in Chapter 4 the acting director felt:-

5.5.1 Learner dimension
- Learners' needs and expectations were being met by the provision of quality online courses.
- In terms of Learner attitude towards computers and self-efficacy the acting director was of the opinion that learners who had attended the prerequisite courses would be equipped to deal with the technologies.

5.5.2 Course facilitator dimension
- Course facilitators were offered training and development resources for the use of online learning – but were not forced to use it. The issue of communication between course facilitators and students via e-learning was not addressed.

5.5.3 Course dimension
- Some courses are currently using mixed mode delivery and others are or will be fully online.
- Opportunity for collaboration occur with some courses be co-run between two institutions.
- Course quality is maintained through the usual University quality controls as with any other course.

5.5.4 Technology dimension

- Reliability and quality were considered a challenge as bandwidth, a perennial issue, and obsolete equipment both pose challenges for the university as does the provision of adequate numbers of computers to students. A further challenge was meeting the needs of lecturers who see applications in use at other institutions and want to have access to them at UB.

5.5.5 Design dimension

- The use of SMART classrooms, video conferencing and video streaming for synchronous delivery seemed to be a prevalent theme.

5.5.6 Environmental dimension

- Perceived cultural and geographic influence - according to the acting director there appeared to be an age factor in the acceptance of online learning although this is not a severe impediment.

- Diversity of assessment - there appears to be an expressed need to conduct some assessment online and that was challenging as there were problems of having access to the required number of computers simultaneously. The acting director stated that more work was to be done in that area.

Chapter 6: Conclusion

6.1 Introduction

This study seeks to reveal how learners at the University of Botswana's Faculty of Engineering use an online learning platform. It also seeks to obtain evidence of learners' satisfaction of the online learning platform and find ways to improve the online learning platform. In particular it examines learner interaction and sense of presence in the course and how these influence learner performance and learner course satisfaction in an online course.

The research aims to observe and analyze the impact of ICTs learning environments using a constructivist paradigm on learners' interaction with the content, with their peers, and the course facilitator with the intention to evaluate how these enhance their learning.

Research questions

The broader research questions that guide this study are:

1. What are the learners' learning needs and expectations?

2. What are the perceptions of learners towards learner– instructor interactions, learner – learner interaction, course structure, and course support?

3. Are students satisfied with their learning experiences and the learning outcomes (perceived content knowledge, quality of course projects, and final course grades)?

6.2 Research question 1 – Learners needs and expectations

Learners needs and expectations: It was not possible to identify learner expectations as so few had prior online learning experience. From the analysis of participant responses it is possible to conclude that on the whole learner needs were met, but there was room for improvement in facilitator feedback and interaction.

Perceptions and attitudes: On the whole this was positive with few dissenting voices, improvement in learner-learner interaction and general discussions could also assist in improving this area.

6.3 Research question 2 - Interactions

Learner – instructor interactions were problematic as identified in both the participant and facilitator feedback. It would be ideal if the University of Botswana (and other participating institutions) could allocate work time that the facilitator can use to attend to such inter-institutional courses as these enhance the universities standing internationally.

Learner-learner interactions occurred, but mostly outside of the learning management system. Further research is required to identify accurate reasons for this and if necessary adaptations to the system could be introduced to accommodate user preferences.

Course structure did not seem to be problematic with most participants indicating they felt positive about the course and content on the whole.

Course support was offered in terms of inductions into the use of the system, but here facilitator-learner interactions could improve this element.

6.4   Research question 3 – student satisfaction and learning outcomes

On the whole students stated they were satisfied with their learning experiences' outcomes, however marks cored in the examination and participant ratings of satisfaction do not show a direct correlation..

6.5   Recommendations

It is recommended that the course administration be placed within an online data base that can be accessed via password for all participants and facilitators. Students should be able to query the data base for marks once the audit process is finalized and facilitators should have access to all their student records. This could assist course facilitators to audit progress of their learners and continuously evaluate their programs.

Likewise, a continuous and interactive evaluation of the course is crucial to enable course facilitators to provide more responsive programmes to the learners that are informed by research finding. This could improve significantly learner satisfaction with the learning programme as well as allowing the facilitator to understand the varying needs of different groups of students.

Notwithstanding, the time differences among participating universities, daily levels of participation and assessment have to be used to draw learners into frequent social, collaborative interaction online. This could be achieved by impressing upon the learners the significance of daily participation during the orientation week as well as exploring alternative technological options. Learners have to be orientated into how to use online learning in order to achieve optimal enjoyable learning experiences, for example, using story telling (using examples from real life situations) and asking participants to state their significance in the subject material.

In addition, the course facilitator could encourage the use of e-journals to help learners to reflect on their learning experiences which is also helpful in self assessment.

Finally, it is recommended that the course facilitator play a more active facilitative role by directing, prompting discussions and 'calling in' learners who seem to be 'fence sitting' to encourage regular participation and collaborative problem solving. This is in line with the collaborative learning philosophy where the facilitator is seen as much of a learner as the

learners themselves as well as dealing with Vygotsky's principle of the Zone of Proximal Development.

6.6   Further research

The technologies used for discussion forums did not seem to meet the needs of this group of students. Further research is needed to understand why not, and if it is true for other groups. It may be necessary to investigate an amalgamation of technologies such as a listserv that sends messages directly to individual email addresses or mobile technologies as pointed out by the acting director of e-learning at UB.

Although the evaluation matrix of dimensions and variables as well as the questions posed to participants are not without problems, these could be refined and used interactively to support research over different years. Student groups tend to have their own dynamics and what is true for this group of students may not necessarily be true for another group. If the outline of analysis proves useful over a number of courses it could be re-used by UB to interrogate their courses and possibly be adapted for use among other institutions in Botswana who are starting to use online learning environments.

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Appendices

Appendix A: **Letter of request to conduct research at the University of Botswana**

<div align="right">

University of KwaZulu Natal
Shepstone Building Level 5
ICT
ITEd.
4041
Durban
South Africa.

19th September 2007

</div>

The Director Research
University of Botswana
P/Bag 0022
Gaborone
Botswana

Dear Sir/Madam.

I wish to request permission to undertake a research in your institution.

I am a Motswana student with the University of Kwa Zulu Natal undertaking a postgraduate course in Information and Communications Technologies - Masters in Digital Media.

I became interested in investigating issues around online learning as I too have received tuition in this relatively new form of tuition and also because Botswana's Vision 2016 policy on education emphasizes the role of ICTs in education for development.

Also as a member of the Communications and Study Skills department of Molepolole College of Education, an affiliate college to UB, the role of ICTs in tertiary education is of grave importance to me personally and professionally. Therefore it would not only be beneficial to me as a researcher to undertake this study but also to UB and the colleges of education as it is Botswana's wish to see colleges producing teachers who are responsive to current trends in education.

UB is already ahead in terms of using online learning and also in terms of research on the same. Therefore it provides suitable ground for a local study on the efficacy of this learning platform. Also given that the course in question is offered wholly online and using a different learning management system from UBel's WebCT, it provides an interesting challenge to local professionals in tertiary education. The multi cultural aspect of the course participants is another area of interest in relation to online learning efficacy.

The research area is a case study of an online *Postgraduate Diploma in ICTs in Telecommunications* course currently administered by Dr. Chuma at the faculty of Engineering.

The scope of the study is, **"An analysis of learner satisfaction and learning outcomes in an Online learning course at the University of Botswana's Faculty of Engineering."**

The aim of this research is to explore the relationship between learners' attitudes, learning styles and course satisfaction in an online learning environment at the University of Botswana. The goal of the study is to gain knowledge on how learners learn within this online course so as to have more insight into the design and delivery of effective online instructional activities.

The project is supervised by Kathy Murrell (Tel: 27 031 2602478: Fax: 27 031 2602125) at the faculty of Humanities, Development and Social Sciences, School of Information and Communications Technologies in Education- University of KwaZulu-Natal. The research data collection is supposed to start in January 2008 and run through the semester until end of May 2008.

I had previously talked to Dr. Chuma about my interest in undertaking this kind of study using his course as a case study and we had a verbal understanding.

I would therefore be indebted to you if you could grant me the opportunity to undertake this study at your institution.

Thank you

Yours faithfully

David Keagakwa
Cell Numbers: 0760311039
Tel: 031- 260- 3590
email: 205525337@ukzn.ac.za/dkeagakwa@yahoo.co.uk/

Appendix B: Ministry approval

(A letter from the Ministry of Education – Botswana granting permission to do research at UB).

TELEPHONE: 3655400
TELEX: 2944 THUTO BD
FAX: 351624/3655408
REFERENCE: E 11/17/XXXX(74)

MINISTRY OF EDUCATION
PRIVATE BAG 005
GABORONE
BOTSWANA

REPUBLIC OF BOTSWANA

28 September 2007

To: Mr David Keagakwa.
       P/ Bag 008
       Molepolole

RE: PERMISSION TO CONDUCT RESEARCH

We acknowledge receipt of your application to conduct research that will :

➢ *Evaluate the perceptions towards learning styles , performance, learning satisfaction and learning outcomes in the postgraduate diploma in ICT for telecommunications course at the University of Botswana.*
➢ *Find out more effective ways of providing target online learning within the context of Botswana Culture.*

You are granted permission to conduct your research entitled:

AN ANALYSIS OF LEARNER SATISFACTION AND LEARNING OUTCOMES IN AN ONLINE LEARNING ENVIRONMENT AT THE UNIVERSITY OF BOTSWANA'S FACULTY OF ENGINEERING.

This permit is valid until 30 June 2008. You are reminded to submit a copy of your final report to the Ministry of Education, Research Unit, Botswana

Thank you,

M.L. Phiri
For /**Permanent** Secretary

Appendix C: Informed Consent Form

I am doing a research on a project entitled, **"An analysis of learner satisfaction and learning outcomes in an Online learning course at the University of Botswana's Faculty of Engineering."**

The aim of this research is to explore the relationship between learners' attitudes, learning styles and course satisfaction in an online learning environment at the University of Botswana. The goal of the study is to gain knowledge on how learners learn within this online course so as to have more insight into the design and delivery of effective online instructional activities.

I am a postgraduate research student from the Information and Communications Technology department doing Masters in Digital Media. The project is supervised by Kathy Murrell (Tel: 27 031 260 2478: Fax: 27 031 260 2125) at the faculty of Humanities, Development and Social Sciences, School of Information and Communications Technologies in Education-University of KwaZulu-Natal.

Should you have any questions my contact details are:

Information and Communications Technology, University of KwaZulu-Natal, Howard College Campus, 4041, Durban.

David Keagakwa
Cell Numbers: 0760311039
Tel: 031- 260- 3590
email: 205525337@ukzn.ac.za/dkeagakwa@yahoo.co.uk/

Thank you for agreeing to take part in the project but before we start I would like to emphasize that:

- your participation is entirely voluntary
- you are free to refuse to answer any question
- you are free to withdraw at any time.

The information you provide in the Interview will be kept strictly confidential and will only be available to the researcher. Excerpts from the Interviews will be made part of the final research report but your identity will not be reflected in the report unless where pertinent and this will not in any way harm your personal standing.

In signing this form you agree with the contents therein and agree to participate in the study.

I…………………………………………(full names) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.
I understand that I am at liberty to withdraw from the project at any time should I so desire.

Signature of the Participant………………………Date……………………..

Appendix D: Community of Learning Questionnaire

DIRECTIONS: Below you will see a series of statements concerning the course or program you recently completed. Read each statement carefully and select the choice that comes closest to indicating how you feel about the course or program. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, select the neutral choice.
Do not spend too much time on any one statement, but give the response that seems to describe how you feel. Please respond to all items in this section. Mark your answers by highlighting the appropriate box.

1. This is my first online course.

    Yes ☐   No ☐

2. Were you inducted on how to use the KEWL program at the beginning of the course?

    Yes ☐   No ☐
    If Yes then:-

3. Did you find the orientation helpful to your course work?

    Not at all useful ☐   Not very useful ☐   A little useful ☐   Useful ☐   Very useful ☐

4. Overall, I was satisfied with this course.

    Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

5. Overall, I learned a great deal in this course.

    Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

6. I felt that students in the course cared about each other.

    Not at all ☐   A Little ☐   Fairly ☐   Quite a lot ☐   A lot ☐

7. I felt that I was encouraged to ask questions.

    Not at all ☐   A Little ☐   Fairly ☐   Quite a lot ☐   A lot ☐

8. I felt connected to others in the course.

    Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

9. I felt that it was hard to get help when I had a question.

    Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

10. I did not feel a spirit of community of learning.

    Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

11. I felt that I received timely feedback.

    Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

12. I felt that the course was like a family.

Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

13. I felt uneasy exposing gaps in my understanding.

Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

14. I felt isolated in the course.

Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

15. I felt reluctant to speak openly.

Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

16. I trusted others in the course.

A lot ☐   Quite a lot ☐   Fairly ☐   A little ☐   Not at all ☐

17. I felt that the course resulted in only modest learning.

Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

18. I felt that I could rely on others in the course.

Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

19. I felt that other students did not help me learn.

Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

20. I felt that members of the course depended on me.

A lot ☐   Quite a lot ☐   Fairly ☐   A little ☐   Not at all ☐

21. I felt that I was given ample opportunities to learn.

Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

22. I felt uncertain about others in the course.

Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

23. I felt that my educational needs were not being met.

Strongly Agree ☐   Agree ☐   Neutral ☐   Disagree ☐   Strongly Disagree ☐

24. I felt confident that others would support me.

Very confident ☐   Fairly confident ☐   Confident ☐   Not confident ☐   Not confident at all ☐

25. I felt that the course did not promote a desire to learn.

Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

26. How rewarding was the course to you?

    Not at all ☐   A Little ☐   Fairly ☐   Quite a lot ☐   A lot ☐

27. How was your level of computer competence when you started the course?

    Weak ☐   Average ☐   Fairly Good ☐   Good ☐   Excellent ☐

28. How did you find interaction with the course facilitator?

    Not helpful ☐   Not very helpful ☐   Helpful ☐   Fairly helpful ☐   Very helpful ☐

29. Did you find group work rewarding?

    Not at all ☐   A Little ☐   Fairly ☐   Quite a lot ☐   A lot ☐

30. Did the use of peer reviews help you understand the course better?

    A lot ☐   Quite a lot ☐   Fairly ☐   A little ☐   Not at all ☐

31. Did you ever feel helpless when working on your own?

    Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

32. Did you ever discuss the challenges you faced in the course with your peers?

    Very Often ☐   Fairly Often ☐   Sometimes ☐   Almost never ☐   Never ☐

33. Did you find grasp of the course content easy?

    Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

34. Have the skills gained in the course improved your professional performance?

    Not at all ☐   A Little ☐   Fairly ☐   Quite a lot ☐   Very much ☐

35. Was the technology reliable?

    Never ☐   Almost never ☐   Sometimes ☐   Fairly Often ☐   Very Often ☐

Appendix E: Email interviews with students.

(The questions will provide for prompting in order to clarify areas that may seem murky and the interviews will be 1 hour long.)

1)   What were your expectations of this course when you started it?

2)   Does the course meet your learning needs?

3)   Does the course address your work related needs?

4)   What was your level of computer competence when you started the course?

5)   Were you assisted in learning how to use the KEWL programme by your course facilitator before starting the programme?

6)   Do you find interaction with the course facilitator rewarding?

7)   What is your view of your interaction with other learners?

8)   Does the course support provide opportunities for independent learning?

9)   Is the course structured in such a way that knowledge scaffolding and ease of understanding is facilitated?

10)   Are course materials readily available or accessible?

11)   Is the technology reliable?

12)   Do you find grasp of the course content easy?

13)   What is your perception of the quality of the course projects?

14)   Are your course grades gratifying?

Life-World Questions

1)   Where did you live before coming to the city?

2)   Do you have a family of your own?

3)   How does enrolling for this course affect your personal liberties and family life?

4)   What is your position at work?

5)   How long have you served in this capacity?

6)   Do you think this course will add value to your professional life?

7)   How will this course provide opportunities for your personal growth?

Appendix F: Expert Review Questions for the Course Facilitator

1. When was this course started at UB?

2. UB mostly uses WebCT for online learning, why did you choose KEWL instead?

3. What are the advantages of using KEWL in this course?

4. What were your expectations when you started the course?

5. How do you help your learners at the start of the course to get acquainted with the KEWL programme?

6. What is your view of your interaction with your learners?

7. What course support do you provide to the learners?

8. How does the course facilitate scaffolding of knowledge?

9. How does the course facilitate improved epistemic agency in the learners?

10. What resource limitations do you have in facilitating this course?

11. Are there ways in which you would want to see the administration of the course improved?

12. Are there any cultural problems arising from using online learning especially to a multi cultural learner community?

Appendix G: Expert Review questions for University of Botswana, Director of e-Learning

(These questions seek to place the research in the SADC and Botswana context to provide trends that could be used in providing improved online learning programmes that are specific and end user responsive.)

1. When was the UBel started?

2. What were its objectives?

3. What is the link between UBel and Vision 2016 ICT policy on education for development?

4. What percentage of UB students is enrolled in online learning?

5. What percentage of UB courses is online?

6. What is the current learner computer ratio at UB?

7. How do you view lecturers and learners perceptions of and attitude to online learning?

8. Are there any technological problems or manpower problems that UB faces in rolling out online learning?

9. Does UB have network support with other universities for growth on online learning research?

10. How are online learning and the use of ICTs envisaged to help UB become 'a centre of excellence' both locally and internationally?

11. Africa is riddled with the problem of weak telecommunications network, weak electricity grids and low bandwidth; how does UB overcome these problems in providing online learning?

12. What is the future of online learning at UB?

13. Does the Botswana culture provide any challenges to effective and efficient online learning programmes?