UNIVERSITY OF KWAZULU-NATAL

INVESTIGATION OF THE USE OF LEARNING MANAGEMENT SYSTEMS IN EDUCATIONAL TECHNOLOGY MODULES: A CASE STUDY

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Investigation of the use of a Learning management systems in postgraduate educational technology modules: A Case study

by

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Declaration of Originality

I, Mafata Paul Mafata declare that this research report entitled “investigation into the utility of the Learning Management System in postgraduate Educational Technology modules: a case study, is my own work, and that all sources I have quoted or used have been acknowledged.

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As the candidate's Supervisor I agree/do not agree to the submission of this thesis.

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Signature: ……Date……

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Dedication

This dissertation is dedicated to my wife: Mrs. ‘Marethabile Mary Mafata and our Children: Ms Rethabile Peggy Mafata, Mr Ramofate Laetus Mafata and my Nephew; Thato Emmanuel Mafata, who took all the responsibility to look after my children, the property and the house; while myself and the wife were away from home for studying, for their unestimatable support, encouragement, sacrifices and giving me the chance and time to complete this research project. My relatives and friends for their understanding, concerns and words of encouragement while compiling this report.

Abstract

Studies (Alavi, 2000, Conole, 2004, Birch & Burnett, 2009,) reveal that technology has been capable of enhancing teaching and learning in various contexts. It is within such a context that this study investigated the utility of Learning Management System (LMS) in postgraduate teaching and learning at the Faculty of Education in the South African university. My focus was the experiences of both academic staff and postgraduate students in relation to the learning opportunities and challenges accompanying LMS as used as a teaching and learning platform.

This study employed a mixed methods approach (a combination of quantitative and qualitative approaches), which was implemented in two phases, following a sequential order (Tashakkori & Teddlie, 2003). In phase one, a quantitative approach was employed. This approach engaged students in completing a questionnaire that comprised of close and open-ended questions. Furthermore, simple random sampling was applied to select the respondents for data production in this phase.

In the second phase a qualitative approach, concerned itself with the production of in-depth data). The sub-sample of the population from the questionnaire was used in the focus group and individual interviews with educational technology students. All those participants whose responses spoke better to the critical questions were selected. Three academics were selected for individual interviews. Convenience purposive sampling (Henning, 2004) was applied for the selection of the participants in this level. Non-participatory observation was applied for triangulation purposes.

In terms of analysis, thematic analysis was used (Aronson 1994), with charts and statistics representing quantitative data and texts representing qualitative data. By means of guided analysis, research findings were interpreted (Hammonds, 1976). In order to discuss all these findings, the principle of construct-connect theory (Gagnon & Collay, 2000: Siemens: 2004) was used.

The results revealed that both selected academics and postgraduate students knew the capabilities and challenges of the LMS. The implications of these capabilities and challenges for teaching and learning were discussed. The research concluded with a set of recommendations to ensure, the effective use of Learning Management System to support teaching and learning in the postgraduate sector.

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CHAPTER ONE

INTRODUCTION

1.1 **Introduction**

Many organizations, including universities, are currently engaging in the establishment and setting up of technological infrastructures (Hall, 2003). These structures are designed to facilitate a smooth innovation of technology for effective and efficient managerial purposes. It is in this context that access to updated information becomes the major priority. Higher education institutions in particular are also making huge investments in the establishment and development of supportive infrastructures for the innovation and integration of educational technology in teaching and learning. This is geared towards enhancing the quality of education (Conole, 2009). This study explores how a type of technology a Learning Management System, is being utilized in postgraduate teaching and learning.

1.2 **Purpose of the study**

The purpose of this study was to investigate the use of a Learning Management System (LMS) in postgraduate Educational Technology modules at a South African University.

1.3 **The problem statement**

Even though technology is transforming education and provides access to a wealth of resources and new forms of communication and virtual learning environments (Conole, 2009), some of the postgraduate modules in which the researcher was engaged did not integrate LMS as a teaching and learning platform. This technology presents a large bundle of pedagogical resources that could be accessible to students 24 hours so that they could work in their own time. The pertinent question is; why would one not utilize this technology to enhance teaching and learning in a training institution of higher learning?

1.4 **Rationale for the Study**

Educational Technology modules (through the utility of LMS) exposed the researcher to a wide scope of online resources, both at national and international levels. The researcher visited different sites via hyperlinks and interacted with colleagues for relevant information to compile the required portfolios. Wiburg (2003) argues that the integration of LMS in teaching and

learning is associated with several learning opportunities, such as enhancing students' critical thinking and problem-solving skills development. It is for this reason that the South African government proposed changes such as Outcome Based Education (OBE) to the education systems. OBE was seen as having a potential to encourage student-centered instruction, which is inclusive: the education for all (Asmal, 1995). Moreover, Nind, Sheehy and Simmons (2003) emphasize that equal opportunities are at the heart of inclusion which meets people's individual needs and celebrates individual strengths. Under these circumstances, Students learn at their own space and pace, and there is more learner-engagement with this idea in place.

The developed South African educational system is an attempt to empower and equip the citizens of this country with valuable life skills applicable for job opportunities (Asmal, 1995). For example, Educational Technology makes it possible for the visually impaired to learn through the use of software packages such as Jaws and Braille. It is in this context that higher education institutions were urged to improve the quality of education through the integration of technology, such as LMS in the educational curriculum. The rationale is that technology would promote students' critical thinking skills through its constructivist learning (Asmal, 1995). With this technology in practice, students could engage and interact fully with content, resulting in active learning. Furthermore, an increasing demand for educational services by all the members of the society could be easily addressed by integrating technology, such as LMS in teaching and learning because it allows for self-directed learning and attends to the needs of a bigger learner population (Birch & Burnett, 2009). With this technology in practice, the construction of new and bigger classrooms is no longer essential because people can learn independently and at their own pace. Transport costs for learners would also be minimized, if not at all eliminated (Woodill, 2007).

1.5 **Objectives of the Study**

The objective of this study was to explore the use of LMS in the Educational Technology discipline. LMS could be used to improve teaching and learning, if used as a teaching and learning platform (Bates, 2006). E-learning resources have those features of promoting constructivist learning (Birch & Burnett, 2009). Students could learn better from collaborations with peers and physical engagement with learning content. The features of LMS for student

support include, among other things, chat rooms, discussion forums and emails. All of these have potential to facilitate communication amongst students (Hall, 2003). It is within this context that learners could interact to share learning resources.

All of these positive aspects of LMS motivated the study to understand, and hence improve if necessary: the teaching and learning using LMS, explore the full potential of LMS. The aim is to access to learning that would expand educational and employment opportunities for the historically disadvantaged and support social transformation and redress (Makgoba, 2007).

1.6 **Review of related literature**

This section presents the review of literature based on the utility of LMS in teaching and learning. It gives the findings of other studies and describes their findings about the potential and challenges of this technology. The section also provides a definition of a Learning Management System and its evolution.

1.6.1. **Defining a Learning Management System**

Olufemi (2007) defines LMS as application software that allows content management, knowledge sharing, information gathering and redistribution, as well as opportunities for collaborative activities within educational enterprise. In Educational Technology; a broad term to signify the use of technology in teaching and learning (Birch & Burnett, 2009); instructional materials may include overhead projectors, transparencies, Internet for e-learning in the virtual classrooms, newspapers and worksheets (Birch & Burnett, 2009). In the technology-rich environment; peer learning, social interaction and constructivist learning are highly motivated (Birch & Burnett, 2009). Students are able to share knowledge online for academic purpose.

1.7. **The evolution of Learning Management System**

Woodill (2007) highlights that LMS has evolved from simplistic limitations of school-based control systems to more elaborate enterprise that allows for various ways to track and facilitate learning. There has been a paradigm shift of a learner management system to a learning management system that now facilitates constructivist learning (with adequate student participation). A single facilitator can handle a larger number of learners, something that could

not be possible within a traditional face-to-face instruction. Within the context of the utilization of this LMS, rather than retrenching staff, the institution can increase the number of students without having to employ additional staff (Van Merrienboer & Koper, 2004). This technology, furthermore, may bring along some learning alternatives, such as distance education, which could as well cater for diverse student population with a capacity to display different learning styles.

Alavi's (2000) and Wagner's (2005) studies, furthermore, indicated that the use of LMS can improve teaching and learning in a number of ways, including but not limited to improved interactive learning environments, and students' accountability. However, Wagner's (2005) study did not employ questionnaire, which is thought to be a little representative of people's opinions. As already indicated, the researcher also agrees with these authors that LMS can improve teaching and learning. This technology is capable of presenting abundant resources for learning. In both studies, nothing was mentioned about the challenges that could hinder the adoption and integration of educational technology components in teaching and learning. It is on these bases that further research was required around these issues. This particular study explored literature to discover more about the benefits and challenges accompanying the integration of LMS in teaching and learning. The researcher's interests were concerned about the utility of the LMS at the postgraduate education and the integration of this technology in teaching and learning in the Bachelor of Education -Honours modules.

In contrast to the benefits, literature indicates that the utility, adoption and integration of educational technology components (e.g. LMS) face a number of challenges (Birch & Burnett, 2009). Pedagogical concern, institutional factors and individual barriers constitute such challenges. Furthermore, Aggarwal (2000) points out that users' negative attitudes towards technology, financial constraints in some contexts, a lack of technical skills for educators and students, network error, and a lack of managerial support towards innovations of this nature, have been the major hindrances to the use of this technology in teaching and learning. In some cases, the institution managers exclude technology plans from their annual financial budgets, and this unfortunately prohibits the expansion of technological infrastructure (Fiore, 2008).

1.8 **Theoretical Framework**

Construct-Connect theory, Constructivism theory (Gagnon, & Collay, 2000) and Connectivism theory (Siemens, 2004) constitute the framework for this study. The two theories match the information access and construction of knowledge and meanings in the digital (information) age of educational technology. These correlate with the use of LMS because they promote social and constructivist learning (Woodill, 2007). It is on these grounds that these theories were relevant to this study. The principles of this new theory are discussed in Chapter 3, and are thus explored further there. Yang (2008) explains that constructivist learning theories are becoming widely accepted in all fields of education, including the application of technology in educational technology. This is because e-learning has shown an outstanding potential to providing an interactive environment that creates effective means for implementing constructivist strategies that would be difficult to accomplish in other media. It is against this background that the study asks: How do the individuals share their thoughts, feelings, and experiences in the virtual learning environments?

1.9 **Key research questions**

- **What are the experiences of the users of the Learning Management System as a teaching and learning platform?**
- **What are the challenges facing users of the Learning Management System for teaching and learning?**
- **How can the Learning Management System improve teaching and learning of Bachelor of Education Honours modules at the Faculty of Education?**

1.9.1 **Research design and methodology**

The study employed a mixed methods approach (a combination of qualitative and quantitative approaches). This method was also discussed by Creswell (1997). McMillan and Schumacher (2006) argue that, with mixed-method designs, researchers are not limited to using techniques associated with the traditional designs, namely: quantitative or qualitative. This study employed explanatory designs with the mixed-methods which were applied sequentially. There were two levels of data collection: the first level involved the administering of a questionnaire to generate data from twenty B.Ed Honours students, the second level (qualitative approach) used focus group interviews, individual interviews and non-participation observation. Four students

constituted a focus group for the production of qualitative data. Three academics and two students participated in individual interviews (two times). Finally, educational technology lectures were observed (three times) using non-participatory observation.

1.9.2 *Context and Sampling*

Sample population: The study engaged the academics and students of the Faculty of Education who were involved in postgraduate Educational Technology modules. *Sample size*: the number of participants depended on the type of method used because their sample sizes differed (Maree, 2007)).

1.9.3 *Methods of Data Collection*

Lauer (2006) defines methods of data collection as tools that researchers use to gather data in an empirical study. The most commonly used instruments in educational research include tests, questionnaires, surveys, interviews and observations. McMillan and Schumacher (2006) argue that poorly designed and incorrectly implemented instruments often negatively affect the results of the research. Poorly designed methods of data collection, for example, might not be able to generate relevant data that answer the critical questions. It is for this reason that researchers should to be very careful when designing research instruments. This study employed the following methods: questionnaires for the production of baseline information that enabled and guided the researcher's decision in selecting interview sample (McMillan & Schumacher, 2006), focus groups interview and semi-structured interviews to generate thick data from the students and the academics by probing into their understandings of LMS utility in teaching and learning (Koshy, 2005), and non-participation observation to collect data on the interactions of students with computers (utilizing LMS) under their normal behaviors in the natural setting (Mertens & McLaughlin, 2004).

1.9.4 *Data Analysis/Interpretation*

The analysis of data encompasses the breaking up of complex data into manageable themes, patterns, trends and relationships (Mouton, 2001). This research stage was concerned with the construction of meanings from the collected data. Thematic analysis (Aronson, 1994) was applied in this study, and similarly, Koshy (2005) suggests that a researcher needs to revisit the

aims and expectations of the project before unpacking filed data. This assisted the researcher in this study with placing responses into categories. The principle of construct-connect theory was used in this research stage to guide the analysis, discussions and support for the claims and arguments that emerged out of the research findings. This is guided analysis.

1.9.5 *Ensuring trustworthiness of the study*

With regard to achieving credibility, the study triangulated sources and methods of data collection. Five interviews were tape recorded, transcribed and transcripts were confirmed with the participants (member checking) at the later stage (Oka & Shaw, 2000). Oka and Shaw (2000) argue that another way to improve the credibility of qualitative research is to allow a peer who is a professional outside the context, but has some general understanding of the study, to analyze materials, test working hypotheses and emerging designs, and listen to the ideas and concerns raised in the study. With regard to peer debriefing**,** one lecturer was requested to evaluate the methodology used in this study and to match the claims made in the study against its implementation strategies. Validity issues were taken care of when the researcher test-piloted the questionnaire with one of the postgraduate students to eliminate any ambiguity (Blanche & Durham, 2002).

1.9.6 *Ethical issues*

Ethical issues encompass all the steps, efforts and precautions that researchers carefully take into consideration to protect the research participants while interacting with them for data collection, and are largely observed in educational research (McMillan & Schumacher, 2006). A credible research design involves the selection of informants, effective research strategies and also adheres to research ethics. The researcher obtained permission from the Dean of the Faculty of Education to conduct research amongst its students and academic population. The participants were told that the data would be stored in a securely locked University cup-board for a maximum period of five years, after which such documents would be destroyed.

10. **The structure of the study**

The next chapters provide detailed information about how this study is structured. Chapter two reviews literature, which also highlights some of the pedagogical benefits and challenges.

Chapter three discusses the framework that guided the researcher's inquiry in this study. The chapter states and explains the principles of theory used for guiding the researcher in analyzing and interpreting the findings of the study. Chapter four explains the methodology that the researcher employed in the study. It discusses the implementation strategies of this methodology, the methods used (highlighting their advantages and some challenges), ways applied to ensure validity, reliability and trustworthiness, and a brief explanation on how data were analyzed and interpreted**.** This chapter gives some ethical procedures that the researcher followed in order to collect the data. In chapter five, the researcher interprets and discusses the research findings. The discussion includes the incorporation of the framework discussion in chapter three to make sense of the data, assessing how the findings answered the critical questions, while chapter six concludes the study by providing its summary, making conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 **Introduction**

The dynamic world initiates the innovations of technological strategies which as part of the attempt to supplement and improve the quality of education for people to be able to cope with challenges that they encounter in their everyday lives (Macnaghten, 2005). These technological strategies present a set of skills for students. These include: problem-solving and critical thinking skills to be able to critique, retrieve, access and utilize any piece of information meaningfully. Some higher education institutions are currently incorporating open source software programs for interactive teaching and learning in the virtual classrooms (Conole, 2004). Some examples of open source software programs include Learning Management Systems. This chapter explores the related literature and the experiences of other scholars on the capabilities and challenges faced by the implementers of Learning Management System (LMS) in teaching and learning. These involve traditional face-to-face learning, blended learning, virtual classrooms and distance learning. The key issues discussed in this section involve the definition of a Learning Management System, its evolution, integrating LMS in virtual learning environments, pedagogical promises of learning online, possible barriers to the adoption and integrating of educational technology, and the criticisms against the use of media in teaching and learning.

2.2. **Defining a Learning Management System**

Olufemi (2007) defines a Learning Management System as application software that allows content management, knowledge sharing, information gathering and redistribution, and opportunities for collaborative activities within educational enterprise. With the help of LMS while instructors are able to manage the content delivered to students online, students are able to share knowledge online for academic purposes. In simple terms, the LMS is a term used to define all strategies developed to help to achieve learning outcomes in virtual communities. These include the use of overhead projectors, whiteboards, smart boards, Internet, videos, newspapers, worksheets, charts and posters (Birch & Burnett, 2009). Furthermore, Barron and Rikelman (2002) argue that this technology provides the necessary tools for managing, creating, scheduling, training and learning in an organization. LMS typically assists in managing both classroom and online learning (also referred to as e-learning). Some learning management

systems often manage classroom learning alone or e-learning as in virtual classrooms. However, it is also important to point out that the manner in which the course is delivered using the LMS depends on the course instructor. In their work, Olufemi (2007), Barron and Rikelman (2002) agree with one another about the explanation of LMS. However, their explanation is silent on the experiences of the users of this technology. This is the reason there is a need to research on the experiences of its users. Lynch (2007) defines virtual classrooms as those institutions that do not have physical campus, but still allow people to receive the same diploma as one would obtain from taking all the courses at the campus. The instructional delivery method is learning management system. Its chat rooms, discussion forums and email tools facilitate online learning. The institutions may offer all their courses completely online, with instructors and administrative staff working from their homes or small business offices. Maximum participation is crucial.

2.3. **The evolution of Learning Management Systems**

Woodill (2007) highlights that Learning Management Systems have evolved from simplistic limitations of school-based control systems, to more elaborate enterprise that allows for a variety of ways to track and facilitate learning, even virtual communities. There has been a paradigm shift of a learner management system to a learning management system that now facilitates constructivist learning (with adequate student participation and social interaction). Woodill (2007) argues that, as long as there is a demand for online tracking and reporting of courses, assessments, and achievements within large organizations, there is a high possibility that the demand for some form of learning management systems will always exist. Broadbent (2002) does not mention a technological paradigm shift, but indicates that LMS has been, and is continuously, being designed by a community of teachers to address students' demands in virtual communities. A group of virtual facilitators come together with a purpose to share what could be good for their students, design and develop relevant content to achieve and meet the needs of a community of students. Tools for online teaching, furthermore, include course builder, syllabus, discussion forum, chat rooms, announcement files, grade book, and the calendar. In addition to these tools, administrative details such as logins, emails and lists are put in place. It could be argued that the integration of LMS in teaching and learning sets a platform for constructivist learning by placing the learner at the centre.

The additional reason for the development of LMS is that, it plays a major role in disciplines such as Educational Technology. Such courses are also offered online (virtual classrooms), in blended learning (combination of e-learning and face-to-face teaching), traditional face-to-face learning (teaching in the physical campus) and distance learning- technology mediated-teaching and learning in which physical campus are of less significance (Birch & Burnett, 2009). Educational Technology, also known as, instructional technology, refers to the use of technology to support learning processes. This is concerned with technology that may influence the learning process, delivering learning materials, facilitating communication and providing assessment and feedback in the technology mediated e-learning environment (Birch & Burnett, 2009). LMS provides support for e-learning, and this may provide training, education, coaching and delivery of information through digital means (Broadbent, 2002). It is normally practiced through a network or the Internet. In some organizations, personal computers are used to facilitate e-learning. Digital assistants (PDAs) and other devices are increasingly being used. E-learning further includes multimedia CBT and other forms of technology-assisted learning. In the same way, LMS is an internet-based medium which requires network in order to function. Academic resources are made available online for learners to retrieve them any time, anywhere, and this is done at their own pace. Multimedia refers to a type of technology in which images, audios and videos are incorporated in the content to enhance learning (Broadbent, 2002). This instruction can enable students to learn through seeing and hearing. In other words, it can be concluded that this technology caters for different learning styles a diverse population of learners bring to the classroom. The integration of LMS in teaching and learning has the potential to provide audios, pictures and animations which may also address a group of learners with unique learning styles (Birch & Burnett, 2009).

2.4. **Integrating LMS in Virtual Learning Environments**

In order for any new innovation to function successfully, there are some steps that the implementers of such policy need to put in place. The same idea is applicable with the users of LMS in virtual classrooms.

According to Burrell-Ihlow (2006), the instructor is advised to refer and follow the Instructional System Design ADDIE model while designing online content. The model is interpreted as

follows; A: analyze: identify a student performance deficiency (training intervention), D: design: write down performance objectives sequencing content, selecting Instructional methods, D: development: creation of instructional materials, I: implementation: installation and maintenance of instructional materials, and E: evaluation: assess the strengths and weaknesses of a newly implemented plan. The explanation provided is that students are likely to develop positive attitude towards online learning because steps are sequentially written for easy understanding

Blignaut and Trollip's (2003) study addressed the issue of instructor "presence" in online discussions. They employed a survey with experienced online instructors and school administrators. They developed and validated the taxonomy of types of instructor postings, and then developed a set of expectations with respect to the type and frequency of feedback messages that learners could expect during a course. They analyzed how well four graduate business online courses met a set of expectations. The research findings provided a powerful tool for stimulating discussion in a faculty development. It is suggested that the availability of the instructors online is essential for students' support in the virtual classrooms. It is their belief that both quality and quantity of participation should be addressed in the faculty development to ensure that learners are satisfied with their online experiences. However, in some training institutions, instructors and students may be willing to participate, but the problem remains with the administrators who hide their heads in the sand and pretend that technology does not exist in their community (Broadbent, 2002). Such administrators may not see the need to include technological development plans as they draw up faculty financial budgets. In this way, the expansion of technological infrastructure is being hindered for optimal faculty participation. Shelly *et al* (2004) argue that in many cases, changes are accompanied by barriers. Any newly implemented technology may not be accepted or adopted by the administrators of certain organizations if its benefits are not explicitly pointed out. In some cases managers' input has played a significant role towards a failure of the innovation of new technology. These managers intentionally ignore the value of technology in teaching and learning by excluding technology plans from their annual school budgets (Broadbent, 2002). If well planned for, every training institution would be able to gradually expand its technological infrastructure to support a sustainable faculty involvement. Again, high-capacity servers and connection lines may need to be purchased and the learning management software will also need to be installed and configured. This suggests that older courseware may

need to be retrofitted to interface with the learning management system. Moreover, Shelly *et al* (2004) argue that technology placement in remote locations can make access difficult because the communities here are experiencing budget constraints and a basic resistance to change by many educators. There are barriers facing the use of learning management systems in teaching and learning.

One of the approaches in using LMS involves more active group learning, participation and activities lessening the roles of the tutor to a "mere" guide (Olufemi, 2007). It is in this context that software designer will have to add features that will promote more interactivity and freedom for learners to choose between alternatives and what to learn, scope of learning and schedule activities according to convenience, and this is why this approach is regarded as learning more towards 3A learning (learning Anywhere, Anytime and At learner pace) which is referred to as learning at convenience, time and pace (Olufemi, 2007). Historically, learners depended most on what teachers had to say during lessons. This did not promote any active learning because of reduced learner participation. Chang (2007) supports Olufemi's (2007) idea in arguing that the inclusion of technology such as LMS in teaching and learning produces learners who are self-directive, active and explorative. Students become responsible for their learning by identifying and interacting with a variety of technologies and teammates to construct and discover their own knowledge. The integration of LMS represents a different way of addressing learning.

2.5. **Pedagogical promises of learning online / integrating technology in teaching and learning**

A number of scholars such as (Broadbent: 2002; Blignaut & Trollip, 2003; Birch & Burnett, 2009 and Olufemi, 2007 etc) have shared their experiences on the use of LMS in Web-Based teaching and learning.

Olufemi (2007) perceives Learning Management Systems as virtual learning environments where course activities are carried out. The LMS becomes a contact between the course provider and the participants. In other words, it is a meeting place which permits freedom for students to come at their convenient time to perform roles on a course with interventions of learning, sharing knowledge and information. Chan, Tan and Tan (2000) explain that in virtual classrooms, the

physical delivery of lessons does not depend only on the teaching techniques chosen by the instructor, but also very much on the technologies used to deliver the teaching materials. With the increasing use of virtual classrooms, technologies have become a critical component affecting teaching and learning effectiveness. Peer interaction and knowledge sharing have been highly motivated. Olufemi's (2007) report however, differs from Chan, Tan and Tan's (2000) report. Olufemi states that virtual learning is a description of learning activities that take place in the virtual learning environments. Olufemi sees virtual learning as a departure from another face-to-face learning as all participants on a course do not need to see one another physically (eye-to-eye) before learning could take place. It could mean another concept, principle or a philosophy in education. This study agrees with the points that the above scholars raise because this is what the researcher has experienced in the discipline of Educational Technology.

In his study, Alavi (2000) wanted to go beyond the traditional classroom instruction to develop and evaluate computer-supported pedagogical approaches (integration of LMS in virtual classrooms) with the undergraduate students. The study investigated whether the use of group discussion support system (GDSS) in a collaborative learning process could enhance student learning and evaluation of classroom experiences. The findings of the study indicated that GDSS-supported collaborative learning leads to higher levels of perceived skill development, self-reported learning and evaluation. Students develop initiatives for their own learning through which they can confidently report their own discovery of knowledge. Alavi (2000) further argues that learning and educational effectiveness at all levels have become a significant national issue during the last decade, and that the national commission and scholarly reports on the status of contempory higher education have criticized the pedagogical approaches that focus on conveying fixed bodies of information and view learners as recipients of knowledge. Alavi (2000) suggests that the integration of technology such as LMS in teaching and learning is unquestionably capable of introducing constructivist (active) learning, and this facilitates the process in which students construct their own meanings.

According to Alavi (2000), in many colleges and universities, the most apparent need is to change the emphasis of instruction away from transmitting fixed bodies of information toward preparing students to engage in continuing acquisition of knowledge and understanding. This

suggests that the instructors should design and develop such learning content which promote student's engagement. In terms of pedagogy, Alavi (2000) states that the preparation for continuous learning implies a shift toward more active forms of instructions, including the use of LMS in teaching and learning. This can further enhance self-directed learning on the side of the student.

Wagner's (2005) study, furthermore, investigated the effect of LMS use on individual learning in a University environment. A case study (using qualitative approach) was conducted to collect data from some of the undergraduate students. It was believed that LMS and other forms of technology were relatively new knowledge sharing technology in the undergraduate teaching and learning (a hypothesis). Students were interviewed on their understandings and experiences on the potential of LMS integration in teaching and learning. The findings of the study indicated that the inclusion of LMS in education could promote constructivist learning, provide reinforcement and increased accountability on the part of a student. The student discovers information and is responsible for applying this knowledge to every day life, using the information to solve problems that may arise in the society. The results also indicated that LMS could be a significant predictor of achieving the learning outcomes, while traditional coursework was not. According to Koshy (2005), interviews are suitable tools for tapping on to people's opinions. However, Wagner (2005) did not disclose how he triangulated the information for maintaining the credibility of the study. One would think that the incorporation of observation would also be appropriate to collect a convincing picture in the natural settings. Some writers, such as Maree (2007), believe that observations are relevant for triangulation purposes. According to Wagner (2005), LMS appears to have the highest predictive power for high and low performing students, but much less predictive value for medium performers. This finding seems to imply that it is easy for the instructor to assess the aptitude abilities of the learners through the utilization of LMS.

These results; suggest that further research is required to explore the learning benefits that LMS provides for effective communication as a teaching and learning platform. Several studies (Alavi, 2000, & Wagner, 2005) have shown that the integration of LMS bears a positive contribution to teaching and learning because it provides an effective communication and full utilization of

resources by the learners. My personal experience with LMS in postgraduate education also proves that this technology is important in teaching and learning. Further research is needed to explore these issues in detail, with more users of LMS. This study's interest is on the utility of LMS in the postgraduate education; the integration of LMS in the teaching and learning of B.Ed Honours educational technology modules.

In his article "*E-learning: The hype and the Reality*," Conole (2004), argues that e-learning is capable of transforming education. It provides opportunities for learning anytime and anywhere. It provides access to a wealth of resources and new forms of communication and virtual communities. However, the reality is that e-learning is still marginal in the lives of most academics, with technology being utilized for little more than acting as content repository or for administrative purposes. There is now a wealth of digital resources and Information and Communication Technology (ICT) tools to support learning and teaching. The fundamental questions raised by Conole (2004) is;

- How can technologies be used to enhance learning? Furthermore: what are the technical, managerial and infrastructural requirements to develop effective learning environments?
- What protocols and standards are needed to ensure materials can be easily transferred between systems?
- How can one ensure accessibility and deal with copyright and plagiarism issues and what new pedagogical models are possible and what is their impact?

Conole (2004) explains that now there is a broader base of research which has expanded in part because of the impact of Internet and the methods in which it can be used to support learning and teaching, but also because of the increased use of different learning management environments and systems. There has been an expansion of research which explores the ways in which learning technologies can be used to backup communication and collaboration. Current research interests in learning technology can be grouped around three main themes: pedagogical, technical and organizational (Conole, 2004). The first theme is concerned with the pedagogy of e-learning, particularly, the development of effective models for implementation, mechanisms for embedding the understandings gained from learning theory into the design of learning technologies and their use in learning and teaching. The area also focuses on the guidelines and

good practice to support the development of e-learning skills, the literacy needs of tutors and students, understanding the nature and development of online communities (virtual communities) and different forms of communication and collaboration, different mechanism for delivering and increasing flexibility and modularization of learning opportunities and exploration of the impact of new emerging influences on learning (Conole, 2004). This also includes the instructional aspects such as understanding effective design principles and promulgating good practice in the design and development of materials, exploration of different models for online courses, cultural differences in the use of online courses, requirements in terms of tutor support needs, time investments, mechanisms for improving the student learning experiences and improving retentions rates.

The second area is research into the underpinning technology of e-learning, involving the development of the technical architecture to support different forms of learning and teaching, different mechanisms of monitoring and tracking activity online, exploration of the nature of different types of virtual presences, context sensitive, mobile and smart technologies and the hardware and software requirements (Conole, 2004). The third area of research issues is arising at organizational level, including effective strategies for integrating online courses within existing systems, development of organizational knowledge, new methods and processes for developing a learning organization, and for the seamless linking of different information processes and systems (Conole, 2004).

Beetham and Conole (2001) argue that e-learning research is important in a sense that technology now has a significant impact on institutions, impinging on both organizational structures and individual functions (administration, teaching and learning, and research). Secondly, the variety and complexity of new technologies and the potential ways in which they can be utilized is changing rapidly and little is understood about the affordances of different learning technologies. Moreover, more academics and support staff are now using technology routinely for teaching, administration and research. Senior management may need help in understanding the nature of e-learning to inform strategic decisions they are making in terms of thinking about how technologies impact on their business, or else there is a danger that they will make ill-informed and rash decisions based on scant evidence. Such results are evident in the

ways in which many institutions have chosen and implemented Virtual Learning Environments (VLE). For instance, in some cases institutions naively decreed that all courses must use the VLE without considering whether it was pedagogically appropriate or appreciating the associated staff development needs and time implications (Beetham &Conole, 2001). Moreover, Conole (2004) reveals that most institutions now have learning technology professionals within their support services and many offer e-learning masters programmes. Learning technologists are now recognized as an important breed of new professionals, ever providing a valuable institutional role spanning the technical and educational aspects of using technologies for learning.

Birch and Burnett (2009) explain that the global transformation of distance education is the function of the advancements in educational technologies. Learning technologies, such as LMS, with its chat rooms, discussion forums, emails and video conferencing, have placed enormous pressure on the distance education sector to operate beyond traditional correspondence modes and embrace an expanding e-learning environment. It is argued that without change, the sector will not be viable, particularly within the context of an increasingly competitive global distance education market. Furthermore, Van Merrienboer and Koper (2004) propose that technological change has been so extensive that traditional approaches to distance education are no longer adequate and fail to meet the needs of new distance learners. The argument is that the majority of educators within the developed countries now have extensive opportunities to develop and design interactive and engaging e-learning resources. This is as a result of desktop access to multimedia and the Internet, combined with access to a range of new social networking platforms (Van Merrienboer & Koper, 2004).

Figure 2.1 below is included to provide a better understanding of how online learning process occurs in the distance education sector:

Fig. 2.1 *Virtual student* (Acclaim Images 2009)

This picture gives an idea on how learning takes place outside physical and traditional classrooms. The student is actively engaged with instructional material for the construction of meanings (Conole, 2004). This idea supports the argument raised by Conole (2004) that e-learning is capable of transforming education. It is able to provide opportunities for learning anytime and anywhere. Birch and Burnett (2009) agree with Conole's (2004) argument, and further explain that the global transformation of distance education is the function of the advancements in educational technologies. The introduction of Learning Management Systems in the curriculum has resulted in the meaningful ways of learning because students are actively involved in the learning process in virtual environments. This claim is evident from Olufemi's (2007) work that further sees virtual learning as a departure from another face-to-face learning, as all participants on a course do not need to see one another physically (eye-to-eye) before learning could take place. Siemens (2004), the connectivist, furthermore, agrees that learning may occur from the interaction of people with non-human appliances, such as mobile phones and Internet. Conole, 2004: Siemens, 2004: Olufemi, 2007 and Birch & Burnett, 2009, seem to agree with one another that virtual classes are possible and meaningful.

Lammy (2009) indicates that students can post their questions to Lord Young, Minister for Students, directly via a new website. Lora Young may want to hear from students about their life at the university. The inclusion of virtual learning technologies may create a space for students to post questions and receive responses online. When listening to students; going on visits to the universities, the thing heard most is the need for better information, advice and guidance. Students are able to participate in the National Student Forums, and technology makes it easy for people to find online communities where they can hear from other's experiences. There are new resources developed for people over 21 who may be thinking about getting into higher education (Lammy, 2009). The contents include interactive map to help potential mature students find out about the options available at individual universities and colleges, videos of mature students' stories and link to mature student forum, so potential mature students can get their questions answered. Some feedback from listening visit implies that there could be more encouragement aimed at disability groups to get them into higher education (Kings College, 2008). Furthermore, Sherlock (2009) explains that the National Student Forum offers a chance for a very mixed group of students to reflect on the way higher education works, and to suggest ways

it could improve. The reason is that most services work better when they are designed in discussion with the people who use them, and therefore education is no different. Online discussions encourage maximum participation of the members of the group (virtual teams) on the matters that impact on them.

In their argument for the implementation of Learning Management System in teaching and learning, Barron and Rikelman (2002) indicate that LMS can manage any form of training, including online, on-the-job, and instructor-led. This enables organizations to offer an optimal composition of training methods, utilizing all the available resources fully. These authors do not disclose the role and experiences of both facilitators and the students in virtual classrooms. Contrary to this, Lynch (2004) argues that a key to any good course experience is the involvement of the faculty. Some institutions mistakenly believe that online learning can eliminate the use of faculty or completely cut out faculty from the teaching process. Literature suggests that effective teaching and learning through LMS can be achieved if faculty involvement is incorporated. In contrast to Barron and Rikelman's (2002) report, Lynch (2004) states that the instructor is still crucial to guiding students towards proper questions, research, problem-solving and further exploration in the field. The report argues that faculty expertise and mentoring are vital to a great online learning experience. This study agrees with Lynch's (2004) opinion that faculty contact in and out of class is of greatest importance to student motivation and involvement. The concern of faculty often helps students get through rough times, making it easier to carry on with their studies. Electronic conferencing, emails, discussion boards and chat rooms increase opportunities for conversations between students and their instructors.

In their article, Blignaut and Trollip (2005) disclose that factors such as ineffective course facilitation and insufficient communication contribute to unfulfilled promises of web-based learning. Students may consequently feel unmotivated. It is also revealed that the success rate increases when students meet or unite in virtual communities. Barron and Rikelman (2002), Lynch (2004), Blignaut and Trollip (2005) value faculty participation is necessary for students' satisfaction and motivation. However, their reports are not saying much about the barriers hindering faculty involvement. Singh (as cited in Piskurich, 2004) indicates that an effective asynchronous e-learner is a self-motivated and self-directed one. This is because asynchronous e-

learning typically requires extra motivation, persistence and perseverance, compared with instructor-led learning. Self-motivation and discipline are especially needed for courses or knowledge portals that do not offer a human facilitator or expert. The instructor can set learning goals and objectives and match those goals with the job requirements, opportunities and business objectives. The use of LMS is therefore important for blended learning.

Literature reveals that technology provides students with access to resources and expertise outside their own institutions (Conole, 2004). It provides wider social interaction (peer interaction) among diverse classmates and teachers. Students meet online, and share information on solving problems. They interact with their peers, teachers and experts from around the world (Tetiwat & Igbaria, 2000). In this way, students can gain knowledge from those who have previous experience with certain topics. Web-based education, furthermore, opens doors to a wider cross-cultural interaction between faculty and students from different cultures. Students may exchange and share information, ideas and elements of culture. Lynch (2004) agrees with Tetiwat and Igbaria's (2000) report and point out that course interactivity is the key to a quality online learning experience. The issue is: the more interactive the instruction, the more effective the learning outcome is likely to become. The key ingredients appear to be the availability of the instructor: whether through direct person-to-person contact or through electronic means and the intellectual engagement of the student, regardless of the method of engagement. Lynch (2004) further recommends the use of quizzes, short questions, simulations and examples to enhance interactivity with the content.

In many institutions of higher education, Learning Management Systems are incorporated for blended learning. This means the combination of the types of e-learning and also the combining of e-learning and conventional learning (Broadbent, 2002). The inclusion of LMS in education is hoped to supplement the face to face teaching. This presents a sort of blended learning. The advantages of blended learning include the improved utilization of available resources because it uses multiple ways through which learners can retrieve useful information or resources for learning. This technology uses several methods, such as collaboration software, web-based courses and knowledge management. It describes the learning that blends various event-based activities, including face-to-face classrooms, live e-learning, and self-paced learning. Broadbent

(2002) also emphasizes the need for netiquettes; the rules of conduct for online or Internet users, including instructors, facilitators and learners. In many cases such users are advised to utilize Internet primarily for academic purposes.

Learning Management System allow students to learn at their own pace. It is very helpful in a system in which there is tremendous diversity of educational backgrounds and differences in ages (Woodill, 2007). This is because different learners possess varying educational experiences, as well as different learning styles, which any instructional approach should be able to address for ideal learning. Lynch (2004) further indicates that some students learn visually, that is, they learn and understand the concept much better if they are making its picture. He argues that online materials contain more visual tools, requiring simple reading and graphic interpretations. However, Lynch (2004) explains that some of the instructors who incorporate LMS in education are dealing with a problem of parents and students who resist the introduction of innovative technology as a whole. Many people have negative beliefs on the potential of LMS in teaching and learning. Furthermore, Forsyth (2001) supports that technology and the methodology to use internet as a tool for the delivery of learning materials is evolving. It is at its infant stage and so many parents and students have not yet fully explored its capabilities in teaching and learning. Therefore this influences their attitudes, regardless of what it can achieve, enhancing students' tests scores as emerged in Foon's and Brush's (2007) report.

Aggarwal (2000) explains that students are free to use resources posted on the LMS because they are easy to access and there is no time constraint for learning with this type of technology. Within the South African context, this suggests that inexpensive resources, such as class notes posted on the net, can be used more effectively than in a traditional school system in which hardcopies dominate. The delivery of a university subject to its student population involves multiple ways of disseminating information. This encompasses the input and feedback from a number of accessible tasks throughout the semester and the written assignments still remain the basic unit of assessment for the vast majority of facilitators (Darbyshire as cited in Aggarwal, 2000). In the same way, Barron and Rikelman (2002) perceive LMSs as a standard communication tool for instructors, students and administrators. This includes the use of emails, bulletin boards, both of which may help organizations to centralize all training efforts, provide

competency management and efficient reporting. In other words, LMSs enable organizations to offer optimal composition of training methods. The members of the organization could collaborate for information. Equally, Norton and Wiburg (2003) argue that people's knowledge is reinvented as the result of their own interaction as in virtual classrooms, and all of which seem to be more informative for authentic learning. Students are likely to be co-opted into the instructional process, both as additional resources to assist their facilitators, as well as evaluators of junior students. LMS integration may be flexible because at any time the curricular specialists can gather data about students' performance on a particular test in some schools. It could be easy for such specialists to identify problematic areas which require immediate attention to promote active learning (Foon & Brush, 2007). Many instructors have been intrigued with the advantages of technology such as LMS to transform education and improve students' learning. This gives a valid reason for many governments who are currently trying their level best to establish technological plans to innovate ICT programs in their schools. According to Barron and Rikelman (2002), the advantages of LMS innovation in an organization include efficient management of resources by the users. In this context, managers and facilitators are able to assess learner profile, analyze skills and knowledge needed to be developed. Courses can now be recommended on the individual basis to fill in the gaps. In short, this system enables instructors and managers to perform assessments, approve training plans, and monitor status within a web environment.

The University of Sheffield (2008) conducted a study on virtual learning environments in Hispanic Studies. The project made innovative and effective use of ICT by producing an electronic learning environment to support student inquiries and enhance their learning experiences by stimulating them to engage confidently and critically with the electronic edition of Benito Pérez Galdós's novel Torquemada en la hoguera (1889). The project was built upon previous teaching of the novel by directly involving the students in the challenges presented by the study of Torquemada en la hoguera. It was intended to maximize the opportunities offered by research-led teaching and the interactive electronic edition, stimulating students to develop new ways of reading the literary texts and to work like researchers. Furthermore, it aimed to improve their skills in information literacy and collaborative learning. In their feedback, students revealed that technology really helped them get to grips with the detail of the novel, and helped them to

think about the issues. *"… I've got a lot more involved with the text. Skills I have learnt from studying this text will help with other books."* At the same time, Heller (2002) states that virtual classrooms are a set of group communities, tools, workspaces, and facilities that are constructed in software. They have been shown to increase collaborative team learning and student to faculty interaction over traditional classroom events. They have increased students' participation.

Pedagogical characteristics of LMSs are ideal for learning. Bean (2003) explains that LMS must show the following features for its optimal utilization and significance: high availability (accessible enough to serve diverse needs of thousands of learners, administrators, content builders and instructors) and scalability. The technological support infrastructure should be able to grow and expand to address the needs of the future growth, both in terms of the volume of instruction and the size of the student body. Usability has to do with the support of a host of automated and personalized services, such as self-paced and role-specific learning, the access, delivery and the presentation of material must be easy to use and highly intuitive, such as surfing the web). Interoperability has to do with supporting the content from different sources and multiple vendors' hardware or software solutions. The technology should be based on an open industry standards for web deployments and support the major learning standards. Stability is concerned with the infrastructure that can consistently and effectively manage a large enterprise implementation running 24 hours in a day). Security deals with selectively limiting and controlling access to online resources and functions. Only registered students of a given institute could access the contents posted on the LMS.

2.6 **Barriers to adoption and integration of technology in classrooms**

This section discusses possible hindrances facing the utility of technology to support constructivist learning in training institutions.

Despite the opportunities brought by the e-learning environments, the adoption and integration of educational technologies by academics across the tertiary sector has typically been slow (Birch & Burnett, 2009). A qualitative study was conducted at a regional Australian university, the university of Southern Queensland (USQ) to investigate factors influencing the manner in which academics adopt and integrate educational technology and ICT, and focused on the development

of e-leaning environments (Birch & Burnett, 2009). These e-learning environments include a range of multimodal learning objects and multiple representations of content that seek to cater for different learning styles and modal preferences, increase interaction, improve learning outcomes, provide a more inclusive and equitable curriculum and more closely reflect on the campus learning experiences (Birch & Burnett, 2009). Semi-structured interviews were employed for data collection. Fourteen academics (four pioneers, six early adopters and four non-adopters) and three instructional designers were interviewed. The analysis of the interviews transcripts was conducted with the help of NVivo 7 software. The research findings revealed that institutional barriers, individual inhibitors and pedagogical concerns were the major factors.

According to Birch and Sankey (2008), obstacles to academics' adoption and integration of educational technology include institutional barriers, which involve a lack of leadership, unclear vision and formal strategic planning, and the absence of clear institutional policies, processes and standards. The lack of careful analysis of the curriculum to determine priorities and failure to develop and implement a technology plan based on clearly defined goals has created a barrier to effective diffusion and integration of educational technologies (Covington, Petherbridge & Warren, 2005). Literature stresses that a lack of systems reliability, technological problems and malfunctions, including slow download times and bandwidth issues, are so frustrating for both academics and students (Eastman & Swift, 2001; Smith, 2001). Inadequate infrastructure to support the technology and lack of access to appropriate hardware and software also impede technology adoption and integration. Bonk (2001) adds a frequently cited reason for the non-adoption and non-integration of educational technology is a lack of specialized and on-going technical support. Failure to provide specialized training in both the use of the technology and understanding of how to effectively integrate it into the curriculum has impacted negatively on educational technology. The timing and source of the training to support technological initiatives must be appropriate, relevant, and specific to academics' needs and interests (Irani & Telg, 2002: McLean, 2005). Covington *et al* (2005) further support that a lack of mentors, role models and technology champions who are prepared to collaborate and share their experiences, conduct workshops and coach colleagues in the use of technology could hinder the rapid diffusion of educational technology. The findings of the study conducted by the University of Sheffield (2008) also revealed that the major barrier to adoption is costs. An activity-based costing system,

which identified the costs of designing and delivering individual courses, had deterred some academics from developing costly technology-mediated resources, and thus was perceived to have stifled innovation.

Another inhibitor (individual inhibitor) to the adoption of educational technology revolves around perceived lack of time and negative impact on academic workload (Schifter, 2000). The time needed for developing technology skills, implementing technology and maintaining the courseware is a major area of concern for the instructors. The need for constant updates, together with the developments and the maintenance of courses that involve Educational Technology, comprise an already time consuming activity. The findings of the study disclosed that early adopters and non-adopters had no time to experiment, share experiences with colleagues, adapt their content, and attend the requisite training. Moreover, Birch and Burnett (2009) indicate that an instructional designer explained that the development of multimedia elements within e-learning environments involves trial and error, and this requires more time. Betts (1998) emphasizes that the time it takes to adopt and effectively integrate educational technology impacts negatively on academics' workload. Some academics also lack the personal motivation to explore the potential of e-learning in their teaching and have thus failed to embrace the opportunity to access technology as a means of enhancing their teaching and to be seen to be innovative. The literature proposes that non-adopters of educational technology may be less adventurous, not willing to take any risk with technology, less comfortable with any possible change, less intrinsically motivated, and less likely try new and novel ideas (Jacobsen, 1998; Rogers, 1995). Fear of change, a lack of willingness to take risks, and lack of assurance about the benefits of technology have discouraged some academics from adopting the innovation. The study revealed that the adoption and the integration of educational technology depend upon technical capability and the existence of a set of required knowledge and skills (Birch & Burnett, 2009).

Birch and Burnett (2009) report that pedagogical concerns (motivations) that influenced academics' development of e-learning involved the need to cater for the learning needs of different students, including English second language and students with learning disability, the desire to improve student learning outcomes, retention and progression rates, and the need to

challenge students to become learner-centered, self-directed, resourceful and independent learners. Birch and Sankey (2008) mention that there is a need to replicate the aspects of the on campus experiences, engaging students in the learning experiences, revitalizing and re-energizing the curriculum, and providing a richer learning environment. The major emphasis that the above scholars raise is that the integration of educational technology is not just smooth. It is also faced by a number of barriers.

2.7. Criticisms against the use of media in learning

People have a diverse range of experiences on issues that arise in their communities. Not all scholars in this study understand LMS as a suitable platform for teaching and learning.

Despite the pedagogical advantages of LMS utility raised by a number of scholars, such as Birch & Burnett (2009) in this research project, Aedo (2002), for example, criticizes the use of media by pointing out that there is no evidence that free navigation is always the best strategy to support learning efficiency. Aedo argues that the developers of hypermedia or web content /online resources consider the target users as homogenous population whose specific needs have to be addressed with a similar strategy. However, he has not disclosed how this conclusion was reached (the study, the purpose, methodology used). Furthermore, Aedo (2002) argues that hypermedia and web are not mature learning tools and suggests that there is still much to be explored. Aedo (2002) agrees with Clark's (1994) argument, and critiques the integration of media in teaching and learning, stating that media will never influence learning in any way. This researcher, however, does not see media as an instructional platform to present interactive tasks that could encourage active learner participation. Clark (1994) has not mentioned the source of the argument and does not give another option or alternative for facilitating lectures in the virtual learning environment. In addition to the raised criticisms, Lynch (2002) further mentions that another major challenge facing the users of LMS to facilitating virtual learning is a lack of suitable online activities, competency skills, and technological facilities for handling a diverse population of students on a web-based education.

Furthermore, FeedBurner (2008) argues that the only problem of virtual students is that they feel isolated and alone in their quest. Studying at home, often late at night, is a solitary activity,

particularly for those people who enjoy the energy of social interactions. It is significant to understand that online study usually lacks a lot of personal social contact. It may be argued, however, that some people may miss the sound of the human voice; those who feel most connected to others by body language and vocal factors would find virtual learning environments impersonal. The logic is that distance learning students do not have to spend time in physical classes listening to the facilitators, so they spend the time on other work, and that can make distance learning courses even more work-intensive than on-campus counterparts (FeedBurner, 2008). Another challenge is that schools may have not quite figured out how to make their virtual classrooms match (real classes) variety of their students' learning styles, especially for visual and auditory learners who need the presence of images and spoken words. This could pose a serious challenge.

2.8 **Conclusion**

This chapter concentrated on the literature and other scholarly reports on the use of LMS for teaching and learning. The chapter reveals that LMS presents a range of multimodal learning objects and multiple representations of content that seek to cater for different learning styles and modal preferences, increase interaction, improve learning outcomes, provide a more inclusive and equitable curriculum, and more closely, reflect on the campus learning experiences (Birch & Burnett, 2009). It also discloses obstacles facing the adoption and integration of educational technology in teaching and learning. These include a lack of systems reliability, technological problems, and malfunctions, including slow download times and bandwidth issues are so frustrating for both academics and students (Eastman & Swift, 2001; Smith, 2001). Some criticisms against the use of media in learning were discussed. The studies reviewed in this literature were chosen because they informed the researcher on issues related to the use of Learning Management System. This literature review seems to be relevant for the phenomenon under investigation. It highlights experiences of users of Learning Management Systems in educational technology. Literature does disclose that the adoption and integration of learning technologies is not free from barriers and challenges. There is also some literature around the phenomenon under investigation in the South African context. Therefore it ties up with the research questions for this study. The next chapter focuses on the theoretical framework used in the study.

CHAPTER THREE

FRAMEWORK FOR THE STUDY

3.1 **Introduction**

This chapter describes the framework used in this study to guide the analysis and discussion of the research findings. It includes learning theories as well as their principles, that the study applied during the analysis and interpretation of the research findings. Two theories were combined to set a framework of inquiry.

3.2 **Construct-Connect theory**

Constructivism theory (Gagnon, & Collay, 2000) and Connectivism theory (Siemens, 2004) constituted the framework for this study. While constructivism is seen as a theory that enables learners to construct new knowledge from their interactions with already existing data and the experiences of group members, Connectivism permits students to retrieve this data from a diversity of sources. In this way, the two theories supplement each other. The combination of the two resulted in Construct-Connect theory. The study used these theories because they seem to match on the one hand, the retrieval of new information and, on the other hand, the construction of knowledge in the digital age. Furthermore, the theories correlate well with the use of Learning Management System because they all encourage social and constructivist learning (Woodill, 2007). Gagnon and Collay (1999) propose six important elements that the constructivists should consider when designing the learning content. The elements include:

- *Situation* – facilitators should develop a situation for students to explain events during the learning process. For example, students may be asked to explain a procedure for sending files as attachments;

- *Groupings* – refers to a process of compiling materials and grouping students for interactive learning. The instructor should identify a criterion to classify learning materials according to their purpose. Design interactive tasks for interactive and active learning. Slow learners could be grouped together with fast learners for improved collaboration and information access;

- *Bridging* - how educators incorporate students' previous experiences into new learning environment. Every individual learner is believed to have some prior experiences related

to what is studied in the classroom. Such experiences need to be included in the new training institution to form the basis of new knowledge;

- *Questioning* - what guiding questions will the facilitators use to introduce the situation or what situation will facilitators set for students to ask questions during a lecture and;
- *Reflect* - encourage students to socially reflect on what they have learned. Students may be given an opportunity to make presentations in groups. Activities such as poster presentations may indicate the level of skills that one has acquired.

While constructivism focused on ways in which the academics design interactive tasks and their presentation to a group of students in virtual classrooms, traditional face-to-face learning focused on how the integration of LMS in education could promote constructivist learning. Constructivists believe that learning should be interactive and active. This is an environment where students discover and construct their own knowledge (Gagnon & Collay, 2000).

Contrary to the capabilities, Scheepers (2000) critiques constructivism by pointing out that it is time consuming and its outcomes are vague and unpredictable. Scheepers argues that in a situation where conformity is essential, divergent thinking and action can cause problems. The principle of constructivism is thus subjective in nature and as a result, students are free to develop multiple interpretations from the learning content, although such context may sometimes fail to match expected learning outcomes.

Siemens (2004) introduces connectivism to bridge the limitations of behaviorism, cognitivism, and constructivism in teaching and learning. He argues that a central tenet of most learning theories is that learning occurs inside a person. Even social constructivist views which hold that learning is a socially enacted process, promotes the principality of the individual (and her/his physical presence) in learning. The three theories furthermore, do not address learning that takes place outside people, the type of learning mediated through the integration of technology. They also fail to describe how learning happens within organizations. Siemens (2004) argues that in a networked world, the very manner of information that people acquire is worth exploring. They should evaluate the worthiness of learning, is something that is a meta-skill and is applied before learning itself begins. When knowledge is subject to paucity, the process of assessing worthiness

is assumed to be intrinsic to learning. Additional concerns arise from the rapid increase in information. In today's environment, many organizations should act by drawing information outside of their primary knowledge. They require new and updated information for the optimal production of goods and services, and therefore the ability to synthesize and recognize connections and patterns is a valuable skill. Siemens (2004) indicates that Connectivism is the integration of principles explored by networking. It focuses on connecting specialized information sets. Each individual learner represents a potential source of information, and when these individuals form connections, they may learn better because their connections might be more important than their current state of knowing. Siemens (2004) emphasizes that Connectivism is driven by the understanding that decisions are based on rapidly altering foundations. This implies that there is a need for a continuous retrieval of new information from all possible sources because it could be appropriate to address new emerging challenges that people have to go through in this current dynamic world. According to Siemens (2004), the principles of Connectivism include:

- *Learning and knowledge rests in the diversity of opinions*. Individual students have a variety of learning experiences and understandings. During their interactions with colleagues in the groups or online, these students may learn from their teammates as they share common learning experiences and understandings;

- *Learning is a process of connecting specialized nodes or information sources*. Siemens (2004) defines a node as any object or human being that can be explored for information. Students learn better when they are able to retrieve information from sources such as people, libraries or textbooks;

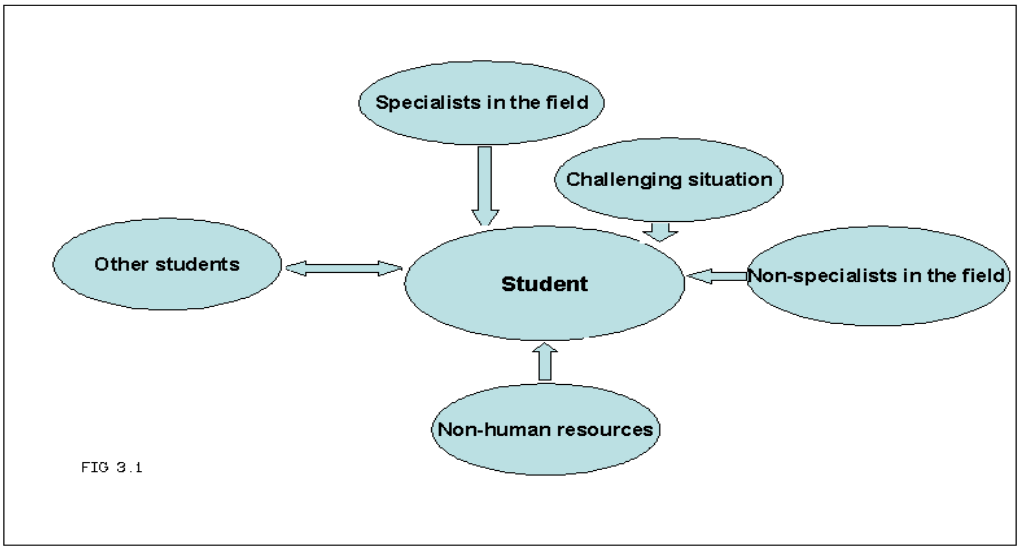
- *Information that people acquire is worth exploring*
  The information that is worth having is the information that is relevant to solve an existing problem. Therefore in order to get this information, people need to make connections with the potential sources of required information and;

- *Learning may reside in non-human appliances.*

  Learning may still occur from the interaction of learners with objects such as computers; a need for the integration of LMSs and that nurturing and maintaining connection is needed to facilitate continual learning (Siemens, 2004). This suggests that the acquisition of information should be continuous because learning process never ends.

Construct-Connect theory is constituted by elements of constructivism (*situation, grouping, bridging, questioning* and *reflect* (Gagnon & Collay, 1999) and the principles of Connectivism (*learning and knowledge rests in the diversity of opinions*, *learning is a process connecting specialized nodes or sources of information, information that people acquire is worth exploring, and Learning may reside in non-human appliance* (Siemens, 2004)**.**

The following diagram was designed to illustrate a Learning Model of Construct-Connect theory in the learning environments. The student learns with some of the following components:



F.g. 3.1 Constructivist and Connectivist learning (Gagnon & Collay: 1999 & Siemens, 2004)

Figure 3.1 above, illustrates that a student is surrounded by multiple sources of information which Siemens (2004) names: "nodes of information." The student may interact with the specialists in the field of Educational Technology, and other students for learning resources. Learning becomes a social process in which a team of students or people interact for information sharing (Gagnon & Collay, 1999, & Siemens, 2004). People are given the opportunity to share their opinions, listening again to others' arguments and point of views (Siemens, 2004). This act can enable the team to listen to and understand others' line of argument and peers' experiences, which in turn may be educative to all the members of the group. It is through such interactions that one could develop and acquire better problem-solving strategies (FeedBurner, 2008). Non-specialists such as technical staff may be connected to assist the students with technical work. For example, LAN technicians are concerned with loading a paper for printing, and other technical issues. The student can interact with objects such as text books, Internet, Newspapers and the Library which could also be potential sources of learning resources (Siemens, 2004). Challenging situations should to exist, in order to provoke critical thinking and development of problem-solving skills on the part of the student. The student uses information, sensory inputs and skills to construct knowledge and meanings in a challenging situation (Gagnon & Collay, 1999).

Siemens (2004) explains that the decision-making on the learning process, the choice of what to learn, and the meaning of new information; are the function of a student; the lens of a shifting reality. It is in this context that efforts should be made to provide a form of a training environment in which students may have an opportunity to connect and interact with machines and their peers for constructivist (active) learning. Students should be encouraged, furthermore, to acquire and develop the skills and knowledge which can be of significant value to their life in future. Kerr (2007) criticizes Connectivism by asserting that networks have not changed learning so much that one could throw away other existing learning theories. He argues, for instance, that Connectivism cannot work in isolation, and states that Siemens (2004) is becoming so enamoured with the power of network, to the point of denying the importance of the individual and the learning that takes place inside "our heads."

3.2 **Conclusion**

The chapter has discussed the framework which was used in the study. Constructivism and Connectivism were relevant theories for this study because they match the retrieval of information and a meaningful construction of knowledge in the digital age (Siemens, 2004). Therefore *Construct-Connect theory* was developed. The principles of this theory were discussed. Some criticisms of the theories were also highlighted. The two theories give a learner responsibility for his/her learning, on which skills to develop for the future use. The subsequent chapter focuses on the methodology used in the study.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 **Introduction**

Henning (2004) defines research methodology as a coherent group of methods that complement or supplement one another to satisfy the needs of the study. These methods have potentials to produce data and the findings that answer the critical questions, and should be in alignment with the research purpose. She argues, however, that methodology is not simply a collection of methods, but what these methods are capable of achieving. This implies that any methodology is not good or bad. The issue is whether or not; it is suitable for the particular research question. According to Koshy (2005), research design and methodology refer to the planning that precedes the action. This involves the preparations and procedures that the researcher follows to conduct the study. In general, research methodology encompasses all things which researchers should consider in designing instruments and administering them in the study to attempt to answer the research questions. This study employed a mixed methods approach; a combination of quantitative and qualitative. The discussion in this chapter covers the evolution of the research methodology, the implementation strategies followed by the researcher, the methods used, their advantages and disadvantages, sampling, how the validity and reliability were achieved, and possible advantages and challenges of the mixed methodology in general.

4.2. **The evolution of the mixed research methodology**

According to Creswell (1997), there are few types of research designs that are widely employed in social research; including a “Mixed research Methodology,” which Maree (2007) refers to as a procedure or way researchers collect, analyze and mix both quantitative and qualitative data at some stage of the research process within a particular study to better understand a research problem. Tashakkori and Teddlie (2003) explain that the need for mixed methodologies developed to respond to the paradigm shift within research activity. They highlight that before the paradigm war, quantitative studies dominated. Then positivists were interested in the numerical analysis. Later on, qualitative oriented researchers who worked within the constructivist paradigm were interested in the analysis of narrative data, involving stories on humans’ experiences and interactions, and mixed methodologists working within other

paradigms, such as pragmatism, transformative-emancipatory paradigm, whose primary interest was in both types of data (quantitative and qualitative data). This study was no exception. The researcher was also interested in both quantitative and qualitative data which could possibly be generated through employing the mixed methodology.

Different paradigms have distinguishing structures, formats, genre and purposes. Researchers who decide to operate under these different orientations or paradigms want to achieve particular goals and, as a result, their research designs and methodologies need to comply with a study under question (Tashakkori & Teddlie, 2003). While quantitatively oriented researchers, for example, should employ the approach that can assist them to generate numerical data, qualitatively oriented researchers should employ the research design that can help them generate narrative data. The mixed methodologists, including the researcher in this study, on the other hand, need to employ the research design and methodology that produces both quantitative and qualitative data. Maree (2007) also reveals that the mixed methods approach evolved from psychology in the work of Champbell and Fiske (1959). These scholars introduced multi-methods approach and encouraged researchers to collect multiple quantitative measures and assess them with different methods to study one's psychological construct. Later on, a few number of researchers started to use this methodology. Suter (2006), for example, argues and believes that valuable educational research should be multiple-methods orientated because it can increase the researcher's understanding of the teaching and learning process in multiple ways that a single method may not. They also highlight that there is no compelling reason for research in education to be single-minded. What method or approach to use is determined by the nature of critical questions and the purpose of the study. It would be useless for the researcher, for instance, to use the methodology that could not generate the desired data for answering the research questions.

Reeves and Hedberg (2003), furthermore, argue that multiple methods are only appropriate when chosen for a purpose, such as investigating a particularly complex issue or programme that cannot be adequately evaluated with a single approach or method. However, these authors further emphasize that using multiple methods is not a simple matter of two or more methods being better than one. On the contrary, they argue that poorly designed and sloppily conducted

evaluation strategies may produce no better picture of the findings. This is to say that the number of methods or approaches employed in a particular study does not necessarily guarantee the effectiveness of the methodology. What matters the most is how these methods correlate and maintain their coherence with the research questions. Caison (2006), for example, suggests that the methodology of the study encompasses an intelligent choice and application of methods of data collection which should also form coherence with the research purpose. In other words, the research design should be in such a way that there is coherence and relationship between the methodology and the tools of data collection.

The important features of mixed methodologies include, among others the use of intramethod and intermethod mixing. Intramethod mixing refers to the concurrent or sequential use of a single method that includes both qualitative and quantitative constituents, while intermethod mixing is achieved by concurrently or sequentially mixing two or more methods (Tashakkori & Teddlie, 2003). The point is that the mixed research methodology uses more approaches which can also be implemented sequentially. This means one approach following the other, and this is the strategy the applied in this study. It allowed for systematic sampling of the participants.

4.3 **The implementation strategies followed by the researcher in this study**

Implementation strategy in the context of this study refers to the sequence, steps or phases that the researcher followed and used to collect both quantitative and qualitative data (Tashakkori & Teddlie, 2003). It was at this stage of the research process that the research plan was put into practice. In this study, the researcher employed first and second levels of data collection. In the first level of data collection, the researcher wrote a letter (bearing conditions of informed consent) to the Dean of the Faculty of Education seeking permission to conduct the study within the campus. After this, the researcher designed a comprehensive questionnaire. This questionnaire was test-piloted with one individual whose character (postgraduate student) represented those of the target population. The reason for instrument piloting was that the researcher wanted to identify possible ambiguity that could lead to some misinterpretations of questions by the respondents, for this would have distorted the research findings. The results of the test-piloted instrument revealed that two questions were not clear for the respondent. The questionnaire was modified by making some changes on those questions that appeared

ambiguous, and it was then administered to thirty B.Ed Honours students. The main purpose of this phase was to collect a range of data: quantitative data that produced baseline information to the researcher about which participants to select for the second stage (qualitative approach), as well as which questions to include in the subsequent methods. It was important for the researcher to use questionnaire at this level because it seemed to be convenient to many respondents as many of them were also busy with their assignments. Students indicated that it could be simpler for them to fill in the questionnaires during their spare time. Tashakkori and Teddlie (2003) emphasize that quantitative approach is a part of a mixed method approach which usually incorporates the distribution of questionnaires to the participants to generate a range of data as researchers often operate under time constraints.

In the second level of data production, the researcher employed a qualitative approach, using focus group interview, individual semi-structured interviews and non-participation observation to generate data from the participants. It was still ethical for the researcher to remind the participants of the conditions stipulated in the informed consent and reminding them about the purpose of the study. This stage was very useful because focus group interview, individual interview and observations provided the researcher with better understanding (generation of in-depth data) of the academics and the students concerning the utility of Learning Management System in teaching and learning. In the same way, Koshy (2005) emphasizes that focus group interview; semi-structured interviews and observation are capable of improving researcher's understanding of the issue under study. It is because humans' experiences and interactions are better understood through these methods. It is for this reason that they are considered to be relevant. Tashakkori and Teddlie (2003) clarify, furthermore, that the mixed method approach studies use qualitative and quantitative data collection and analysis techniques, in either parallel or sequential phases. In this case, the sequential technique was suitable, and this is why it was used. The methodology allowed the researcher to implement one approach first to provide some idea on who should be selected for the next approach (qualitative approach in this study). In many cases, mixed methodologists implement quantitative approach first, in which questionnaires are distributed to the respondents (Tashakkori & Teddlie, 2003). The data is analyzed and then the researcher chooses the sub-sample of the population who participated in the questionnaire. The qualitative approach follows, in which the focus group interviews and

other methods, such as observations, individual interviews follow for the production of rich data (Tashakkori & Teddlie, 2003). The sub-sample of the population who participated in the focus group interview was also chosen for semi-structured interviews to get deeper into the topic.

4.4 **Context and Sampling**

The sample population in this study included the academics and Bachelor of Education Honors (Educational Technology) students at the South African University. According to Maree (2007), the number of participants depends on the type of the method in research. Different methods require different sample sizes. In this study, thirty B.Ed Honors students were selected randomly to complete the questionnaires. This constituted the first level of (quantitative) data collection. The researcher wrote names of 35 B.Ed Honors students, placed them in a plastic bag, mixed them by shaking, and randomly selected twenty students by picking up a paper that came in contact with the hand. According to Maree (2007), random sampling gives every member of the population equal opportunity to be selected for participation. This sampling technique could provide a general overview of opinions of the participants. In the second level of the research process, the researcher employed convenient purposive sampling to select the academics and Educational Technology students for collecting qualitative data through the use of focus group interviews, individual semi-structured interviews and non-participation observation. The researcher targeted and selected those people who seemed to have a better understanding of a Learning Management System (LMS) and the way this type of technology could be used in teaching and learning. The learning opportunities and the challenges they were facing. It was also easy for the researcher to meet with some of the participants (students) because they were attending their block session lectures. Koshy (2005) argues that convenient purposive samplings is hoped to select those individuals whom are easy to reach and more knowledgeable with regard to research topic for the production of thick data. McMillan and Wergin (2002) explain that qualitative investigators often select a purposeful sample to meet and achieve a specific need. It was easy for the researcher to meet two academics. The third one was met once, and the communication occurred via the email.

4.5 **Methods of Data Collection**

Lauer (2006) defines methods of data collection as the tools that researchers use to collect data in research studies and states that the most commonly used instruments in an educational research include tests, questionnaires, surveys, interviews, focus group interviews and observations. According to Mouton (2001), all empirical studies employ a variety of instruments for collecting data from the participants. Empirical studies are the ones which implement methods of data collection to gather data for analysis. This study was also empirical, and this is the reason it employed the methods discussed in the next sections.

4.5.1 *Questionnaires (with twenty B.Ed Honors Educational Technology students***)**

A group of students indicated that they were busy with their academic work and had no time to fill in the questionnaire. Only twenty respondents returned the questionnaire. In general, the process went fairly well in this phase because (twenty out of thirty) 67% of questionnaire was returned for analysis. The questionnaire comprised both closed and open-ended questions. This stage of the research process was hoped to generate a range of information or quantitative data for the study which could fairly represent the opinions of the target population (Naiker, 2000). Mertens and McLaughlin (2004) suggest that questionnaire data are easy to compare and analyze, and further argue that they are helpful when conducting the study with many people. The intention here is to get to get sufficient data within a short period of time. The researcher, furthermore, was operating under time constraint because both lecturers and postgraduate students did not have adequate time. The incorporation of the questionnaire in this study became a suitable method for the sake of generating baseline data. Naiker (2000) reminds us that questionnaires are inexpensive to administer, and that can also enhance anonymity. Questionnaire was employed to collect data because it was a quick method. Furthermore, it enabled the researcher to gather information from people in a non-threatening way. Since many sample questionnaires already exist, researchers find it simple to construct questionnaire schedules that are up to the required standard (Mertens & McLaughlin, 2004). Careless wording when formulating questions might influence the manner in which study participants attempt to answer the critical questions. Often, this tends to impact on the validity and reliability of the findings. In contrast to the benefits, questionnaires were problematic because some of them were not returned. This could impact on the quality of the research, hence some good responses for

analysis could be missing (*See appendix D1).*

4.5.2 *Focus group Interview*

It involved four B.Ed Hon educational technology students. The study used focus group interview as a subsequent tool, following up the analysis of the questionnaire responses collected in the first phase of the research process. The sub-sample of the main targeted population (four out of twenty), students who participated in the questionnaire, was used. These students were chosen because their responses to the questionnaire addressed the critical questions of the study. Furthermore, they were available. Strewing and Stead (2001) explain that focus group discussions can involve four to eight participants, and it is for this reason that this study argues that sample size was relevant. This method permitted the study to gather sufficient data based on the understandings and experiences of the students about the utility of LMS in learning (Koshy, 2005). The researcher had to arrange appointments with the participants at their own convenience and the first meeting with one of them was on the April, 2008, at 9.00 am. The participants were once more reminded of the research topic and the conditions stated in the informed consent. The interview was tape recorded and later transcribed. According to Bell (2005), a tape recorder can be helpful in a sense that it can allow the interviewer to keep eye contact with the participants, making the researcher look interested in what the interviewees are saying. In this way, individual interviewees could feel motivated to speak out their opinions. The researcher does not have to ask, listen and write down the responses simultaneously, but concentrates more on which questions to ask, modify or rephrase in order to probe a profitable discussion. Note taking becomes the function of the tape recorder while the researcher is listening and probe further if required. The mere presence of the tape recorder, however, might disrupt the interview, as participants feel threatened and therefore affect the responses that interviewees could give (McMillan & Schumacher, 2006). In terms of this study, the interview went well because relevant data were produced. The follow up appointment was set for the April, 2008, at 9.00 am. The purpose of this meeting was for the researcher to confirm the transcripts of the recorded data with the participants in order for them to agree or disagree with what the researcher claimed to be their opinions. The participants had new additional and useful information which was then added to the previously collected data. Lauer (2006) defines focus group as a group of participants interviewed together to share their opinions on a specific topic.

The interviewer makes the arrangement with a group of participants and interviews them. The role of the researcher here was to lead the discussion by throwing questions to the group. Koshy (2005) indicates that focus group interview targets those members of the targeted population who are informative about the idea under study, the purpose being to provide thick data for a given research question. Focus group interview, furthermore, is usually engaged with people who could give detailed information about the topic under study. It was also relevant due to time constraints (*See appendix E).*

4.5.2.1 *The evolution of focus group*

Struwing and Stead (2001) explain that focus group interview, evolved from the management sciences (market research) in which producers met to discuss production techniques and ways through which they could maximize the production of goods and services. These could also suggest best advertising strategies of their products. Focus groups were often used in this field to capture consumers' attitudes and opinions about the product. Suppliers shared information on the production techniques that they could employ to improve the quality of their commodity so that it could attract more consumers. Focus group discussions, furthermore, enabled these suppliers to quickly gather new information on the perspectives of other producers about the effective production techniques which could have been a long process with the use of questionnaires. Its application in this study was hoped to collect sufficient data on the experiences of students in relation to the integration of LMS in learning.

Mertens and McLaughlin (2004) emphasize that focus group interviews are used to explore a topic in depth through the utilization of group discussions and indicate that they can quickly and reliably get common impressions about the problem. Likewise, it was possible for the researcher in this study to collect sufficient detail from the selected participants within a short period of time.

In contrast to the benefits, Maree (2007) indicates that focus group interviews may be a little bit problematic on the side of the researcher because they require a good facilitator for safety and closure. It might not be easy for the investigator furthermore, to locate convenient dates and times that could suit all the members targeted for group discussion, which of course was not the

case in this study. The challenge that the study faced here was that some individuals were easily influenced and dominated by those who were not shy to speak out their opinions in a group and dominated the whole discussion. It was thus not possible for the researcher to guess what these members had to say. Naicker (2000) argues that it is impossible for the interviewer to grab useful information from shy participants who cannot voice out their opinions if they have to form a part of focus group interview. So such characters can be requested to participate under individual interviews. This, however, is not applicable to this study.

4.5.3 *Semi-structured interviews with two B.Ed Hon (Educational Technology students using the LMS in their learning (twice)*

The study selected the sub-sample of the population that participated in the focus group interview. Two postgraduate students were selected. The criteria used to select the sub-sample was to choose those individuals who provided most of the desirable responses during focus group interview, so that a further probing into their experiences could be achieved. McMillan and Wergin (2002) highlight that qualitative investigators often select a purposeful sample to meet and achieve a specific need. In many cases, qualitative studies select those individuals who are knowledgeable about the concept under the study. The researcher negotiated the appointments with the participants and, fortunately, both of them suggested a Sunday. The interviews were conducted on the May, 2008. An interview with the first participant (A) was conducted at 8.00 am to 8.30 am. The researcher stated and emphasized that the conditions for participation still stood as they were stipulated in the informed consent and reminded the participants about the purpose of the study. The participant did not have any query. An interview with the second participant (B) was conducted at 9.30 am. It was at such occasions that the researcher reminded the participant of the conditions for participation, the purpose of the study and then commenced the discussions. The researcher followed the same procedure as indicated above. Both interviews were profitable and significant. It was believed that the data they provided represented their real understandings and the reflection of their interactions with LMS in learning. All the above interviews were also tape recorded and transcribed later.

The second appointment (for the approval of the transcripts with the participants) was on the June, 2008. The first meeting was at 8.00 am, with the participant (B) who agreed with the

transcripts. The second meeting took place at 10.00 am with participant (A), who also agreed with the transcripts, but gave additional information on the challenges faced by the users of LMS in learning. Denzin and Lincoln (2000) suggest that it could be through such sequences rather than in single turns of talk that researchers could make sense of conversations. If participants could be able to give the same piece of information which they provided earlier, it would then mean that the data were reliable and valid. Koshy (2005) explains that interviews are associated with the collections or capturing of individuals' experiences and understandings of a concept under the study. These are the only means through which the researcher could tap on people's opinions. Koshy furthermore, argues that the main purpose of conducting interviews is to gather richer and more informative responses about a problem than questionnaire data. Interviews are designed for the gathering of in-depth data because they can provide a relaxed context for exploration. They are flexible, and this is to say that the interviewer is able to rephrase and simplify his/her questions to gain deeper understanding from the respondents. The researcher can steer the discussion through a fruitful route *(See appendices F1 & F2).*

4.5.4. *Semi-structured interviews with three academics teaching B.Ed Hon modules (in two sessions)*

The profiles of the academics: Participant K is an M.Ed (Edetech) holder, who is a lecturer at the university and uses LMS in teaching. The participant L is B.Ed Honors holder, and is using LMS for teaching, and currently a lecturer at the university. Participant M is an M.Edetch and PhD holder (in Edtech), currently using LMS as teaching platform in one of the South African Higher Institutions. Initially, taught in the Faculty of Education when signing the declaration for participation in this study, and started providing some data.

Initially, the study had planned to conduct interviews with six academics, but that did not work out. Some of the lecturers indicated that they had no idea about LMS, and therefore could not offer any help or participate in the interviews. The researcher selected those academics handling B.Ed Honours educational technology modules (convenient purposely selected) and gave them letters bearing informed consent, requesting for their participation (done twice). Only three academics agreed to participate and signed a declaration form. Then the researcher negotiated for appointments at the participants' convenience. The interview with the first participant

(participant K) took place on the June, 2008 at 11.00 am. The researcher welcomed the participant to the interview and reminded the participant of the purpose of the study, and stated that the conditions stipulated under the informed consent still applied. The discussions went well and this interview was profitable.

The interview with the second participant (participant L) was conducted on the June, 2008 at 9.00 am.. These interviews were tape recorded and transcribed. These also went well, and the discussions were profitable because the responses were addressing the research questions. The researcher met with the participant (K) on the July, 2008, at 10.00 am. The purpose of this meeting was for the participant to confirm the transcriptions of the interview written by the researcher. This stage was important because the participant provided additional information. The next meeting with participant (L) was on the July, 2008 at 2.00 pm. The purpose of this meeting was to verify the transcripts with the participant. Nothing was added or reduced. The participant agreed with the transcriptions. By means of e-mail, the participant (M) was also interviewed because of time constraint and unavailability. The discussion commenced on the 15 January, 2008 while this lecturer was still the staff member in Educational Technology discipline until the July, 2008, while he was away (*See appendices G1, G2 & G3).*

4.5.5 *Non participation observation (observe a lecture in one B.Ed Hon Educational Technology module: the lecturer and students (three sessions)*

This method was used in order to collect data on live events in the natural settings, and this could enhance the raised claims during data analysis and interpretation (Henning, 2004). The researcher obtained permission from the facilitator to observe lectures of Educational Technology module. The facilitator did not hesitate to approve the request. The lecturer was reminded about the conditions of ethical issues, that confidentiality would be maintained throughout the research process, how the data would be used for academic purposes only, and how it would be stored. The researcher observed how Educational Technology lecturer and students interacted with and utilized LMS in three lectures. The researcher stayed with this group of students for a period of three days, recording live events without interacting with the observed. Fortunately, the researcher was given an opportunity to deliver a lecture on one of the topics to the same target group, but not integrating LMS in that lecture. The students did not see

me as a researcher, but as the facilitator, and therefore they continued with their normal behavior. Henning (2004) supports that it is significant for the researchers to observe the scene of everyday life to explore issues that reveal more about the information collected through interviews and in this way, the credibility of the study could be enhanced (*See Appendix H*).

4.6. *Data Analysis/Interpretation*

The analysis of data encompasses the breaking up of complex data into manageable themes, patterns, trends and relationship (Mouton, 2001). This research stage was concerned with constructions of meanings from the collected data. Thematic analysis (Aronson, 1994) was used and ideas emerged from questionnaires and conversations that could better be understood under the control of a thematic analysis. This analysis method focuses on identifiable themes and patterns of behavior or experiences (Aronson, 1994). Segments of information were coded and categorized in order to establish patterns. All of the talk that fitted under the specific pattern was identified and placed with the corresponding pattern. Themes were formulated by bringing together the fragments of ideas and experiences (patterns), which of course could be meaningless when viewed in isolation (Aronson, 1994). There was a need, furthermore, to revisit the research questions and assess the relevance of the data in relation to the key questions. This is in line with Koshy's (2005) suggestion, who points out, that the researcher needs to revisit the aims and expectations of the project before unpacking field data. Each piece of information should be placed under a correct category. The principles of Construct-Connect theory (Gagnon & Collay, 2000: Siemens, 2004) were applied at this research stage to support the claims and arguments that the researcher made in the study. Other new components of theories that could emerge from the data would be accommodated. It is in this way that the study used guided analysis. Hammonds (1976) explains that guided analysis carefully leads students through an integration of pre-selected concepts or theories. It provides a detailed modeling of the decision-making processes. The descriptive, graphical and statistical means were used for data representation. In this study, the researcher operated within the interpretive orientation (Koshy, 2005). Multiple realities were created from the interpretations of experiences and interactions of the users of LMS in teaching and learning

4.7. *Ensuring Trustworthiness of the research findings*

According to McMillan and Wergin (2002), Validity refers to the appropriateness of the conclusions claimed from the analysis of the collected data. This has to do with whether the research methods, approaches and techniques used actually relate to, and measure the, issues that the researcher has been exploring in the study conducted. Blaxter, Hughes and Tight (2004) argue that the method of data collection should be test-piloted before it can actually be implemented, and explain that method-piloting enhances the validity of the instrument. This is what this study followed. In the first level of data collection, the study test-piloted a questionnaire with an individual whose character resembled that of the target population (one of the postgraduate students). The reason for this move was to eliminate any possible existing ambiguities that could have led to the misinterpretations of the questions by research participants (Blanche & Durham, 2002). As a result, test-piloted instruments were believed to be free from ambiguity. They in turn provoked the participants to provide relevant data that answered the critical questions. It is therefore believed that the research findings of this study are valid.

In the second level of data collection, the researcher was interested in the credibility of the study. This is analogous to internal validity in conventional criteria (Oka & Shaw, 2000). Credibility relates to how the reconstruction of the researcher fits the realities and views that the participants express in the process of the inquiry. To establish credibility in this study, the researcher began by interviewing (using tape recorder in some cases) the participants with an intention to tap on their understandings and experiences about the learning benefits and challenges they were facing with the integration of LMS in teaching and learning. The interviews were transcribed and the transcriptions were verified or confirmed with the participants in the subsequent meetings. The researcher then observed Educational Technology lectures in three sessions, and spent three days with the Educational Technology students and the lecturer, observing how they were utilizing LMS in the natural setting. The third step by the researcher was to employ, a variety of instruments, including questionnaire, focus group interview, observation and individual interviews were used. Data were collected from different sources, such as experiences and understandings of both academic staff and postgraduate students of the learning opportunities and challenges that the integration of LMS in teaching and learning presented to them, and some visible suggestions that could be applied to minimize those challenges. The employment of a

variety of methods of data collection and the use of different sources of data (lecturers and students) complemented one another (Maree, 2007). The interview participants, furthermore, were requested to check if the transcriptions of data could be relevant enough to support all the claims or arguments made to answer the critical questions in this study, and whether the data could support the themes formulated during the analysis. Key (1997) suggests member checking as one of the significant strategies with which researchers can establish trustworthiness of the study. On the basis of these measures that the claims, arguments and conclusions raised in this study are reliable, credible and trustworthy.

4.8 *Ethical issues*

According to McMillan and Schumacher (2006), ethical issues refer to all the precautions, steps and efforts that researchers carefully put into practice to protect the research participants while interacting with them for data production. Bell (2005) argues for the establishment of ethics committees which can ensure that no badly designed or harmful research is permitted. A credible research design involves the selection of participants, effective research strategies, and that which also adheres to research ethics. Likewise, the researcher obtained permission from the management of the University to conduct the study amongst the students and academics. Later, the prospective participants were issued letters which requested their participation. The letters attached informed consent bearing the details of the study, conditions for participation; that is, choice to participate, to sign and withdraw at any time when they so wished. It was also valuable for the research participants to be informed on how data would be analyzed, reported, stored and disseminated. The researcher promised to keep and maintain the confidentiality of information, identity and anonymity undisclosed. That to achieve this, fictitious names were used to represent the real names of the participants (Maree, 2007). The informed consent also stated that the research data would be securely stored in the University for the maximum period of five years, and thereafter the documents would be destroyed (*See appendices A, B, and C).*

4.9 **The overall advantages of the mixed research methodology**

In this study, a mixed-methods approach has demonstrated a number of capabilities in conducting a research in educational settings. Here are some of the advantages that the methodology presented to the researcher in this study:

Development: the analysis of data collected from the questionnaire shaped the subsequent methods and the procedures (sampling method) in the research process. For instance, the questionnaire data informed the researcher on which participants to include for the focus group interviews, as well as which questions to ask. Only those participants whose responses seemed to speak better to the critical questions were selected for focus group interview. The intention was to probe further into their experiences. It is for this reason that Green and Valerie (1997) reveal that the mixed methodology research design can enhance the research findings in this way.

*Triangulation (crystallization)***:** In this study, similar and related information was collected from a diverse number of participants and through different instruments. For example, both students (from the questionnaire) and academics (from the interviews) indicated that the utility of LMS in learning could promote self-paced learning and adequate access of academic resources. Equally, Green and Valerie (1997) argue that the use of multiple methods of data collection or sources of data could yield consistent data that, in turn, could promote the reliability, credibility and validity of the study.

Complementary: the combination of quantitative approach for the production of a range of information (statistical data) and qualitative approach for the generation of narrative data complemented each other. Through the questionnaire, the researcher collected a range of information from a large number of students, and this could have not been possible with the focus group interviews, with their minimized sample size or a single method (for example; individual interview). In the same way, focus group interviews explored humans' experiences (qualitative data), and this could have not been possible with the questionnaire tool (Koshy, 2005). It could therefore be concluded that the methods and approaches complemented each other, and that could also strengthen the quality of the study because an adequate evidence for claims has been generated.

*Initiation***:** it was possible for the researcher to analyze the quantitative data, especially the open-ended questions, and identify important emerging themes and issues that the existing research questions were not able to probe further. This enabled the researcher to include other questions that could allow one to gain in-depth understanding of the concept.

Expansion: allowing the researcher to increase the scope of the instrument with the purpose to adequately collect the desired data, which could have not been possible with one approach or instrument, the researcher was free and able to increase the number of questions, even to rephrase some of them for clarity purpose (Green & Valerie, 1997). McMillan and Schumacher (2006) explain that an important advantage of mixed-method studies is that they can show the results (quantitative), as well as explain how such data were collected (qualitative). This was one of the reasons the methodology was used.

4.9.1 **Challenges that accompanied the Mixed-Methods Approach in this study**

The Time-consuming: this is an aspect of mixed-methods approach. It remains one of the challenges as the implementation strategy of this method was done in phases. This took the researcher time to design the instruments for both phases, collect and analyze the collected data. Time consumption appeared to be the most limiting factor for this method. In critiquing the use of mixed research methods, Slonim-Nevo and Nevo (2009) argue that this methodology may produce inconsistent findings. The quantitative method does not allow entry into the internal, subjective and complex world of the individual. Researchers in here, treat their respondents as objects that lack perceptions and concepts. On the other hand, the opponents of qualitative research methods claim that they yield subjective findings and they are not based on rigorous investigation. They lack procedures that assure validity, reliability, and generalizability (Slonim-Nevo, 2009).

4.10 **Limitations of the study**

Ten participants did not return the questionnaires. The concern is that these questionnaires might contain important data which could inform the researcher better about the experiences of the students on the utility of LMS in learning. The study only involved Bachelor of Education Honours Educational Technology students, whose responses could not represent the students' population at the University. The results of this study could not be generalized. It was not easy for the researcher to find all the target participants because they were already busy working on their portfolios. They thus could only allocate small amounts of time for the study. The use of emails was hoped to address time and distance barriers with one participant. It is on this basis that face-to-face conversation was impossible. Things such as non-verbal responses were not

noticed. Only three academics had experiences with LMS in teaching. Their data could not be representative of opinions from the larger sample.

4.11 **Conclusions**

This chapter has discussed the methodology used in the study, the instruments employed for data collection; semi-structured interview, questionnaires, focus group interview and non-participatory observation, and sampling strategies were discussed. It highlighted advantages and some challenges accompanying the use of mixed research methods. The limitations of the study were also discussed. The study did not get the targeted number of lecturers. The next chapter presents the analysis, presentation, and interpretation of the findings of the study.

CHAPTER FIVE

DATA ANALYSIS

5.1 **Introduction**

The previous chapter described the research methodology employed in this study. It provided reasons for the choice of research methods used for data production. This chapter presents the data analysis and is organized in terms of the three research questions posed in chapter one. Frequency of events, thematic analysis (Aronson, 1994) and guided analysis were used to identify themes that emerged from the data. In keeping with the qualitative nature of the study, data obtained from the questionnaire, focus group interview, individual interviews with students and academics, and observation, were analyzed thematically (McMillan & Schumacher, 2006). For each research question, themes were identified and discussed. The next section presents the analysis and research findings.

5.2 Analysis and Findings

This section analyzes data collected from a diverse number of methods. Themes were identified from the data to answer the research questions. Each theme is supported by some quotes from the participants.

5.2.1 **Research question one:**

What are the experiences of the users of Learning management system as a teaching and learning platform?

Three central themes regarding the participants' responses and observations were identified in order to answer this question, namely: source of learning materials (resources), collaboration (communication), and active participation.

Learning resources

The users of the LMS see this technology as the source of learning content. This is evident in the participants' comments. The lecturer said,

> *"LMS has functions such as resource list, previous course outlines and assignments. Students are encouraged to use these resources and access them for*

the course or module."

One student said;

"LMS provides a great deal of information for learning purposes."

One participant even indicated that LMS provides information at the lowest cost rather than buying books, which would be relatively expensive than using LMS with its support lists. Thirty percent of the participants from the questionnaire indicated that LMS provides information. This is indicated in figure 5.1 below. Equally, Olufemi (2007) explains that Learning Management Systems speed up the rate of knowledge sharing and information gathering.

Collaboration (communication)

The data suggest that LMS promotes collaboration. For example, Table 5.1 illustrates that fifty percent of participants from the questionnaire indicated that LMS improves collaboration amongst the students. Also, all four participants from focus group interview mentioned that chat rooms, discussion forums and email programmes facilitate the collaboration. One of the academics said,

"The discussion forums, chat rooms are useful to encourage peer collaboration amongst students. It also allows for group work."

Collaborative learning process may help students achieve deeper levels of knowledge generation through the creation of shared goals, shared exploration, and a shared process of meaning-making (Palloff & Pratt, 2001). Collaboration, furthermore, may promote the social construction of knowledge and meanings. Barron and Rikelman (2002) explain that LMS provides several communication tools for the instructor and students. It allows the students to communicate and collaborate with each other and with the instructor. For instance, the data given by figure 5.1 indicates that sixty percent of the participants from the questionnaire and the data from individual interviews with the academics indicated that LMS can be used as communication tool.

In his article, Woodill (2007) argues that LMS sets a platform for adequate students' participation, which could not exist with traditional face-to-face teaching and learning.

The following figure represents the statistical data of the participants' experiences during an online lecture. Statistical data can be presented; using charts (Pietersen & Maree, 2007).

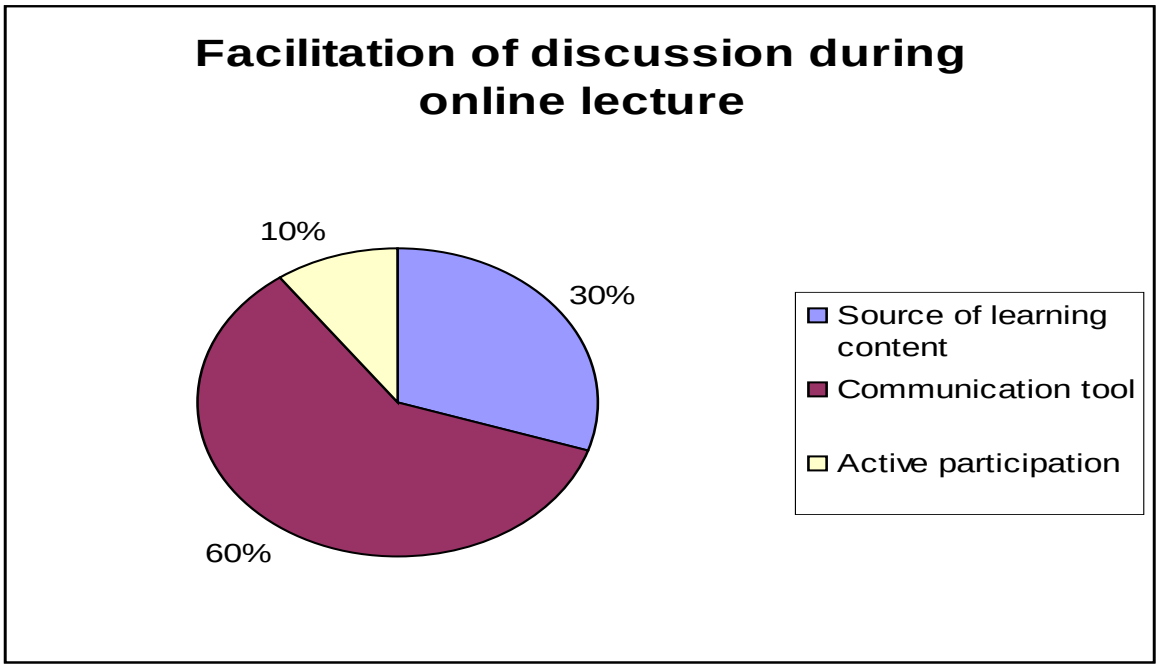


Figure 5.1 Students' experiences on LMS while used as an online learning platform

It would appear that LMS as a communication tool ranks highly in the perceptions of the students. In their responses, they have indicated that this technology assisted them in many ways: chatting with their colleagues and the lecturers for information. Conole (2004) also argues that technology has improved communication in e-learning environments, and explains that e-learning provides access to a wealth of resources and new forms of communication and virtual communities.

Active participation

The users of LMS in teaching and learning indicated that it can encourage active participation. Ten percent of the participants from the questionnaire indicated that LMS can enhance active participation (See fig. 5.1 above). This is evident in the following responses:

One of the academics said: *Independent learning is encouraged."*

A student in the focus group interview said: "*LMS is a more of student-centered approach."*

This approach can promote active and authentic learning. Adelsberger, Collis and Pawlowski (2002) explain that this type of learning encourages students' engagement. The learner becomes actively engaged with the learning task. Authentic learning leaves the function of navigation of information and construction of meanings in the hands of the learner (Adelsberger *et al*, 2002). In this kind of learning, students are actively engaged in the learning process. Authentic learning refers to true or real learning (Adams, 1996). This is a kind of learning that encourages full students' engagement. On the other hand, passive learning is more of instructor-centered approach. Students become mere recipients of knowledge from the instructor. Birch and Burnett (2009) also declare that the integration of technology in the curriculum increases peer social interaction for resources. Students are able to share learning experiences and improve the level of understanding.

The data provided by figure 5.2 signifies that LMS can be used to enhance authentic learning. Fifty percent of the participants from the questionnaire indicated that LMS promotes authentic learning, 45% of the students from questionnaire believed that LMS promotes active learning. Very few students (five percent of them) indicated that it can encourage passive learning. This was indicative in the comment from one lecturer:

"Independent learning is encouraged. Students can work at own pace."

Again, it was evident in the comments from a student as well:

"We can share our presentations online and then comment on them. These help us a lot."

Another student said: *"LMS just provides information about portfolio tasks which one retrieves and works on."*

This student did not value LMS as an effective technique that could promote quality of learning.

The following figure was designed to illustrate the responses relating to question three of the questionnaire, that is, what kind of learning can you achieve with this technology which would be impossible without it? I. Authentic, II. Active, III Passive learning. The responses are presented in the figure 5.2. Charts were used because they are other means used to present quantitative data (Pietersen & Maree, 2007).

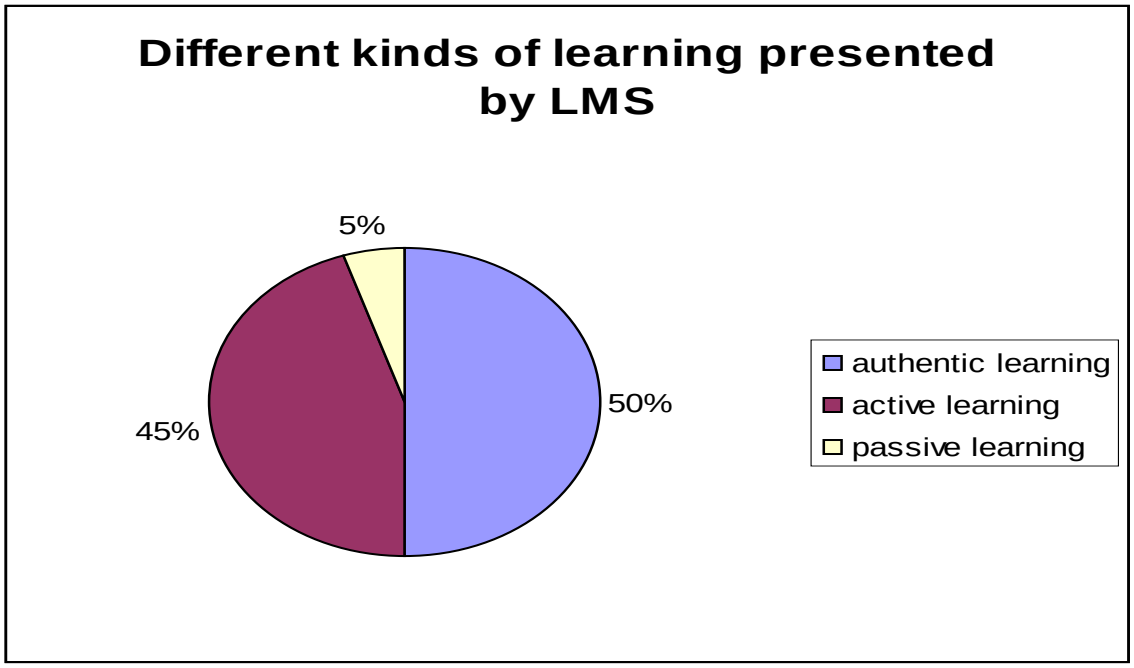


Figure 5.2. Students' experiences on the benefits of LMS for learning

Based on the data collected from the students' questionnaire, the inclusion of LMS in learning may bring about authentic and active learning because students are fully engaged in the process. However, five percent of students indicated that this technology may result in passive learning. According to Birch and Burnett (2009), this is possible with those individuals who may lack technical capability, knowledge and skills for operating technological devices.

To conclude, the responses provided for this research question imply that LMS is useful for learning. The analysis suggests that both sets of users, students and instructors, perceive that the LMS has great potential for teaching and learning. In their interviews, the academics indicated that this technology has resource list, previous course outlines and references to other resources. Active participation of students in the learning process is also important. The construction of knowledge and meanings are the responsibilities of students. LMS can facilitate their communication. Students can chat, email, and discuss anytime to facilitate the development of their portfolios.

5.2.2 **Research question two**

What are challenges facing users of the Learning Management System for teaching and learning?

Themes that emerged from the data relating to this question are accessibility, physical barriers (poor quality of hardware, limited number of computers with Internet and the space) and technical skills

Accessibility

A number of factors affect accessibility of this technology for learning. For example, figure 5.3 illustrates that 75% of the participants from the questionnaire with students indicated that network failure impacted on accessibility. The following quote from the focus group interview indicates some of the accessibility issues:

> *"Nowadays we are experiencing load shedding, is even worse. So when you want the computer now, the server is down, we have got so many problems... sometimes you want to consult your colleagues and you find that the server is down.*"

During one of the observation session, the researcher experienced network failure and noticed the frustration of the students when they could not submit their portfolios on that day because the server was down. Accessibility was also hindered by insufficient number of computers connected to Internet. This is evident with data coming from the students' questionnaire:

there are not sufficient LANs for all students, accessibility becomes a problem…..

It is also evident from the focus group data with the students:

> *"We have problems, we cue the whole day for the computers, we don't access information any time you want. There are a controlled number of computers."*

Physical barriers

In this study, physical barriers include things such as hardware, software, memory, quality of computers and any other materials that work in conjunction with LMS utility. Some of the data in this study suggest that other challenges facing LMS users are due to physical barriers. In an interview, one lecturer said:

> *"Printers – sometimes no paper for students to print. Frustration when printer*

does not work. Quality of computer-memory/speed. Down loading time is too long…..slow bandwidth."

Some data from focus group interview with students;

"….*and also replace the computers frequently because some of computers are very old. They are just decorating."*

The researcher observed a number of computer users (students after hours) frustrated because they were unable to recover their portfolios due to virus attacks. In the technological context, Pandor (2004) defines a virus as software programmes that are capable of destroying data. In some cases, technology users might become technophobic (threatened) to work with technology because their work could get destroyed or distorted.

Technical skills

The questionnaire data implies that a number of LMS users lack technical skills to fully implement this idea in educational technology. It is evident from figure 5.3, that fifteen percent of the participants from questionnaire indicated that some students lack technological competent skills. They are struggling with things such as sending attachments. However, this technology requires students who can retrieve information and at the same time, they should be able to use chat rooms, email tools and discussion forum to facilitate the process of teaching and learning. One student said:

"You know the lack of skills, lack of skills always is factors. Very much interfere with the use of LMS."

Bonk (2001) explains that a frequently given excuse for non-adoption and non-integration of educational technology in education, is a lack of specialized and on going technical support.

The researcher has designed the following pie chart to represent the data relating to question four of the questionnaire. That is, what challenges are you currently facing in utilizing LMS in learning? Participants provided a variety of opinions on the experiences of using the LMS in learning. Their responses were grouped and identified as the themes, namely: accessibility, physical barriers and lack of technological competent skills. The figure 5.3 represents the

quantitative data gathered for this question. Charts can be used to present quantitative data (Pietersen & Maree, 2007).

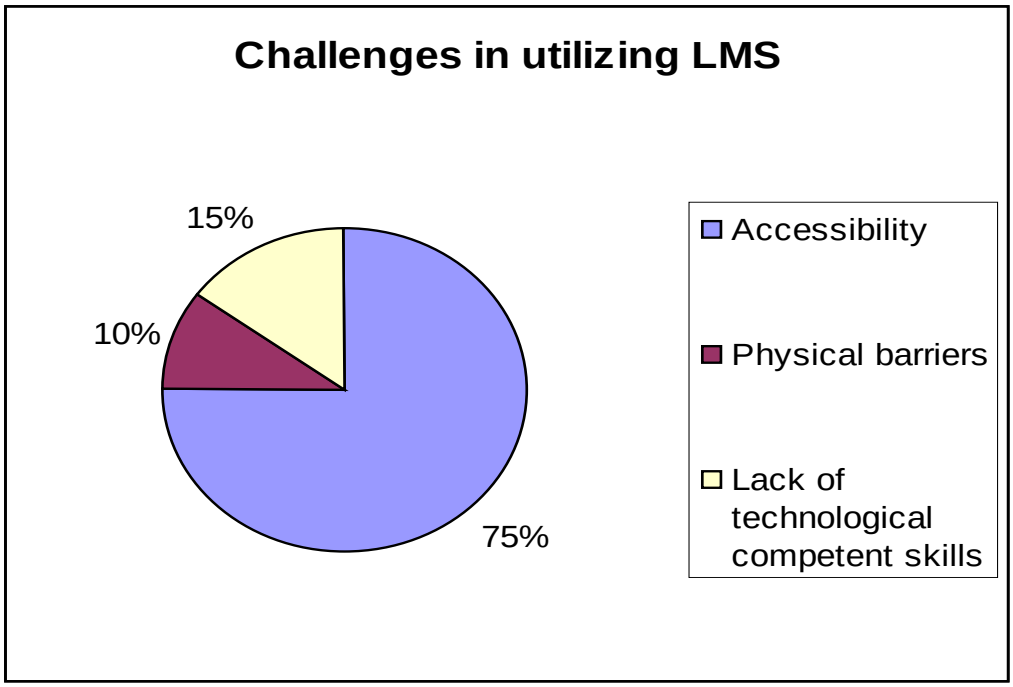


Figure 5.3. Students' experiences on challenges facing LMS users in learning

It is evident from the figure above that accessibility is one of the greatest barriers in using the LMS hence it impacts on learning. This problem impacted adversely on the work of the students because many of them failed to meet the due dates for the submission of their work. Quotes from the focus group interview indicate this:
The student said: "*it's a problem. We are always behind.*"

Literature reveals that the adoption and integration of Educational Technology is hindered by a number of factors, namely: institutional barriers, individual inhibitors and pedagogical concerns (Birch & Sankey, 2008). Of course, some of these barriers were disclosed during data collection and analysis.

In conclusion to this question, accessibility is a major barrier, that is, network failure, load shedding and insufficient number of computers. Equally important is the lack of technologically competent users. This has major implication for teaching and learning. A small but important

aspect is the physical barriers, for example, lack of printing facilities and paper.

5.2.3 **Research question three**

How can the Learning Management System improve teaching and learning of B.Ed Honours modules in the Faculty of Education?

Four themes emerged from the data, namely: LMS for student support, instructor's support, environment support and support for the diversity of students.

LMS as student support

Different sources of data suggest that LMS is beneficial for student support**.** This is indicative in the quotation below from one lecturer:

> "LMS *has functions such as resource list, previous course outlines and assignments. Students are encouraged to use these resources and access them for the course or module."*

An interviewee A: "*It provides a lot of information*."

Another student: "We *can share our presentations online and then comment on them. These hel*p *us a lot."*

Some data quotes from students' questionnaire: "..*LMS creates a wider network for students to interact with other students from other universities etc."*

Tetiwat and Igbaria (2000), as cited in Aggarwal, state that as students learn to sift through the huge amounts of information on the Web, they exercise their critical thinking skills by judging the value of the information they come across. Students learn to analyze and synthesize sources of information, and then construct their own thoughts. It is in this context, that the web-based teaching resources further provide students with access to resources and expertise outside their own institutions (Lammy, 2009). From these collaborations, students may gain knowledge from those who have previous experience with certain topics. Students may access information locally and internationally. The chat rooms, discussion forums, Internet and emails facilitate this support system. Lammy (2009) also emphasizes that online communities provide better information, advice and guidance for the mature e-learners.

LMS for instructor support

The data from the academics highlight that LMS could also be classified as instructors' support in teaching and learning. This is indicative with one lecturer:

> "Yes, *LMS is an innovation approach to facilitate teaching and learning. While out of the office and lecture hall, one can facilitate teaching. One does not have to be lecture bound."*

Another lecturer said**:**

> *"It has a great impact in facilitating teaching and learning, because firstly, regarding the resources, the resources are easily available for all the students to access rather than going physically to the library. So, it is easy for them to access the resources that will help to tackle the different tasks that students are given. So nobody will have any excuses that they did not get any relevant resources for the task. Again***,** it saves time and energy*, because maybe you talk a lot while teaching but if students are given information, resources and given instructions on how to use resources online, it's easy for them."*

Instructors can gain greater ease of monitoring students and communicating with them through the use of chat rooms, discussion forums and emails. Furthermore, Tetiwat and Igbaria (2000) state that instructors can obtain new dimensions in professional development through sharing previous knowledge and new research with other lecturers in their particular fields. The instructors may also obtain instant feedback from web-based tests to assist in adjusting their teaching plans. The automatic feedback may also make for quick response time for students who can see their correct answers and mistakes immediately after taking a test. In short, the facilitators are granted extensive opportunities to create information to exchange with other instructors. Instructors gain more competence during the utility of LMS in teaching.

Supportive environment for learning

Data from the students' questionnaire: "*…technology improves some boring discourses."* For instance, thirty percent (six out of twenty) of participants from questionnaire data indicated that the integration of LMS in teaching and learning can enable interactive presentation (See *Table 5.1*). Some quotes from individual interviews with the academics follows:

A lecturer said,

"Time – more time to liaise with students, differentiated teaching is possible now, automated tests via the computer is possible. Group work amongst students is much easier."

Thirty percent of (six out of twenty) participants from the questionnaire indicated that LMS integration could be relevant for information access in the digital age, while twenty percent of (four out of twenty) participants believed that this technology could be used to foster team spirit at the training institution (*see Table 5.1*). Based on the data provided in the above instruments, one can conclude that LMS can be used for environment support. This is to say, anytime, anywhere access to learning materials and communication provides a supportive environment. Birch and Burnett (2009), furthermore, explain that pedagogical motivations with technology, involve the desire to engage students by making learning more enjoyable and proving a rich, relevant, meaningful and applicable learning environments that can encourage constructivist learning.

The table 5.1 was designed to illustrate some questionnaire data for questions 7 and 9. Tables are other means used to present quantitative data (Pietersen & Maree, 2007).

Questions	Students' experiences	Number of respondents	Number of respondents in %
7	Improved communication	10	50%
	Fosters teamwork spirit	4	20%
	Enables interactive presentations	6	30%
9	Enhances accessibility of resources	6	30%
	Serves as supportive environment	6	30%
	Provides information	6	30%
	Enhances independent learning	2	10%

Table 5.1 Students' experiences on the benefits of LMS for Learning

It is evident from the table above that communication is one of the greatest functions in using the

LMS, hence it impacts on learning. Interactive presentations, accessibility of resources, and supportive environment follow. Active participation and independent learning rank in the minds of few students.

LMS for student diversity

Training institutions admit students from different cultural backgrounds. As a result, these students bring along different experiences to the classrooms. A lecturer said: "*LMS is capable of accommodating diversity."* All three participants from individual interviews with the academics indicated that LMS could be capable of accommodating diversity: individual differences that may display varying learning styles, including visual, aural, verbal, kinesthetic, logical, social and solitary (Advanogy, 2007). One out of three academics even indicated that LMS integration could also allow students to work at their own pace, and stated that differentiated teaching for differing ability group of students could possibly be accommodated. The instructor needs to determine a profile of each learner, identify corresponding learning styles and therefore teach accordingly.

One student in the focus group interview said:

> ***"****Another thing is that, like myself I am very happy with this type of learning because I am very shy. I don't normally speak in class but aa I am so comfortable using this because I am free to ask questions."*

Kings College's (2008) comment suggests that there could be more encouragement aimed at disability groups to get them into higher education, and that the Disability Students Allowance (DSA) could be better advertised by virtual universities.

To summarize this section, postgraduate students and academics understand LMS as a useful tool for students' support, environment support, instructors' support and support for the diversity.

5.3 **DISCUSSIONS OF THE FINDINGS**

5.3.1 **Introduction**

The purpose of this study was to investigate the utility of the Learning Management System and understanding the experiences and interactions of the academics and postgraduate students with this technology in teaching and learning. Some postgraduate modules in which the researcher was engaged did not integrate LMS as a teaching and learning platform. The study was conducted to understand the experiences of the academics and students on the potentials and challenges accompanying the integration of LMS in teaching and learning. The principle of Construct-Connect theory is used to discuss the research findings and support the claims made in the study. Research findings are discussed using five elements of Constructivism and four principles of Connectivism as discussed in chapter three. The researcher interpreted and discussed the research findings from interpretivists' point of view.

5.3.2 ***Situation and questioning***

LMS for diversity of students

Learner population consists of individuals who possess various cultural backgrounds, as well as different learning experiences and preferences (Palloff & Pratt, 2002). It would be significant for the instructor to identify a learner profile before much is dealt with in the classroom. Gagnon and Collay (2000) argue that educators should organize the learning environment in such a way that students can explain and ask questions. This study revealed that the integration of LMS in teaching and learning is capable of establishing a kind of situation for students (including the shy) to be able to voice out their opinions. The shy may also feel free to ask questions to better understand a learning content and get feedback (Kings College, 2008). With this technology in place, questions are real time and synchronous (take place at the same time). I believe an individual would only be able to explain things when he or she is studying in a relaxed situation, non-threatening environment. For instance, hundred percent (all the three) of the participants from individual interviews with the lecturers indicated that LMS could be capable of accommodating diversity; it could cater for a variety of learning styles including; visual, aural, verbal, kinesthetic, logical, social and solitary (Advanogy, 2007). Visual students prefer using pictures, aural students prefer using sound, verbal students prefer using linguistic, both in speech and writing, and kinesthetic learners prefer using body, hands and sense of touch. Tileston

(2005) argues that kinesthetic learners may become discipline problems in a traditional setting, unless they are given the opportunity for movement. Tileston encourages educators to provide opportunities for the class to go outside or on the field trips or to role-play. Logical learners (mathematical) prefer using logic, machines; social (interpersonal) learners prefer to learn in groups or with other people while solitary (intrapersonal) learners prefer self-study. Hundred percent is a big number to suggest that the academics understand the value of LMS in teaching and learning (Advanogy, 2007). One would believe that students could only be able to explain issues and ask questions if learning content is presented in such a way that student's learning style has been catered for. It may be useless for the facilitator to spend time developing the content that cannot benefit their target learners. It could be thought that for educators to be able to achieve a set of learning outcomes, students' involvement, fulfilment of target skills and knowledge is essential. LMS meets the needs of individuals who may also have a particular learning style.

5.3.3 ***Grouping***

Active participation

The instructor may establish a process for grouping materials into authentic tasks or interactive tasks. Students may be divided into small groups to encourage effective participation, which is also seen as the improved social interaction by Birch and Burnett (2009). In the same way, constructivists believe that students could learn better from interactions and their experiences with learning content and their colleagues (Gagnon & Collay, 2000). Students construct new knowledge from their own interactions with the learning materials and the members of the group. They engage with learning tasks and make their own interpretations and meanings. Fifty percent from the students' questionnaire data indicated that LMS integration could assist students achieve authentic learning. This is a fair number to indicate that the idea is good. These students perceive LMS as a suitable media through which real learning (chances exist for full learners' engagement with their own learning) could be achieved and interactive tasks could be uploaded. Interactive tasks that could be presented on LMS would enable students to engage meaningfully with the content. Therefore active participation could be motivated.

5.3.4 ***Bridging***

Constructivists argue that the previous experiences of students should be incorporated into new learning environment (Gagnon & Collay, 2000). People have experiences in life, and in some cases, schools may only have to make these people aware of what such experiences could mean in an educational setting. In the same way, a need may arise for other experiences in order for a certain function to happen. For instance, two out of three academics and hundred percent (all four) from the students' focus group interview indicated that students could apply their computer literacy skills while exploring the contents of LMS. Most participants believe that LMS could assist students in applying acquired skills and knowledge. The application of knowledge and skills may resemble active learning (Charlesworth, 2004). Computer literacy becomes the prerequisite skill for the innovation of LMS in teaching and learning. This is to say that individuals should first acquire computer literacy skills before they could be able to utilize LMS in teaching and learning. Writers such as Charlesworth (2004) also indicate that learning should move from known to unknown. In other words, start with what students have experienced and know, and then use that as concrete basis for the construction of new knowledge. If this technology can incorporate students' previous experiences for easy learning, why would one decide not to utilize this idea in teaching and learning?

5.3.5 ***Reflect***

Gagnon and Collay (2000) advocate for learning environments in which students can reveal what they have learnt from the lecture. For instance, two out of three participants from individual interviews with the academics indicated that students were beginning each lecture with three minutes of reflection on how the LMS helped them to improve their understanding of the concepts, acquisition of new skills, knowledge and competence. This suggests that the idea is good because it is supported by more academics. I would personally see no harm in this technology if it also provides a sort of self-assessment or reflection of competence on the learner. Reflection is part of the learning process (Charlesworth, 2004). Moreover, Charlesworth (2004) argues that for appropriate assessment, there is a need for authentic evaluation of educational achievement that directly measures performance in the subject area. If LMS integration is able to make learners assess the knowledge and the level of skills they have gained from the previous lecture, one would think that it is a good and relevant idea in a training institution. Assessment

assists educators to determine how much a learner knows or does not, then revise the implemented plan and the approach if necessary.

5.3.6 ***Information that people acquire is worth exploring***

Learning resources

Connectivists believe that people search for information if it is relevant to tackle a problem. Therefore, potential sources of information should be identified and visited (Siemens, 2004). In educational settings, students may identify all those sources of relevant information and establish their connections with them (Siemens, 2004). Chat rooms, discussion forums and emails (LMS components) could facilitate the exploration of new information. If 75% from the students' questionnaire data complain of poor accessibility, how would they be able to use the LMS at all? One might not see the university management succeeding in its plans with this idea because it impacts on many users. Students' work is affected, and therefore they may develop negative attitude towards the use of LMS in their learning.

5.3.7 ***Learning and knowledge rests in the diversity of opinions***

Collaboration

Siemens (2004) suggests that when two or more people engage in a group discussion to exchange ideas on the content (topic), there are chances of learning from those opinions. This move is good because a huge quantity of information may result as the number of people increases. A group of people may have different perceptions about a topic. Even the arguments which they raise in support of their claims may be important and challenging. One might think critically about what the group has said, and which parts of information to include or exclude (Siemens, 2004). Fifty percent (ten out of twenty) of the participants from the students' questionnaire indicated that LMS may improve collaboration amongst the students. Fifty percent is a fair number to signify that this idea is good and relevant. Again, sixty percent from students' questionnaire data indicated that LMS can facilitate communication amongst the students, as well as with their lecturers. This is a reasonable number to suggest that students value the integration of LMS in their learning. Twenty percent (four out of twenty) of students even indicated that LMS could foster team work spirit in the training institutions. One would want to believe that many training institutions would like to observe a good team spirit prevail within

their communities. People may find it easy to collaborate when every member is friendly and welcoming. They could feel free and confident and be encouraged to share their opinions in a non-threatening situation (Gagnon & Collay, 2000). University life may set a new home for people with diverse background experiences, knowledge, thinking abilities and reasoning skills. To tap out information from a certain individual in the university community, one needs to connect personally or electronically to his or her colleagues (Siemens, 2004). In the same way, Paquette (2002) as cited in Adelsberger and Collins advocates for a kind of interaction that would permit learners to collaborate with all possible units of resources in the training institution. This includes interaction with instructors, managers and their peers for information. Van Merrienboer and Koper (2004) argue that technological change has been so extensive such that e-learning resources as a result of desktop access to multimedia and Internet are easily accessed. Literature also supports that LMS is capable of motivating knowledge sharing, information gathering, redistribution and opportunities for collaborative activities (Olufemi, 2007).

Supportive environment for learning and teaching

New technological advances in digital age, video conferencing, and use of emails, chat rooms and discussion forums facilitate students' collaboration (Siemens, 2004). There is no time constraint associated with information accessibility with LMS in place. This technology operates 24 hours. The learning process could take place anywhere and at any time. Betts (1998) reasons that the inclusion of technology in curriculum has established virtual communities, e-learning environments and distance learning, all of which facilitate learning anywhere, anytime and improve learner accountability and quantity of electronic resources for pedagogical purposes.

5.3.8 ***Learning is a process of connecting specialized nodes or sources of information***

LMS as learning resources

Siemens (2004) defines a node as a person or machine that has a potential to provide some information. In this study, nodes meant the individual students and academics. Every student or lecturer represents a unique source of information. It is believed that students establish group discussions because they know that a quantity of information might multiply with the increasing number of individuals. In groups, people would be able to present their opinions and think

deeper about what they have got to say. In the digital age, people might be able to utilize the technology such as LMS (with its chat rooms, discussion forum components) and emails for continuous retrieval of information from potential sources (while outside lecture theatres) any time (Siemens, 2004). It is a good idea when students consult with their colleagues and lecturers outside of the lecture time using the LMS. This might allow the students to access help whenever a need arises. One may not see any problem with this. So, what reasons would other lecturers and postgraduate students give for not utilizing this technology in teaching and learning at this faculty and in the virtual classroom?

5.3.9 ***Learning may reside in non-human appliances***

LMS for student support

According to Siemens (2004), non-human appliances may include networked computers, cell phones and all other digital appliances. Networked computers may have ample information relevant for pedagogical purposes. These computers do have websites or search engines which a student could use for exploration of additional information to supplement the one provided by their facilitators on the LMS. So, why would one not integrate this technology in teaching and learning? Moreover, the findings of this study also indicate that LMS integration could encourage the development of responsibility in students.

With this technology in practice, learning process is the function of the student. Students may also log on the LMS wherever they are, and access online content. It is important to note that the evolution of LMS was hoped to facilitate a number of learning modes; including virtual communities, distance learning and traditional face-to-face learning (Bates, 2006). In the same way, the University management has established this technology for a significant purpose such as pedagogical function. It is strongly believed that the university would not spend money in establishing this form of technology if it has no academic or pedagogical advantage to its community.

LMS for instructor's support

The availability of a sample of previously conducted research, assignments and portfolios could be of the greatest support to novice LMS users, including the instructors themselves. People are

always learning and instructors may require certain skills in order to choose appropriate tasks that would encourage students to ask questions, reflect and bridge students' previous experiences (Gagnon & Collay, 2000). The designing of online content that can promote interactive learning depends on the ability of the instructor to choose relevant content for his or her learner population. This technology could be of great help for the professional development of the instructor because it provides updated content and skills to its users. In the same way, it could be argued that the exposure that the facilitator or the instructor has with a certain technology is likely to have a great influence on the choice of media that a particular facilitator decides to use for teaching purposes. For instance, if the facilitator does not upload learning content on LMS, and is not using emails, chat rooms and discussions forums, it means there is no chance of encouraging the students to utilize these technology components in learning.

In some cases, LMS may also save energy and time on the part of the academics. There is likelihood that lecturers talk and travel less and shorter distances (Bates, 2006). What they need to do is facilitate online learning by selecting relevant resources to achieve set goals. However, this could be possible only after the appropriate skills have been acquired.

Literature also states that the integration of Learning Management System bears positive impact on teaching and learning. The findings by Wagner (2005) indicated that LMS could promote constructive learning (learning through activity engagement), provide reinforcement and increased accountability on the part of the student. Normally, the university faculty might love to see its students becoming responsible and more accountable citizens of South Africa who could further contribute positively towards the economic development of the country. The research findings by Alavi (2000) further indicated that GDSS (group discussion support system) supported collaborative learning, leading to higher levels of perceived skill development, self-reported learning and evaluation. Furthermore, Alavi (2000) indicates that LMS integration is a relevant media to change the emphasis of instruction away from the transmitting fixed bodies of information toward preparing students to engage in continuing acquisition of knowledge and understanding. If this technology can encourage the development of desired personal qualities and skills, what reasons would other training institutions provide for not integrating it fully in teaching and learning, where the majority of the future potential leaders of the country are being

empowered with appropriate skills and knowledge? Asmal (1995) and Pandor (2003), the former National Ministers of Education in South Africa, believed that one of the strategies to empower the disadvantaged citizens of this country could be through the implementation of e-education in schools. E-education comprised of issues such as e-learning (learning through the use of internet) and web-based learning, both of which could include the utility of LMS in teaching and learning. If the National Ministers of Education valued the significance of integrating this technology in teaching and learning, associating it with the improved quality of education, why would the institution not take the advantage of the potentials of this technology and improve its teaching and learning? Furthermore, LMS exists at the Faculty of Education. The existing technology infrastructure at this university is enough to promote the innovation of LMS as a teaching and learning platform. Moreover, it has been the intention of the South African government to implement ICT to transform teaching and learning (Asmal, 1995 & Pandor, 2003). The researcher believes that the LMS integration can work in South Africa because it would be fulfilling the vision of the government, which is to empower its citizens with technological skills. If a small number of lecturers is currently utilizing this technology at postgraduate level in the faculty, one may conclude that less is done to achieve the vision.

Based on the findings of this study, it is evident that few academics and students of the faculty were using LMS in teaching and learning. However, the same academics and students who participated during data collection in this study provided meaningful arguments for the inclusion of this technology in teaching and learning. Hundred percent of the participants in the focus group and hundred percent of the participants from lecturers interviewed indicated that LMS integration could provide huge quantities of pedagogical information for authentic learning. Moreover, sixty percent of the respondents from students' questionnaire indicated that LMS serves as a communication tool. Lecturers could upload the learning content onto the LMS, while students would log in and access the resources for tackling portfolios any time. Hundred percent (all three) of the participants from individual interviews with the academics indicated that LMS is capable of accommodating diversity and could cater for a number of learning styles because it has multimedia, visual, music and more. In contrast to the benefits, traditional teaching approach (which addressed only logical and linguistic learners) would not be able to satisfy all the learning styles, including visual, physical and solitary (Advanogy, 2007).

In critiquing Clark's (1994) idea, that media would bear no impact on learning, Siemens (2004) strongly argues that learning can occur from non-human appliances. Learning can take place from the use of computers and all other digital appliances. Networked computers may have relevant information for learning. There are also search engines which students could use for the retrieval of additional information to supplement the one provided by the facilitators. Based on the personal experiences and interactions with LMS, the researcher agrees with Siemens' (2004) argument that chat rooms, discussion forums and emails could promote collaborative learning. He has used, and still uses, these tools with the colleagues for collaborative learning. They are working well. To promote meaningful learners' collaborative and interactive learning, Gagnon and Collay (2000); the constructivists, emphasize that the designers of online content should include learning activities that are interactive to encourage learners' engagement for the construction of new knowledge from their experiences. They also argue that it would be of the greatest value for such content to allow for groupings of students, which would in turn establish better understanding from a number of individuals' experiences. Likewise, Siemens (2004), the connectivist, emphasizes that the learning process does take place from a diversity of opinions. This is to say, group discussions or team work enables its members to share experiences and views on a problem under question. In his chapter, Lowyck (2002) argues for learning in and from groups. Firstly, Lowyck (2002) indicates that learners can profit from the discussions because they have to coordinate their interactions through making their reasoning explicit and understanding the others' line of reasoning or argument.

Secondly, Lowyck (2002) explains that cooperation can elicit the so-called socio-cognitive conflict, which may force learners to revise their cognition when confronted with unknown or contradictory information from the team mates. Students should learn from criticisms and arguments. Thirdly, he indicates that collaboration may challenge the thinking processes, since one has to defend his or her point of view, offer arguments, tune own information to that of the partners, and evaluate possible solutions for problems. Lowyck's (2002) point is reasonable because learning becomes meaningful when one's mind is stimulated to think about a problem and derive a solution. Lastly, he mentions that cooperative learning influences both academic task fulfillment and student motivation in terms of increased students' self-efficacy, learning goal orientation, and intrinsic valuing of the learning task. Lowyck (2002) is correct because

educators design certain learning tasks in order to achieve a set of learning outcomes. Therefore any learning task that cannot achieve targeted learning outcomes is valueless. The integration of media in learning promotes real learning in assisting educators to achieve their goals.

Furthermore, Gagnon and Collay (2000) argue that online content must also provide a situation for students to ask questions. Data suggest that this technology provides information for learning purposes. Even shy students could feel free to ask questions for clarity when they feel comfortable with computers not interacting face to face with the humans. Such students might feel unintimidated to ask questions via the discussion forums, chat rooms and emails. The findings of this study also indicate that LMS integration in teaching and learning can motivate learners to reflect on their experiences. Students' interaction with LMS might help one weigh the level of technological competence, which would stimulate further learning. Traditional way of learning might not necessarily allow for this. Van Merrienboer and Koper (2004), furthermore, support that technological change has been so extensive that traditional approaches to distance education are no longer adequate, and therefore fail to address the needs of distance learners.

5.4 Implications for teaching and learning

The research findings implied that both the academics and students are aware of the use and potential of LMS integration in teaching and learning. The integration of LMS in the curriculum can enhance teaching and learning processes. For example, hundred percent of the participants in the focus group and hundred percent of the participants from lecturers' interviews indicated that LMS integration can provide huge quantities of pedagogical information for learning. There is overwhelming agreement that this form of technology could be used as a communication tool. Many participants in this study believe that LMS could be a good media for teaching and learning. This is in support to Conole's (2004) claim that e-learning is transforming education, and provides access to a wealth of resources and new forms of communication including virtual communities. To enhance teaching and learning, students should be given a chance to interact with LMS for constructivist learning (constructing knowledge from experiences and interactions with their peers). LMS integration can stimulate the development of individual responsibility. In contrast to learning opportunities, the same population sample provided some data on the challenges facing the implementers of LMS in teaching and learning. For instance, 75% from

students' questionnaire and hundred percent of the students from the focus group interview indicated that network failure (some times due to load shedding) was the major problem. One out of three academics from interviews indicated that down-loading speed and poor computer memory were some of the challenges encountered in utilizing this technology. In short, all the parties had a picture of what LMS could do, and what could be the dominating obstacles hindering its effective and efficient integration. The adoption and integration of Educational Technology in the South African Schools is likely to succeed because this idea has been supported by the Department of Education in the past (Asmal, 1995 & Pandor, 2003). The methodology answered the critical questions of the study.

5.5 Conclusion

The chapter has analyzed, represented and interpreted the data collected through diverse number of methods. The research findings were then discussed and matched with the key questions that the researcher has been trying to tackle throughout the research process. Arguments were made, based on the evidence from these research findings. Criticisms of learning media (LMS) integration that came from other researchers were also addressed. Guided analysis was used during the analysis. The principles of Construct-Connect theory were used to guide the analysis and substantiate the researchers' claims. The subsequent chapter concludes the study. A summary, together with recommendations for teaching and learning, are presented in the next chapter.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 **Introduction**

This chapter provides the summary of the study. According to Hofstee (2006), this chapter exists to tell readers what the researcher has discovered and the value of it. The conclusions were made on the basis of the research findings from the academics and students' experiences of using the LMS in teaching and learning. Some recommendations have been made for future research on issues related to this study.

6.2 Summary of the study

Chapter one introduced the whole study. The research topic, research questions, problem statement and rationale of the study were presented. Chapter two provided literature review about the research topic. This literature revealed the results of some previously conducted studies on the utility of LMS in teaching and learning (in virtual communities, distance learning, traditional face-to-face and in blended learning), and the methods used in these studies were highlighted. The literature provided a better picture on the effects of the utilization of LMS in teaching and learning. It has highlighted some of the criticisms against the inclusion of media in teaching and learning by Clark (1994) and Aedo (2002).

Chapter three discussed the framework. Construct-Connect theory: the combination of Constructivism (Gagnon & Collay, 2000) and Connectivism (Siemens, 2004). These theories were combined because they could supplement each other, and they are both theories of digital age. Some elements of constructivism and the principles of Connectivism were stated and discussed. These included situation, questioning, grouping, bridging and reflecting (Gagnon & Collay, 2000). The information that people acquire is worth exploring, Learning and knowledge rests in the diversity of opinions, Learning is a process of connecting specialized nodes, and Learning may reside in non-human appliances (Siemens, 2004). The criticisms against these theories were also highlighted.

Chapter four explained the research methodology used in this study. The mixed methods

approach (Tashakkori & Teddlie, 2003) was used for data production. Its overall advantages and disadvantages have been highlighted. Both qualitative and quantitative approaches were applied during data production. Questionnaire constituted the quantitative approach for producing a range of data on the opinions of the participants in relation to the utility of LMS. A simple random sampling was applied to select the participants. The second level of data collection (qualitative approach) incorporated focus group, individual interviews and non-participatory observation for the production of thick data. Convenience purposive sampling was applied to select the participants (McMillan & Schumacher, 2006). This chapter also briefly explained ways in which data were analyzed (thematic analysis: Aronson, 1994). The validity, reliability and trustworthiness (credibility) of the research findings and ethical issues were discussed.

In chapter five, the study analyzed, represented and discussed the research findings. Thematic analysis (Aronson, 1994) was applied for data analysis. The data were coded and categorized. The research questions were categorized according to possible emerging themes (opportunities and challenges in this study). The research findings were matched with the critical questions, and used to tackle some of the debates or criticisms around media integration in learning. The principles of Construct-Connect theory and the literature review were used to guide the analysis, interpretations and the discussion of the research findings. These were applied to substantiate the arguments that the researcher raised on the basis of the research findings in this study.

6.3 Findings

Hofstee (2006) argues that this section is concerned with the things that a researcher can deduce from his/her work as a whole. It reveals all those lessons that the researcher has learnt from the research findings. A similar approach was used in this study. Based on the analysis of data from the users of LMS, the study concluded that the selected academics and postgraduate students have knowledge of LMS, its potential and challenges in teaching and learning. The research findings revealed that LMS enhances teaching and learning:

- promotes access to learning resources, improves social interaction and peer learning amongst the users;
- establishes relevant environments for active participation;
- Furthermore, it serves as student support, instructor’s support, supportive environment

and support student diversity.

It also appears in Sherlock's (2009) article that Educational Technology offers a chance for a very mixed group of students, which was of course impossible with traditional way of teaching and learning. The integration of LMS in the curriculum shifts the learning process from instructor-centered to student-centered approach (Birch & Burnett, 2009). Students become active constructors of knowledge and meaning-makings. Students are socially able to achieve deeper levels of knowledge construction. They create shared goals, shared exploration and therefore achieve common outcomes (Palloff & Pratt, 2001).

Contrary to the benefits, the study has also revealed that:

- accessibility;
- quality of hardware, number of computers with Internet, physical barriers;
- technical skills are major challenges facing the users of LMS in teaching and learning.

It is also evident from research conducted by Birch and Sankey (2008) that the integration of educational technology is faced by a number of obstacles including institutional, individual and pedagogical factors. Asmal (1995) valued the inclusion of technology in the curriculum as one of the most effective strategies to empower the disadvantaged citizens of South Africa. The data from LMS users suggest that this technology really achieves the mission statement mentioned in the above because of its strength to promote active participation, and quantity of learning resources. The discipline of Educational Technology is trying its level best to utilize technological resources at its disposal. However, a small number of students' population is currently using LMS for postgraduate learning in this Faculty. The implication is that only a few individuals might experience the promises of Educational Technology integration raised and discussed in this study.

The research findings indicated that the users of LMS have a positive attitude towards its integration, but they are currently facing some pitfalls. Observation session revealed that LMS users enjoy it, in spite of the challenges are facing. Teaching and learning are not currently done to the capacity of the existing technological infrastructure at the postgraduate level in the faculty. The data suggests that this technology has many benefits for teaching and learning purpose, but

few postgraduate modules are currently utilizing it to its optimal potential. All the critical questions have been satisfactorily attempted.

6.4 Recommendations for teaching and learning

Possible ways of dealing with the raised and experienced hindrances;

- For regular occasions of network failure (which sometimes resulted from load shedding), the University management may establish a back-up generator that could automatically switch on whenever there is any unexpected power cut;

- The University may increase the number of computers (with Internet) to match its student population. Students could now be able to access computers when they need to;

- The management of the faculty may purchase and install sophisticated computers to match emerging technology advancements that can accommodate a smooth utility of Learning Management System in all the disciplines;

- Students may be free to visit other campuses for accessibility of computers with the Internet;

- In a case of printers which lack paper, permanent technical staff may be employed, for loading paper, and other technical issues and;

- In-service training workshops may be conducted regularly, to equip students with relevant technical skills that match emerging technologies.

6.5 Conclusion

Chapter six sets the conclusions the study made on the basis of the research findings. It also gives some possible recommendations to tackle the challenges raised by the participants. The researcher believes that if the recommendations could be put into practice, LMS integration might be effectively implemented to promote teaching and learning. With the concluding

remarks, and recommendations based on the research findings, I believe that further research must be conducted by the Educational Technology specialists to explore post graduate students' experiences with LMS in other campuses of the university, or carry out a similar study with other universities' Faculties of Education. This could help researchers gather better understandings on the LMS integration in teaching and learning. It is evident that the use of the LMS is certainly useful and supportive of learning and teaching, even amidst challenges faced by the users and indicated by research findings in this study.

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Appendix A

University of KwaZulu – Natal
Edgewood Campus
Kinnoull Flat 2
Room 69
November, 2007

The Dean
The Faculty of Education
University of X
Hlejula Campus

Dear Professor

RE: A REQUEST TO CONDUCT RESEARCH

I am a Masters student conducting a research project titled; "**investigation of the use of a Learning management system in postgraduate educational technology modules."** I kindly seek your permission to conduct my study within the University premises because I need to interview the academics and students of this University.

The integration of Learning Management System in teaching and learning has been able to enhance learners' critical thinking and problem – solving skills development. In the same way, The South African government developed and established an educational policy (OBE) whose main idea was to empower the marginalized citizens of this country through the engagement in group work with other organizations, community and using Science and Technology (Asmal, 1995). Therefore, the study is hoping to help in the fulfillment and achievement of the mission statement of the government policy.

I intend to conduct interviews and observations with lecturers and administer questionnaires to students as well as engage students in semi-structured interviews (both individual and focus group).

Attached to this letter is a list of ethical issues I will take into a consideration with my participants:

Notes to the participants:

1. There will be no benefits that participants may receive as part of their participation in this research project.
2. Please attempt to all questions.
3. Respond to each question in the manner that will reflect your own personal opinion.
4. Your identity will not be divulged under any circumstance.
5. There is no right or wrong answer.
6. All your responses will be treated with strict confidentiality.
7. Fictitious names will be used to represent participants' names (real names of the participants /institution will not be used throughout the research process).
8. Participation is voluntary; therefore participants are free to withdraw at any time without negative or undesirable consequences to them.
9. The participants will not be under any circumstances forced to disclose what they do not want to reveal.
10. Audio or Video recording can only be done through the permission of the participant.
11. Data will be stored in the University locked cupboards for a maximum period of five years and thereafter destroyed.

This study is supervised by **Mr. Khoza. S. B. Cell: 0833111468, Te1: (031) – 260 7595, Email address: khozas@ukzn.ac.za .**

I thank you in advance.

My Contacts: Cell: 083 9299 870 or (00266) 58074762 Tel: (00266) 22 401 753

Email addresses: paulmafata@yahoo.com or 206512039@ukzn.ac.za

I thank you in advance.

Yours Sincerely
Mafata Paul Mafata

Appendix B. **Informed consent for Academics**

University of KwaZulu – Natal
Edgewood Campus
Kinnoull Flat 2
Room 69
November, 2007

The Participant
University of X
Hlejula Campus

Dear Participant

RE: A REQUEST FOR YOUR PARTICIPATION

I am a Masters student conducting a research project titled; "**investigation of the use of a Learning management system in postgraduate educational technology modules."** I kindly request you to participate during interviews and observations during data generation period which will take place within the University premises. My study targets the academics because of their experiences in teaching and learning to which you belong and therefore may form a part of my sample.

The integration of Learning Management System in teaching and learning has been able to enhance learners' critical thinking and problem – solving skills development. In the same way, The South African government developed and established an educational policy (OBE) whose main idea was to empower the marginalized citizens of this country through the engagement in group work with other organizations, community and using Science and Technology (Asmal, 1995). Therefore, the study is hoping to help in the fulfillment and achievement of the mission statement of the government policy.

Notes to the participants:

1. There will be no benefits that participants may receive as part of their participation in this

research project.

2. Please attempt to all questions.
3. Respond to each question in the manner that will reflect your own personal opinion.
4. Your identity will not be divulged under any circumstance.
5. There is no right or wrong answer.
6. All your responses will be treated with strict confidentiality.
7. Fictitious names will be used to represent participants' names (real names of the participants /institution will not be used throughout the research process).
8. Participation is voluntary; therefore participants are free to withdraw at any time without negative or undesirable consequences to them.
9. The participants will not be under any circumstances forced to disclose what they do not want to reveal.
10. Audio or Video recording can only be done through the permission of the participant.
11. Data will be stored in the University locked cupboards for a maximum period of five years and thereafter destroyed.

This study is supervised by **Mr. Khoza. S. B. Cell: 0833111468, Te1: (031) – 260 7595, Email address: khozas@ukzn.ac.za .**

I thank you so much for your precious time and assistance.

My Contacts: Cell: 083 9299 870 or (00266) 58074762 Tel: (00266) 22 401 753

Email address: @yahoo.com and 206512039@ukzn.ac.za

I thank you in advance.

Yours Sincerely
Mafata Paul Mafata

If you agree to participate, please sign the following declaration form:

A DECLARATION FORM

I …… (Full names of participant) hereby confirm that I have read and understood the contents of this document and 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 PARTICIPANT DATE

…… ……

Appendix C **Informed consent for students**

University of KwaZulu – Natal
Edgewood Campus
Kinnoull Flat 2
Room 69
June, 2008

The participant
The University of X
Hlejula Campus

Dear Participant

RE: A REQUEST FOR YOUR PARTICIPATION

I am a Masters student conducting a research project titled; "**investigation of the use of a Learning management system in postgraduate educational technology modules."** I kindly request you to participate in the study during data collection that takes place within the University premises. The research targets postgraduate students and the academics handling postgraduate modules to which you belong and therefore form a part of the sample for my study. You will be expected to participate in focus group interview which will be in three contact sessions, and also fill in a questionnaire which will be twice during the data production process. An observation will be conducted where students will be observed in using LMS in learning. The processes are anticipated to be conducted at least thrice during the data production period.

The integration of LMS in teaching and learning has been able to enhance learners' critical thinking and problem – solving skills development. In the same way, The South African government developed and established an educational policy (OBE) whose main idea was to empower the marginalized citizens of this country through the engagement in group work with other organizations, community and using Science and Technology (Asmal, 1995). Therefore, the study is hoping to help in the fulfillment and achievement of the mission statement of the government policy.

Notes to the participants:

1. There will be no benefits that participants may receive as part of their participation. in this research project

1. Please attempt to all questions.
2. Respond to each question in the manner that will reflect your own personal opinion.
3. Your identity will not be divulged under any circumstance.
4. There is no right or wrong answer.
5. All your responses will be treated with strict confidentiality.
6. Fictitious names will be used to represent participants' names (real names of the participants /institution will not be used throughout the research process).
7. Participation is voluntary; therefore participants are free to withdraw at any time without negative or undesirable consequences to them.
8. The participants will not be under any circumstances forced to disclose what they do not want to reveal.
9. Audio or Video recording can only be done through the permission of the participant.
10. Data will be stored in the University locked cupboards for the maximum period of five years and thereafter destroyed.

This study is supervised by **Mr. Khoza. S. B. Cell: 0833111468, Te1: (031) – 260 7595, Email address: khozas@ukzn.ac.za .**

My Contacts: Cell: 083 9299 870 or (00266) 58074762 Tel: (00266) 22 401 753

Email address: paulmafata@yahoo.com and 206512039@ukzn.ac.za

I thank you in advance.

Yours Sincerely
Mafata Paul Mafata

If you agree to participate, please sign a declaration form and kindly fill in the questionnaire attached to this letter:

DECLARATION FORM

I …… (Full names of participant) hereby confirm that I have read and understood the contents of this document and 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 PARTICIPANT DATE

…… ……..

Appendix D1. A Questionnaire to be completed by the students

Would you please assist me to conduct the study on "**investigation of the use of a Learning management system in postgraduate educational technology modules at the South African University.**" **Please tick relevant answers** where options have been provided?

1. How often do you incorporate Learning Management System (LMS) in your learning?
   (a) Very frequently (b) less frequently (c) not at all
2. How does the LMS integration facilitate group discussion during online lecture?

---

3. What kind of learning can you achieve with this technology which would be impossible without it?
   I. Active learning, II. Authentic learning, III. Passive learning

4. What challenges are you currently facing in utilizing LMS in learning?

---

5. Would you suggest that these challenges be addressed?
   Yes N0

6. Why would you suggest that these challenges be addressed?

---

7. What opportunities does the LMS integration have for you in learning at the University?

---

8. How does the inclusion of LMS help you reveal or reflect on your previous experiences?

---

9. What reasons would you give for the establishment of LMS by the University for learning?

   ---

10. Does students' performance improve with the integration of a Learning Management System in learning?

    Yes N0

11. Do you think the integration of LMS may improve the quality of learning in this University?

    Yes N0

Please explain how? ----------

---

12. What reasons would you give in advising other academics and students of the University to utilize LMS in learning?

    ---

13. Explain how the inclusion of LMS may maximize information access in learning?

    ---

14. How are you currently using LMS to enhance learning?

Thank you so much for your assistance and time.

APPENDIX D2

Responses provided by the majority of students' questionnaire (20 respondents);

QUESTION	RESPONSES	NUMBER OF RESPONDENTS	NUMBER OF RESPONDENTS AS IN %
2	Source of learning content	6	30%
	Communication tool	12	60%
	Active participation	2	10%
4	Poor accessibility	15	75%
	Technical competent skills	3	15%
	Physical barriers	2	10%
7	Improved communication	10	50%
	Fosters teamwork spirit	4	20%
	Enables interactive presentations	6	30%
9	Enhances accessibility of resources	6	30%
	Serves as supportive environment	6	30%
	Provides information	6	30%
	Enhances independent learning	2	10%

Table 5.2 Students' experiences on the benefits of LMS for learning

APPENDIX E

Transcriptions of focus group interview (with students)

Focus group interview with the participants who have indicated from the questionnaire that they were frequently utilizing LMS in their teaching and learning, and their responses talked to the critical questions:

Researcher. How does LMS facilitate your learning? Does it help you in learning?

Interviewee A, it provides a lot of information.

Interviewees B, C & D: (simultaneously) yes it does.

Researcher: nhee... any other idea?

Interviewee B: again, if I have a problem on understanding issues on the topic, I can consult my lecturer or even my colleagues immediately; I don't have to wait for the time for the lecturer.

Interviewees A: it saves time and allows one to attend a problem whenever it arises.

Interviewee, C and D. no response.

Researcher: okay, how… how does the incorporation of LMS help you link your previous experiences and knowledge to the new learning environment?

(Pause).. Interviewee B: you know we can apply what we already have since we are computer literate, we can apply all the skills that we have acquired. Interviewees A, C and D, mmm..Yes.

Researcher: any other thing. It is not there. How does the integration of LMS help you learn from your colleagues?

Interviewee C: we can share; we normally share our presentations online and then comment on them. These help us a lot.

Researcher: what features does LMS have which enable you share, share with your colleagues?

Interviewee D: chat rooms**. Interviewee C:** discussion forum**. Interviewee A:** where we can email the lecturers and ask questions who can also send the email back to you with answers.

Researcher: okay. Nhee. What advantages does the utility of LMS in teaching and learning have for you?

(Pause) interviewee B: we use the skills, you know, we already have, computer literacy to surf the Internet. **Researcher: nhee.**

Interviewee C: aa another one, I know where to get information any time.

Researcher: any time?

Interviewee A: another thing is that, like myself I am very happy with this type of learning because I am very shy. I don't normally speak in class but aa I am so comfortable using this because I am free to ask questions. **Researcher: nhee. Interviewee A** (continues) without facing any body but at the end I know I am getting the information**.**

Researcher: okay.

Interviewee A (continues) again, aa it builds some sort of self-discipline, as a student, I see that you have to be responsible for your own learning.

Researcher: yah.

Interviewee C: it promotes a… (Pause) self confidence**. Interviewee B**: and again you can yah, access books online, **interviewee A**: yes. **Interviewee B**: if you buy books outside here for sure are very expensive. **Interviewee A**: yes. **Interviewee C:** oh, I just want to say aa or it promotes individual, independent learning.

Researcher: this is a good idea. Now explain how the LMS promotes students' networking for their ideal learning?

(Pause) **interviewee B:** yah, through LMS, nhee.

Researcher: yah.

Interviewee B (continues) we can chat with our colleagues, chat with our lecturers, chat with students around the campus.

Researcher: okay. Now in your own opinions, what factors do you think facilitate or prohibit the integration of LMS in teaching and learning? (Pause).

Interviewee B: you know the lack of skills, lack of skills always is factors. Very much interfere with the use of LMS.

Interviewee C: that prohibits the chances.

Researcher: so if means now if academics lack suitable skills aa is likely to impact on learning of students?

Interviewee A: sometimes, I think is about what lecturers are assuming what I mean the selection of the content they need to put on the LMS. So I think that goes along with preparations because if a lecturer may put something that will not benefit us it means there is a problem, like literacy skills.

Researcher: cut and paste.

Interviewee A (continues) I think the other thing is the space allocated for each course is so limited. So, it is not enough for every lecturer. The space is limited.

Researcher: space! So, in the case of the number of computers that you are using, is there any problem?

Interviewee A: we have problems, we cue the whole day for the computers, we don't access information any time you want. There is a controlled number of computers.

Researcher: okay, so what are other challenges do you a…encounter in using LMS in teaching and learning?

Interviewee A: apart from being computer literate, as it is a requirement in this course, you find that there are other skills that you need to have acquired like browsing and searching skills, if you are not confident in that you idle in the class. So I think we need more skills in dealing with this LMS, other than computer literacy alone.

Researcher: yah, say something about technical problems, are technical problems rare?

Interviewees A, B, C and D: (simultaneously) that one is terrible.

Researcher: terrible!

Interviewee B: nowadays we are experiencing load shedding, is even worse. So when you want the computer now, the server is down, we have got so many problems

Researcher: so sometimes you are not even able to do your work.

Interviewees (A, B, C & D): (simultaneously) yes.

Researcher: then so what do you think happens to those who need to submit their work, assignments?

Interviewee A and B: it's a problem. They are always behind. **Interviewee A**: yes.
Researcher: there is no networking? So I do think this is likely to impact on other students' collaborative learning.
Interviewees (all): yes.
Interviewee A: sometimes you want to consult your colleagues and you find that the server is down. **Interviewees** B and C: yes. Interviewee B: you become so demotivated at that particular time it's like.

Interviewees A, C & D: yes.

Researcher: yah having indicated these challenges, what solutions, what possible solutions do you think can be taken into the considerations?

(Pause**) interviewee A**: yah you see this one of load shedding, as well as servers, I don't see any possible solution, I think those are the major challenges, critical challenges or critical issues. They can be addressed by the way I don't know, but I understand if there is a chance that these are addressed, that would help us a lot.

Interviewee C: yes, it is serious.

Researcher: what about the number of computers, would say, would you encourage the university to increase, buy more computers?

Interviewees A, B, C & D (simultaneously): yes very much.
Interviewee D: and also replace the computers frequently because some of computers are very old. They are just decorating. **Interviewees** A, B, & C, (laughed).

Researcher: how, how does the inclusion of LMS in teaching and learning motivate you to learn? What does it have that makes you learn better?

Interviewee B: information that is loaded on the LMS can be accessed.
Researcher: nhee.
Interviewee B (continues) the lecture. So during the lecture we just consult and ask questions.
Researcher: what do you think would you learn better without LMS?
Interviewees (all): not without it. **Interviewee C**: more especially while we are transforming.
Interviewees A, B, C (all): yes.
Researcher: transforming! What do you mean by saying we are transforming now?
Interviewee C: we are shifting the way of teaching. **Interviewee A**: the new way of learning.
Researcher: I want to get more about this new way of learning.

Interviewee B: this is a learner-centered approach so whereby the learner searches for information, you are not the one as the teacher; you are not one to tell the students.

Researcher: the learner discovers information. Okay.

Interviewee A: and also aa I like it because I learn my own time and at the same time being responsible.

Researcher: be responsible? Okay, yah, yah. Now tell me, would you encourage other students to use LMS in their learning and teaching?

Interviewees A, B, C & D (all): yes.

Interviewee A: as we have just discussed, there is information, most relevant information, it caters for individual learning styles, it helps up to your pace of learning as we are individuals. **Interviewees B** and **C**: yes. **Interviewee A**: it has multimedia.

Interviewees B and **C**: yes.

Researcher: now I would like to say thank you so much for your time and assistance. I promise to share the findings of my study with you, your input and see what you have done. Thank you so much.

Interviewees A, B, C and D: bye. (Laughed).

APPENDIX F. Transcriptions of students' individual interviews

APPENDIX F1 Transcriptions with interviewee A

Researcher: In our focus group interview you indicated that computers are limited for facilitating effective integration of LMS in teaching and learning. What did you mean by this?

Interviewee: the faculty has two computer LANs, one for the postgraduate students and the other for undergraduate students. In many cases undergraduates occupy computers in our LAN.

Researcher: Is there anything wrong with sharing resources with your fellow students?

Interviewee: In this case yes, because we do not use or access these computers whenever we so wish. We have to wait for them to do their work.

Researcher: How does this impact on your learning?

Interviewee: We missed so many due dates. We were not able to complete our portfolios in time.

Researcher: I thank you so much for your time and assistance.

APPENDIX F2: Transcriptions with interviewee D

Researcher: In our focus group interview, you indicated that computers are not enough for the integration of LMS, and also stated that some of them are very old. How does the age of a computer impact on its efficiency?

Interviewee: Old computers have a poor memory**.**

Researcher: how does its memory quality affect its efficiency?
Interviewee: Old computers cannot match advanced technological programs in the information age. The memory affects the quality and quantity of loadable content.

Researcher: You also mentioned that you cannot learn better without the integration of LMS in teaching and learning. What reasons do you have in your mind?

Interviewee: LMS contains interactive activities which I think can promote active learning.

Researcher: I thank you very much for your assistance and time.

APPENDIX G1: transcriptions of Interview with the academics

Interview with participant M (academics).

Welcome to this interview. Like I have indicated to you earlier in your letter of participation; my research topic is "**investigation of the use of a Learning management system in postgraduate educational technology modules**. The conditions shown in the informed consent remain the same.

Researcher: Do you currently have any of your modules uploaded onto the LMS / Learning Management System? Please explain why?

Participant : Yes, the LMS is a learning management system that allows for interactive online teaching and learning

Researcher: Do you use the LMS to facilitate teaching and learning? Explain your answer?

Participant : Yes, it is an innovation approach to facilitate teaching and learning. While out of the office and lecture hall, one can facilitate teaching. One does not have to be lecture bound

Researcher: If Yes,In your own opinion, how can the integration of LMS promote collaborative learning in your lectures?

Participant: The discussion forums, chat rooms are useful to encourage peer collaboration amongst students. It also allows for group work. The LMS also allows for easy access to the Internet for students to engage in research based learning

Researcher: What do you do to link students' previous experiences with LMS?

Participant: The LMS has functions such as resources list, previous course outlines and assignments. Students are encouraged to use these resources and access them for the course or module

Researcher: What do you do to improve teaching and learning with LMS at your working environment?

Participant: Students are encouraged to use the LMS. Assignment topics and tests dates are posted on the LMS. Students registering for the module have to have some pre requisite knowledge of accessing the Internet and web pages.

Researcher: What do you do to motivate students reflect on what they have learnt with the integration of LMS in teaching and learning?

Participant: Students begin each lesson with a three minute reflection of how the LMS helped them to improve their understanding and acquisition of new skills,

knowledge and competencies.

Researcher: What kind of environment do you establish for students to ask questions with the inclusion of LMS in teaching and learning?

Participant: Students ask questions via email, discussion forum or chat room. These questions are real time and synchronous. I simple moderate the discussion forum once a week. This allows for peer collaborative learning as students themselves give clarity to the questions being asked. In this way they learn from each other and tend to understand the clarity better than I would explain.

Researcher: Does the integration of LMS have any effect on your facilitation? Please explain how?

Participant: Yes, I have more time to cover ground of the syllabi. Independent learning is encouraged. Students can work at their own pace. Differentiated teaching for different ability group of students is accommodated

Researcher: What can you achieve with LMS in teaching and learning which could not be possible with the traditional way of teaching (teacher-centered instruction)?

Participant: Time – more time to liaise with students, differentiated teaching is possible now, automated tests via the computer is possible, group work amongst students is much easier. There is access to more information.

Researcher: What barriers/challenges do you encounter in incorporating LMS in teaching and learning?

Participant: Possible challenges with this technology, bandwidth, quality of computer – memory / speed, printers – sometimes no paper for students to print

Researcher: In your own opinion, how may such challenges hinder students from connecting for information under the constructivist learning?

Participant: frustration when printer does not work, down loading time is too long … - slow bandwidth

Thank you so much for your assistance and time

APPENDIX G2 Transcriptions of academics interview

Participant K

Researcher, welcome dear participant to the interview. My research topic is "**investigation of the use of Learning management system in postgraduate teaching and learning in the Faculty of Education"**. Let me also indicate that the conditions stipulated under the informed consent still stand as they are. I have got some few questions here for you to answer. The first one is;

Researcher: Do you currently have any of your modules uploaded onto the LMS?

Participant: Yes.

Researcher: Do you have any reason for that?

Paticipant: mma, yes, LMS is a very interactive means of learning.

Researcher: Does the University have any sort of infrastructure or do you see any need for LMS?

Participant: Well, as I have indicated earlier, LMS is capable of introducing constructivist learning.

Researcher: thank you so much for that part. amm….**in your own opinion, do you think the integration of LMS can promote collaborative learning in your lecture in case it has been implemented?**

Participant: I think it can very strongly because LMS lends itself to students from various institutions, various countries as well you know ... (pause)... to actually access information on learning areas, subject that could be on LMS, so definitely yes, collaborative learning can be promoted very strongly in the filed of technology. Technology is relatively new field in South African Educational System, as well as in schools. yes; collaborative learning will also be great as a lot of information can come because it is internally.

Interviewer, nhee….

Researcher: How do you, do you think is also possible for maybe the user of LMS, to be able to set a kind of situation in which students' previous experiences can be

integrated into the new learning environment?

Participant: Aa.. if students have got questions, I think database of some sort , can log those questions on, you know, if possible students wait to read, extra, so people can look at students' previous experiences with the regard to LMS extra, you know so, I think it is very possible for students' previous experiences ..aa…to work very very well with LMS.

Researcher: nhee… do you think..a.. the user of LMS can be able or the integration of LMS can improve teaching learning?

Participant: most definitely, because some times my experiences from teaching at schools and at the university, you find that certain students, feel intimidated whatever reason to ask questions, right on LMS there is goanna no intimidation as such, if they want to ask questions or whatever, because they are not linking to a person or a lecturer, so you know, I think any question can be posed. Because I am sure you would also understand that in classroom situation such students do feel intimidated or afraid in some way that the question maybe insignificant to ask meanwhile it may be very very important question/aspect, many aspects. Another thing is that if you are looking at teaching and learning, there is no such stipulated time. A student can always go to LMS do anything at the point in time and access information at any time.

Researcher: OK. What can you achieve with LMS in teaching and learning which could not be possible with the traditional way of teaching (Teacher-centered instruction)?

Participant: I partly answered this question; students do not feel intimidated to ask questions with LMS, they are free to ask questions and interact with their learning environment, Postgraduates and so on. Free to open up with LMS. This technology accommodates mixed learning abilities.

Researcher: now in some cases like you have indicated that you are currently integrating LMS in this case, what do you think are the challenges which

may hinder you from including LMS in teaching?

Participant: budgets constraints, with budgets we can set up, it can work very effectively.

Researcher: what about the attitudes of other academics? Do you think they can be willing?

Participant: opinion, I cannot see that they can be unwilling to LMS because it can only enhance the actual learning area, subject. Besides that, it goes beyond the class room. Students can access information at anytime. If somebody is reluctant to integrate LMS in teaching and learning that is problematic, I am saying my opinion.

Researcher: I thank you so much for your time and assistance.

Participant: I just hope that my responses were satisfactory towards your research.

END

APPENDIX G3 Transcriptions (academics interview)

Participant L

Researcher: welcome to this interview dear participant, let me remind you of my topic; "**investigation of the use of Learning management system in postgraduate teaching and learning**." Let me also indicate to you that the conditions stipulated under our informed consent still stand as they are. So my first question here for you to answer is,

Researcher: **do you currently have any of your modules uploaded onto the LMS?**

Participant: Yes.

Researcher: please can you explain your answer?

Participant: LMS sets interesting learning environment in the virtual classrooms.

Researcher: which means you are using LMS in your teaching now?

Participant: yes for now. yes, I think it's a good idea to use it because students learn more (pause) on the program or about the program. **Researcher: nhee….**

Participant: (continues) there are, for example, books which could be available on the program for which they cannot get from the library. So if it is available online it is easy to access these resources.

Researcher: , nhee…. Now in your own opinion do you think the integration of LMS in teaching could promote collaborative learning?

Participant: of course yes, because if the students are also computer literate, they are able to log in to the program and to work together as a team. It does facilitate teaching and learning. There are those students who are shy to talk in the classroom, but if you are using this technology, they can voice out their opinions. They are not talking to the people but to a computer.

Researcher: so amm, for example, if we want to teach a certain concept through the Internet, it means we first have to teach these learners computer literacy?

Participant: yes.

Researcher: now, amm... do you think the integration of LMS would have any impact on your facilitation? Aa maybe improving your own teaching or improving your own method or the way students learn?

Participant: I think it has a great impact in facilitating teaching and learning, because firstly, regarding the resources, the resources are easily available for all the students to access rather than going physically to the library. So it is easy for them to access the resources that will help to tackle the different tasks that students are given. So nobody will have any excuses that they did not get any relevant resources for the task. Again, it ***saves time and energy***, because maybe you talk a lot while teaching but if students are given information resources and given instructions on how to use resources online, it's easy for them.

Researcher: aa what do you think you can achieve with LMS in teaching and learning which could not be possible with traditional way of teaching (the teacher-centered instruction that we used to have)?

Participant : LMS caters for all learning styles**.** Again, it teaches the responsibility amongst the students. Because plan is there for students to follow, so they know, if they have project or task which they have to do, they just log in and do the work, and submit on the due date. So it teaches them a lot of responsibility.

Interviewer, nhee.

Researcher: aa.. I was also aware that you said it is easy for you to include LMS in your teaching now. What are the possible barriers that you may face/have?

Participant: (pause)... I think basically in our department, I would say some of us are not

full time lecturers, so it is not easy to make changes within the systems while you are still going to leave. This is a challenge to me.

Researcher: so how may such challenges hinder on learning /teaching in general?

Participant: I will also base this on educational technology, a lot of its modules need practicality, therefore here LMS will work.

Researcher: so I want to say thank you so much my participant.

Participant: thank you Mr. Mafata, I hope my responses will make a positive impact in your study.

Researcher: thank you so much. Bye.

Appendix H: Observation schedule:

The researcher observed the lecturer and educational technology students while utilizing LMS as a teaching and learning platform. The areas of interest included the following;

- Do students interact with the LMS in learning?
- Are students connected to share ideas on a learning content?
- What can the academics and students do with LMS during a lecture?
- Possible challenges that may hinder the academics and students while utilizing LMS in teaching and learning: