

**TECHNOLOGY ENHANCED LEARNING AS A SUPPORT TOOL  
FOR LEARNING AND TEACHING PROCESS IN HIGHER  
EDUCATION**

by

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CAMPUS**

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## DECLARATION OF ORIGINALITY

I, Geoffrey Pinagase Tshephe, declare that this doctoral thesis on Technology Enhanced Learning as a Support Tool for Learning and Teaching Process in Higher Education, submitted to the Faculty of Education Sciences of the NWU (Mafikeng Campus) is my work in design and execution. I have not previously in its entirety or in part submitted it at any university for a degree. All sources cited or quoted have been duly acknowledged and I did not and will not allow anyone to copy my work with the intention of presenting it as his/her own work.

Signature: ..... Date: .....

## DEDICATION

This PhD thesis is dedicated to

my late grandfather

Albert Timothy “Ete” Tshophe

who in his lifetime wanted to see me reaching higher levels of education

and

to my grandmother

Shanki Anna Motsepe

who always supports every move I make and every step I take

You have been an inspiration and always made me believe in myself!

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## ABSTRACT

The purpose of the study was to investigate the implementation of technology enhanced learning (TEL) techniques as a support tool for the learning and teaching process at the Medunsa campus of the University of Limpopo, in the Gauteng Province of South Africa. The University of Limpopo was created in 2005 by the merger of two historically black institutions. The two merged universities, University of the North (Turfloop) situated in the Limpopo Province and Medical University of Southern Africa (Medunsa) found in the Gauteng province became the two campuses of this university. Ten years later, in 2015, the two merged institutions unbundled and a new health sciences university was established as a result. The newly established university, Sefako Makgatho Health Sciences University, took over the services, resources and premises of the Medunsa campus. One of the initiatives this institution has to grapple with is TEL.

The study employed multiple-mode approaches and methods. It used both qualitative and quantitative approaches and used two research methods, namely, case study and survey. The rationale to use multiple-mode design was to provide an additional source of validity and data trustworthiness. Most importantly, this type of design compensates for the limitations of the other. The population of the study was drawn from the 2012 first-year cohort of students at Medunsa, their lecturers and the campus management directly involved with the implementation of TEL. Two sampling techniques were used, convenient sampling to select 266 students and purposive sampling to select 12 lecturers. The study used online and paper-based questionnaires to collect quantitative and for qualitative data, the study used interviews, observation and document analysis. Six (6) members of the campus management were interviewed. Policies relating to ICT and teaching and learning were analysed. A constant comparative method of analysis was used with the help of the hermeneutics strategy for interview data and content analysis strategy for document analysis and observation. The quantitative data was descriptively analysed using Survey Monkey for preliminary analysis and SPSS for final analysis.

Findings showed that Medunsa partially implemented TEL, with a focus on computerised technologies. Three online learning tools were used by the campus; Bb managed from the ICT department, Amber.net from the Public Health department and one programme developed by a lecturer in the Human Anatomy department. Although Medunsa adopted TEL technologies to improve learning and teaching processes, the intended users showed a lack of interest in using these technologies and inadequate technical and academic support. Though the campus had

Internet connection, it was not yet well-resourced with facilities that would assist in enhancing learning through various learning and teaching technologies, with the exception of the newly-erected e-Learning centre. It appears that the strategic plan for the implementation of TEL had not been fully implemented. Before implementation of the technology, several matters required serious consideration, for example, pedagogical, technical and cost issues. It is possible that inadequate attention was paid to these issues at that crucial stage of development. Even though the university erected the e-Learning centre, WIFI and the provision of computers for students, attitudes had a negative effect, on the level of success of the implementation process. The lack of a clear and unequivocal TEL policy, may have given rise to the negative attitudes. The fact that many stakeholders were unaware of the existence of such a policy may have had a bearing on the lack of proper use of TEL. Policy underpins processes and procedures, giving them both direction and credibility.

Finally, following the quality of discussion on the implementation of TEL as a support tool at HILs, this research might contribute to the body of knowledge by providing an increased understanding of the implementation of TEL as a support tool at Medunsa. The study recommended ways in which successful implementation can be carried out. In conclusion, an opportunity for further studies has been created. This broader TEL theme could be taken forward and the following themes researched further:

- Use of TEL in health science education
- Use of social media in teaching and learning

Evaluation of this proposed integrated strategy to implement e-Learning.

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## ABBREVIATIONS AND ACRONYMS

Bb	Blackboard
BL	Blended learning
DoH	Department of Health
DoHET	Department of Higher Education and Training
F2F	Face to face
HE	Higher Education
HEIs	Higher Education Institutions
HILs	Higher Institutions of Learning
HoD	Head of Department
ICT	Information and Communication Technologies
IT	Information Technology
LMS	Learning Management System
NET	Network
RSA	Republic of South Africa
SM	Social Media
SN	Social Networks
TEL	Technology Enhanced Learning
OBE	Outcomes-based Education
OBA	Outcomes-based Assessment
ODeL	Open Distance e-Learning
ODL	Open Distance Learning
UL	University of Limpopo
U.S.	United States
UK	United Kingdom
WWW	World Wide Web

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# CHAPTER 1

## ORIENTATION

### 1.1 Introduction and background to the study

This section sets the platform for the problem that was researched, namely, technology enhanced learning (TEL), as a support tool for the health sciences learning and teaching process. The study used a funnel approach, where it first looked at general issues related to the problem and then outlined more specific issues related to the problem. The researcher started by considering the need for technology as a tool to support the e-Learning and teaching process, especially in higher education institutions (HEIs) or higher institutions of learning (HILs), and proceeded to focus on TEL at the Medunsa campus of the University of Limpopo (UL). In this study, the terms HEIs and HILs are used interchangeably.

Medunsa was one of the two campuses of UL that emerged after the merger of the then-University of the North situated in Limpopo Province and the Medical University of South Africa situated in Gauteng Province. After consultation and a series of meetings with the relevant stakeholders, the South African Ministries of Education and of Health deemed it fit to unbundle the two merged institutions and incorporate the Medunsa campus into the newly-established health sciences university in Gauteng Province. The newly-established university, Sefako Makgato Health Sciences University, took over the resources and infrastructure of the Medunsa campus, including its personnel.

#### 1.1.1 Need for technology in higher education institutions

The 21<sup>st</sup> century is a technological era in which people's lives are dependent on, and governed by technology. Electronic and computerised technologies are of the utmost importance in this age. Technology has become increasingly interconnected with our everyday lives. Companies, organisations and schools are becoming more dependent on diverse forms of technology. Students who identify themselves with these kinds of technologies are better equipped for the workplace than people of earlier eras. Scheffler and Logan (1999) support the above argument by indicating that technology is now, without doubt, a part of one's everyday life. Daily activities and commercial enterprises depend on technology and without it, major institutions and industries would not be able to maximise profits. Beaty, Allan and Read (2005) highlight further the

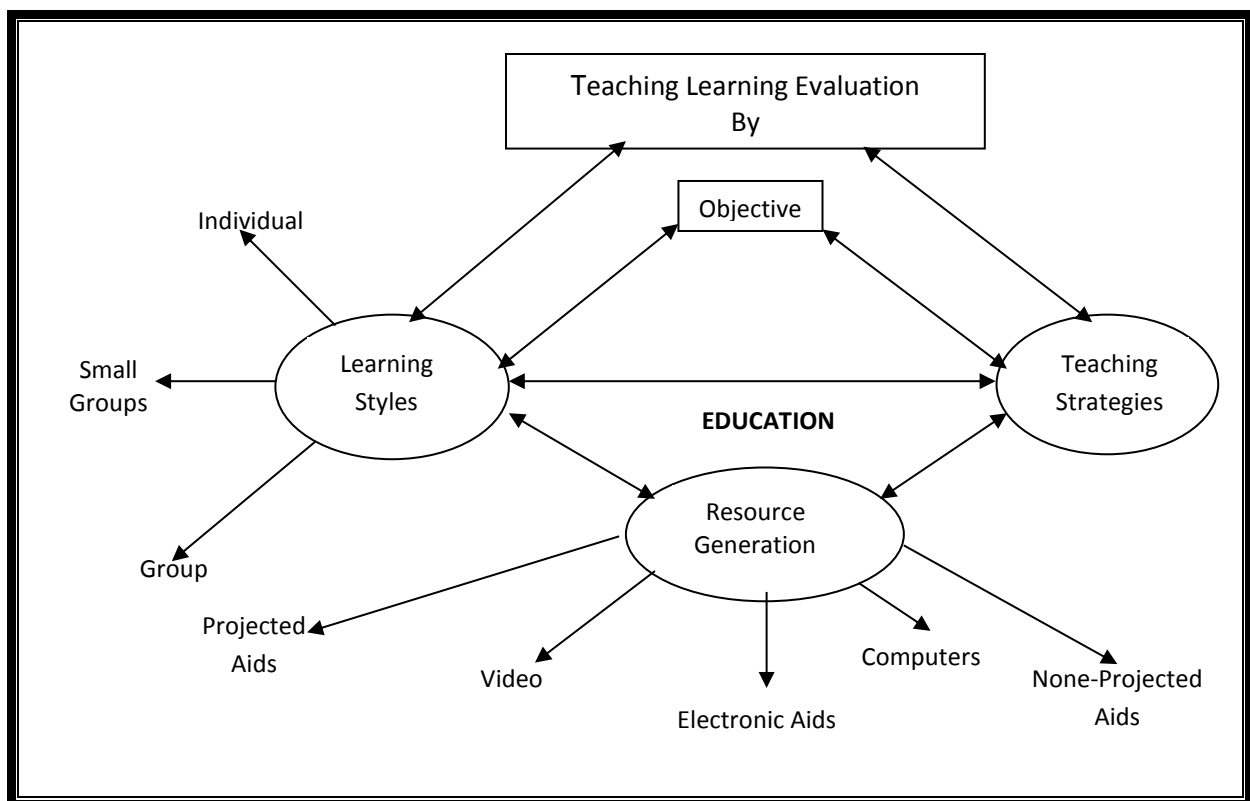
dependence of human life on technology by postulating that people use the new technologies every day for information, communication and entertainment, among others. In this era, education is made easy and manageable by using electronics. Woodard, Love and Komives (2002) point out that higher education (HE) is increasingly becoming dependent on technology in and outside the classroom and this dependence on technology is seen at various levels of HE, including academic and student service areas. The use of technology, in general, has also affected the teaching fraternity, including that at HEIs, which has brought many challenges. Light, Cox and Calkins (2009) emphasise the need for technology in HEIs by asserting the fact that university students, whom they term “Millennials”, are not only extremely at ease with technology but also view its existence as part of their natural living environment. These authors also cite Oblinger (2003) to support their argument that computers, the Internet, email and social networking, for example, Facebook and MySpace are considered an integral part of daily living, enhancing students’ easier grasping of the potential application of new technologies than their teachers. Emphasising the importance of the use of technology today, Watts (2003:5) states:

We cannot ignore the transformation taking place in our world today. The fact is that the new technologies and the associated dramatic changes in the relationship between people and information are creating the cultural signature of the world. We are in the midst of a revolution that will profoundly alter how we learn, work, and communicate, and conversations emerge about philosophical considerations inherent in the use of these technologies.

It is therefore evident that technology is no longer foreign to Millennials. Hence it cannot be regarded as an innovation any longer but a part of day-to-day activities.

HEIs need technology for instructional purposes. Instructional media play a vital role in enhancing learning and teaching especially with the introduction of the outcomes-based education (OBE) principles in South Africa. The introduction of OBE principles saw the demise of the traditional content- or competency-based education (CBE), whereby education was teacher-centred and teacher-paced. Unlike CBE that aimed at mastery of knowledge, OBE is learner-driven and aims at achieving outcomes (Olivier, 1998). Although scholars perceive the current status of OBE in South Africa in different ways, the researcher aligns himself with Steiner-Khamsi (2004) and Maluleka (2015) who argue that since OBE was introduced post- apartheid, in 1998, all the phases through which the curriculum has passed to date (Curriculum 2005; Revised National Curriculum Statement; National Curriculum Statement, and Curriculum Assessment Policy Statement), have been constructed on OBE principles. Instructional media as a whole is one of the vehicles needed to drive OBE, to the benefit of all students in South Africa.

Instructional media are in most cases used interchangeably with educational technology, which is defined by Kumar (1996) as an application of scientific knowledge to improve the efficiency of the process of teaching and learning. Educational technology encompasses learning styles, teaching strategies, instructional objectives and resources. All these are used in order to enhance e-Learning and teaching. The figure that follows, taken from Kumar, clarifies the above description.



**Figure 1: Components of educational technology** (adapted from Kumar, 1996:10)

The educational sector, including HILs, functions as one of the vital service providers that contributes to the socio-economic development of the country, and should not lag behind other sectors of the economy in its approach to the technological process. Education has become a service in which people seek to invest for their own personal gain, to ensure equality of opportunity and as a route to a better life. As a result, HEIs find themselves competing more than ever before for students, funding, research and recognition. HEIs are under increasing pressure to do more with less resources and to optimise teaching methods through the use of technologies. The business and commercial worlds expect students exiting HILs to perform better in academic subjects than those who have never attended an HIL, in order to compete effectively in the

workplace. These students are expected to be literate in information and communication technology (ICT). To help students achieve this, institutions of learning are obliged to turn to ICTs and the World Wide Web (WWW), commonly referred to as the Web, to meet the demands of potential employers (Davies, 1998). In support of the above argument, Uys (2000) notes that it is clear that HILs have often responded to new ICT applications on the basis of efficiencies. This implies that HILs have an obligation to deliver high quality teaching using aspects of the technologies at their disposal. This also suggests that the use of the intranet, Internet and other electronic tools should be introduced at HILs, not only for staff but also for students, and be evaluated to ensure that teaching, using technology, leads to learning. In support of the above statement, Uys (2000) alludes to the fact that tertiary education has often responded to new ICT applications on the basis of efficiencies.

Many disparities exist among South African HEIs because of their geographical location and historical background. While some institutions are located in rural areas, others are found in urban centres. Since 1994, when the new South African government came into power, attempts have been made and policies developed which aim at redressing the situation. The government has tried to resolve the issue of disparity among institutions by merging previously disadvantaged institutions with advantaged ones. However, the playing field has not been levelled completely hence, today we speak of the possibility of the demerger of some institutions. Historically disadvantaged universities still have a long way to go in order for them to be at par with their counterparts in a variety of areas, including the integration of technology in e-Learning and teaching processes. Even though TEL has been criticised, especially in developing countries, the benefits it has brought seem to surpass its disadvantages. It has brought development in pedagogy leading to an increasing need to support diversity and flexibility in HEIs in South Africa. This technique will develop further to become embedded in higher education through the efforts of universities and colleges, and could eventually become an integral part of these institutions. Within HEIs, there is a need to support the establishment of processes and structures that are appropriate for the development and delivery of high quality education underpinned by technology. This means that all HEIs should be provided with an array of information and technological devices and resources for instructional purposes. This should be done in order to meet individual, instructional, management, communication and research needs, as expected by employers in all spheres of the economy. However, the foundation for the use of technology in education should be laid in schools. Learners from these schools feed universities. Consequently, this warrants technological investment at that level as well. What South African HEIs need is a substantial

overhaul of education and training that can match the technology revolution and keep pace with continued technological development. Education and training must be reoriented so that learning institutions become far more responsive to the skills required in all communities of every kind.

### **1.1.2 TEL as a support tool for learning and teaching in HEIs**

Owing to rapid developments in technology and education, TEL has been a necessary discourse in which e-Learning scholars have begun to participate. The TEL technique or e-Learning (both terms refer to the same concept and are used interchangeably) is an appropriate approach to be used as a support tool for learning and teaching in HEIs. The resource generation, as indicated by Kumar's model (cf. figure 1, page 3), includes projected media, video, electronic media and computers. This model depicts the importance of technology in education. The non-projected media also play an important role in today's learning and teaching processes in this electronic era. Learning and teaching have been forever transformed throughout the world by the blending of technology and the face-to-face mode of teaching. It is now possible for a lecturer or an instructor to be accessible to students at any time of the day or night through the instrumentality of the TEL facilities (resource generation) including the Web. This technology enables students to share text, voice, graphics, music, digital files of all sorts and to store them (Nomvete, 2002).

This approach to learning and teaching helps students to be free from the limitations of the four walls of the classroom. It also enables students to conduct searches on the subject content from the Internet or Web and any other device used for electronic learning. E-students do not rely only on the information provided by a lecturer or instructor during a face-to-face or contact session. Segrave and Holt (2003) attest to this statement by pointing out that TEL is one of the most exciting tools in the learning and teaching process as it enables students to move electronically outside the classroom walls and communicate with other students and resourceful people around the world. This is one of the advantages of e-Learning. TEL produces students who are self-directed because they work independently, at their own pace, without competition, and are able to manage their own learning (Piskurich, 2003). Anderson and Elloumi (2004) point out that TEL allows for flexibility of access, from anywhere and at any time. They further elaborate that this tool for teaching and learning allows participants to collapse time and space. Through TEL, e-students can access the Internet and other electronic learning materials; interact with the content, the instructor, and other students; and obtain support during the e-Learning process, in order to acquire knowledge, to construct personal meaning, and to grow from the e-Learning experience.

Given all the benefits and advantages above with regard to TEL, it is clearly a dynamic approach, and at the same time has shown to have the inherent capability of delivering instruction at any time, and anywhere to all e-students, therefore it has a wide reach. TEL knows no time zones, location or distance (Anderson & Elloumi, 2004). Institutions of higher learning, through the TEL approach, can offer distance learning programmes to a wider range of students than in earlier decades because TEL enables learning institutions to deliver education anywhere and at any time. HEIs are using TEL to make learning more accessible to all students in a more efficient way, for example, by delivering distance learning programmes to other African countries and overseas students. The Microsoft Corporation notes that TEL is of interest to schools, colleges and universities. Lecturers can personalise learning to meet the needs of individual students; students can collaborate using a range of multimedia resources. Such innovative teaching methods can motivate students and in turn assist them to achieve academic success. E-students can access e-materials at any time. The e-materials can be updated and students are able to see the changes at once (Anderson & Elloumi, 2004; Microsoft Corporation, 2005).

One cannot overemphasise the importance of TEL in the rapidly-changing climate found in HEIs across the world. The use of TEL as a support tool for learning and teaching is growing apace in HEIs. Catherall (2005:36) supports the above statement indicating that:

e-Learning and related systems used to support learning and teaching are quickly becoming an important feature of the rapidly-changing climate in HE provision. The e-Learning system will obviously play an important role in delivering education.

Although Catherall emphasises the importance of TEL at HEIs and indicates the growth in connectivity, he appears to have some misgivings about its future when he states that

...it remains to be seen to what extent integration of networked access will remain proprietary and how far the systems will go toward mutual computability (2005:37).

At that time his fears may have been well-founded, but looking at the rate at which technology is growing, including wireless connectivity, these fears may today, be no longer valid, especially in areas where connectivity is of a high standard.

The background above, gives an overview of trends around the world on implementing TEL at HEIs. Therefore, it is crucial to investigate whether or not the implementation of TEL techniques at the Medunsa Campus of UL has an impact on learning and teaching.

## 1.2 Statement of the problem

From the background of the study, it has emerged that using TEL as a support tool for learning and teaching at Medunsa is crucial as the technique has proved to be a “Can’t do without” technique in the 21<sup>st</sup> century. The use of this technique affords students an opportunity to study in their own homes or wherever they reside, at their own pace and in their own time. The technique enhances student learning and makes it easy for students to collaborate through tools such as blogs, discussion forums and other web-related resources and also clarifies and elaborates on whatever course content the student did not understand during face-to-face sessions. Although there have been rapid developments in HEIs, which include the availability of resources such as computers, access to the Internet, and other electronic devices for the implementation of the TEL approach, the majority of HEIs have not yet implemented the technique. Despite the altruistic and beneficial intentions of the merger of some HEIs with regard to resource sharing, UL has not yet implemented TEL successfully because of a limitation of resources (both human and material) and proper structures for the technique to be implemented, which may be as a result of merging two former historically disadvantaged institutions.

With regard to access to a computer, it was observed that although most academics at Medunsa do have computers in their offices, it appears they are hardly ever in use, especially for the purposes of learning and teaching. As a staff member in the academic development unit at Medunsa campus, known as the Centre for Academic Excellence (CAE), whose duty was to support academics in their teaching responsibility, I had from time to time formal and informal discussions with academics. During some informal discussions with the academic staff, a number of them admitted that they could not even open an email let alone use the computer for word processing. Some academic departments have only two computers, allocated to the secretary and the head of department (HoD); other members of staff receive their email through the departmental email which the secretary prints and puts into their mail boxes. In addition, this institution also serves students from isolated rural areas whose schools might not have had computers; for the first time computers are available to them at this institution.

Apart from the learning management system (LMS), which Piskurich (2003) sees as the nerve system that binds all other TEL components, UL is not yet using any other component of TEL successfully. The university purchased Blackboard (Bb) in 2006 and since then has been paying for the licence without using Bb. In addition, the university also sent two TEL specialists for Bb

training, which qualified them as Bb certified trainers. In spite of the existence of the TEL division at UL, the division is focusing almost exclusively on Bb, (the UL LMS) at the expense of other TEL techniques. The status quo makes this division a Bb division rather than a TEL division. Lack of a clear structure and draft policy on the use of TEL at UL makes it difficult to implement the approach. In this connection, Catherall (2005) stipulates that the development of policies and procedures are vital aspects of system deployment. He further argues that policies should not only reflect regular operational activities but also complement wider strategies, such as an institutional learning and teaching approach.

Although the unbundling process of the two institutions has been finalised, prior to the unbundling of the two campuses, from my observation, as well as from discussions with other Medunsa staff, staff morale was low and some employees felt virtually coerced to do their work, probably due to the uncertainties of the future. It appeared that employees did not want to invest in something that might not be permanent, such as establishing a system that would collapse on the finalisation of the demerger process and birth of a new institution. In addition to these problems, the institution does not have sufficient resources to develop e-materials. Apart from the development of materials, in some instances students and lecturers lack the basic computer literacy skills, essential for using this approach. Taking into account the current situation at the campus, one notices that classes are packed beyond their capacity. This situation could result in the interruption and delay of students' learning. Students who are at the back of the learning auditorium may not even hear what the lecturer is saying, which may cause a lack of concentration on the part of students and disturbance of each other in the learning process; there is also the possibility of student non-attendance.

With the picture of the research problem outlined and supported by the above arguments, it was essential that this study on the implementation of TEL be conducted as a support tool for the health sciences learning and teaching process at the Medunsa campus of UL.

### **1.3 Purpose of the study**

#### **1.3.1 Purpose**

The purpose of the study was to investigate the implementation of TEL techniques as a support tool for the e-Learning and teaching process at the Medunsa Campus of UL, in the Gauteng Province of South Africa.

### **1.3.2 Objectives**

In order to achieve the above purpose, the following objectives have been formulated:

- To examine the extent to which users have access to TEL facilities and resources;
- To determine and analyse the perceptions and expectations of users in the implementation of TEL;
- To examine the factors that affect the implementation of TEL; and
- To recommend strategies for implementation of TEL at the Medunsa Campus.

### **1.3.3 Research questions**

Acastat (2003) defines a research question as a clear statement that the researcher intends to investigate; what should be specified before the research is conducted; and what will be openly stated in reporting the results. This study seeks to answer the following research question:

- To what extent has the UL Medunsa Campus implemented the TEL technique as a support tool for learning and teaching processes?

To answer this main question, the following research questions are addressed in this study:

- To what extent do TEL users have access to TEL facilities and resources?
- What are the perceptions and expectations of users in the implementation of TEL?
- What are the factors that promote or inhibit the implementation of TEL?
- What strategies can Medunsa campus use to promote the implementation of TEL?

## **1.4 Rationale for the study**

The urge and motivation behind this study was prompted by several factors and observations, which are noted in this section. Among others, it appears that there are insufficient studies of this nature in South Africa and in Africa at large. Closer to this study, the related studies that the researcher has found in South Africa include the following that were conducted between 2008 and 2011:

- 2008 Barriers to e-Learning among postgraduate black students in higher education in South Africa;
- 2011 e-Learning adoption in eastern and southern African higher education institutions; and,

- 2010 Can technology assist the disadvantaged student? A case study at the University of Limpopo.

The challenge faced by HEIs with regard to the implementation of TEL is an area that is not well researched, especially in Africa.

This study seeks to contribute toward improving the competence of both students and academic staff in the use of technology to enhance their learning and teaching platforms and experience. It suggests effective and efficient methods for students from other countries to be in touch with their lecturers and fellow students, who in most cases remain in South Africa. The study also looks at international trends on the use of TEL and attempts to identify the most suitable approach for the use of TEL at Medunsa. The study also helps academics to realise how many resources they have to use in an innovative way in their teaching. This study paves the way for further research and studies in the future, in areas such as the use of modern technology in HE, which is in high demand in South Africa (Alqahtani, 2010). Finally, it is expected that the results of this study will clarify issues discussed in subsequent sections.

The study may contribute to addressing the lack of skills with regard to the use of TEL in HEIs, especially by academics, and their role in new technologies in the classroom. As is the case in other countries, academics in South African HEIs are left on the periphery, believing that they do have the skills to use the technology. In many instances, this is not the truth because some academics do not even have basic computer skills let alone the expertise to use TEL resources. Nussbaum-Beach and Hall (2012) accurately express the view that the academics' lack of knowledge and skill in using TEL technology and the attitude they develop towards the technology make it difficult for students to move rapidly toward e-Learning. Students feel cramped and locked into the past. In addition, the study has sought to contribute to the policy development around the use of TEL at the institution. The policy should show how TEL can be implemented and also clarify issues for those managing TEL; it should incorporate training for unskilled end users.

## **1.5 Delimitations and limitations of the study**

As outlined by Hofstee (2006), this study has considered delimitations and limitations as a coin with two sides, the reason being that delimitations limit the scope of the study. This section discusses what is included in this study and what is excluded.

### **1.5.1 Limitations of the study**

The researcher discusses the limitations to the study in this section, as defined above. Although it has been argued and debated by various scholars that a case study tends not to provide reliable information on generalisations of the findings, in this instance it has given the researcher an opportunity to elicit rich data from the Medunsa community. The case study method focused the researcher's attention on details, including small details relevant to TEL.

The researcher noted that TEL is a contested area at UL. The researcher also anticipated difficulties in accessing certain information from other important stakeholders, who might want to protect their territory.

Since the announcement of the unbundling of UL in May 2011, the university had been silent and shown no progress with regard to the unbundling process until 2014 when the new university, which would incorporate Medunsa was announced. This event might also affect the quality of data collected.

Lastly, the exodus of staff from the Medunsa campus may also affect the responses, as some respondents might leave the institution before they can be interviewed.

### **1.5.2 Delimitations of the study**

The study focused on the Medunsa campus of UL, particularly with regard to the implementation of the TEL technique as a support tool for learning and teaching processes. Although the merger/demerger proposal had an unfavourable impact on this study, it should be noted that the study did not cover details of the merger or demerger of the university or political aspects pertaining to these issues.

The study limited itself to the Faculty of Health Sciences (Medunsa campus) with focus on the four Schools of the Faculty, namely, School of Medicine, School of Health Care Sciences, School of Pathology and Pre-clinical Sciences, and School of Oral Health.

The study has not developed a model of implementation but has suggested an approach that could be used in implementing TEL technologies effectively at UL. The results of this study cannot be generalised to other institutions, although the approaches suggested may be used.

## **1.6 Definition of concepts**

### **1.6.1 Internet**

Greenlaw and Hepp (2002:142) define the Internet as a global information system that is logically linked by globally unique addresses. Space-based on the Internet protocol or its subsequent extension, it is able to support communications using the Transmission Control Protocol/Internet Protocol suite or its subsequent extensions or other Internet protocol-compatible protocols. It provides, uses or makes accessible, either publicly or privately, high-level services layered on the communications and related infrastructure described herein. In simple terms, the Internet is defined as a global system of networked computers, together with their users and data. This system is global because people from all over the world can connect to it.

The Internet was born from the concept of accessing information quickly, easily and with the possibility of communicating more easily and quickly (Greenlaw & Hepp, 2002:142). The Internet is sometimes called simply the “Net,” which is a worldwide system of computer networks – a network of networks in which users at any one computer can, if they have permission, get information from any other computer (and sometimes talk directly to users at other computers). Its original aim, when conceived in 1969, was to create a network that would allow users of a research computer at one university to “talk to” research computers at other universities. A side benefit of Internet design was that because messages could be routed or rerouted in more than one direction, the network could continue to function even if parts of it were destroyed, for example, in the event of a military attack or other disaster. Today, the Internet is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people worldwide (Mackay, 2006).

In this study, Internet is used interchangeably with the term “Net” which refers to the network environment that the student accesses to keep in touch with fellow students and facilitators of learning wherever they are.

### **1.6.2 Technology enhanced learning (TEL)**

TEL refers to learning and other supportive resources that are available through a computer and other technological gadgets (Carliner, 2002). TEL is the delivery of a learning, training or education programme by electronic means. It involves the use of a computer or electronic device

in some way to provide training, educational or learning material (Stockley, 2004). Holmes and Gardner (2006:14) define TEL as a vehicle for education and as a channel for collaboration.

In the context of this study, TEL refers to all technological tools that can be used in teaching and learning processes, embracing electronic and non-electronic technologies.

### **1.6.3 Blended learning**

According to Stockley (2004), blended learning (BL) is the term used to describe e-Learning, or training events or activities, where e-Learning in its various forms is combined with more traditional forms of training such as classroom training. He further stipulates that it can be delivered in a variety of ways. A common model is delivery of theory content by e-Learning prior to actual attendance at a training course, or programmes to put the theory into practice. It can be a very efficient and effective method of delivery. E-Degree (2004:1) sees BL as a method that presents an opportunity to combine the innovative and technological advances offered by online e-Learning with the interaction, participation and support offered by traditional face-to-face e-Learning.

This research refers to BL as learning and teaching processes that encompass TEL and face-to-face (F2F) learning.

### **1.6.4 Information technology**

According to Draft White paper on e-Education, Information technology (IT) is a term used to describe the items of equipment (hardware) and computer programmes (software) that allow us to access, retrieve, store, organise, manipulate and present information by electronic means (SA: DoE 2003). According to De Shutter (2004), IT is not only about computers, software or services. IT is a combination of all these elements, capped by a vision of how technology can help an organisation to reach its goals. Today, businesses are concentrating on their core activities in their struggle to survive. Any IT department has to do ever more with less. Under these circumstances, there is a growing need for well-informed IT professionals.

This research perceives IT as all the information communication technology (ICT) tools, including both the hardware and software that are used to communicate with significant others.

### **1.6.5 Synchronous**

Piskurich (2003:8) provides a clear definition of synchronous TEL, as follows: real time, instructor-led, online eLearning, in which all participants are logged on at the same time and communicate directly with each other and the instructor through the computer and possibly by other means as well.

Piskurich further states that participants join at the same time from different locations (2003:118). Synchronous, according to Catherall (2005:15), means real time. Users can exchange messages or text or other resources within the same time frame. Holmes and Gardner (2006:15) emphasise the definition by citing chat rooms and shared whiteboards to be examples of synchronous tools that offer the immediacy of two-way communication.

In this study, the research uses synchronous as access to the Web or Internet-based technology in real time, where the communication between the communicators is in real time.

### **1.6.6 Asynchronous**

Asynchronous learning is a self-paced learning environment. Students are online at different times and cannot communicate without time delay. Examples are courses taken via the Internet, CD-ROM, Web presentations, or videotaped classes (Learnframe, 2001). Meloni (2010) perceived), asynchronous learning as more advanced and popular approach to e-Learning than the previous two are. Using this method, different groups share information through online bulletin boards, online discussion groups and email. On the other hand, it can teach directly through links to reference materials at the office or residence of the instructor. Here instructions are carried out over an indefinite time (Catherall, 2005:15).

Asynchronous in this study refers to students and lectures accessing the Web or the Net at different times, although they are working on the same platform and responding to significant others in their own time and space.

### **1.6.7 Social media**

Social media involve two primary actions which are socialisation and sharing, be it of information or of space. The term describes a set of technological gadgets that are mediated opportunities for bringing people together and encouraging social networking and dialogic communication. Social media allow online users to interact with one another (Eckler, Worsowicz & Rayburn, 2010).

Prasad (2013) defines social media as forms of electronic communication, such as websites for social networking and micro-blogging, through which users create online communities to share information, ideas, personal messages and other content (such as videos). Social media represent a revolutionary new trend that should be of interest to companies operating online.

Social media in the context of this study refer to all ICT tools that students and facilitators of learning use to communicate with each other in a social setting, or tools that have been created for the purpose of socialising.

### **1.6.8 Facilitators of learning**

Mazarin (2014: [online]) defines a facilitator of learning as

...a teacher who does not operate under the traditional concept of teaching, but rather is meant to guide and assist students in learning for themselves – picking apart ideas, forming their own thoughts about them, and owning material through self-exploration and dialogue.

Mazarin considers the traditional concepts of teaching as a teacher being a leader in the classroom, telling us how to think and what to think about; showing us how to relate to subject matter and giving us examples to understand his/her messages.

By contrast, a facilitator of learning actively engages all learners in his/her classroom in the construction of their knowledge, using strategies and activities that bring the learner to a state of understanding that leads to the accomplishment of the objectives. The role of the facilitator of learning is to guide the learner to the outcomes of the e-Learning experience and to keep the learning experience moving forward and on track (Zachary, 2012).

This study refers to lecturers as facilitators of learning because of the role they play in ensuring that learning takes place using the technology and the new methodologies of delivering new skills and knowledge.

## **1.7 Plan and organisation of the study**

This section of the introductory chapter gives a preview of the entire study and how its chapters are organised. The study is arranged in six chapters, which are summarised below.

## **Chapter 1: Orientation**

In the introductory chapter, the focus is on the general orientation and overview of the study. It outlines in detail the importance of the use of technology in enhancing learning and teaching because this is the focus of the study. The chapter looks at the background, states the problem and research questions. The purpose of the study, the rationale, the delimitations and limitations of the study are explained. Included in this chapter is the outline regarding the organisation of each chapter.

## **Chapter 2: Theories underpinning the study**

Chapter 2 presents the theories underpinning the study. Some of the common adopted theories are reviewed to depict their suitability in e-Learning, especially in HE.

## **Chapter 3: Literature review**

This chapter, guided by the purpose and the research questions, gives a general understanding from primary, secondary and tertiary sources, of what TEL is, how other authors perceive it, and how it operates, especially in the HE sector. In chapter three, some of the widely-adopted models of TEL implementation are reviewed, with the aim of detailing their suitability in the implementation of TEL in HE. This chapter also seeks to answer the research questions asked.

## **Chapter 4: Research design and methodology**

Chapter 4 discusses the empirical research approach used for the study. The chapter focuses on the procedural models that have been implemented by the researcher as part of the strategy to obtain results. It describes the research design, including methodologies to investigate the main research questions on which the study is based. Both qualitative and the quantitative procedures are employed to gather data on the implementation of TEL at the Medunsa campus of UL. This chapter also examines the issues of ethics, validity and reliability.

## **Chapter 5: Data analysis and interpretation**

In chapter five, detailed presentation, analysis and interpretation of research findings from the collected data are included. This chapter is categorised into themes following the instruments used.

## **Chapter 6: Summary, conclusion and recommendations**

This chapter outlines the summary of findings; conclusion; deficiencies of the research; recommendations; and summary of the study. The summary, recommendations and conclusion of the study are based on the outcomes of the study. This chapter closes the study with a suggestion of an approach for TEL implementation in education.

## CHAPTER 2

### THEORIES UNDERPINNING THE STUDY

#### 2.1 Introduction

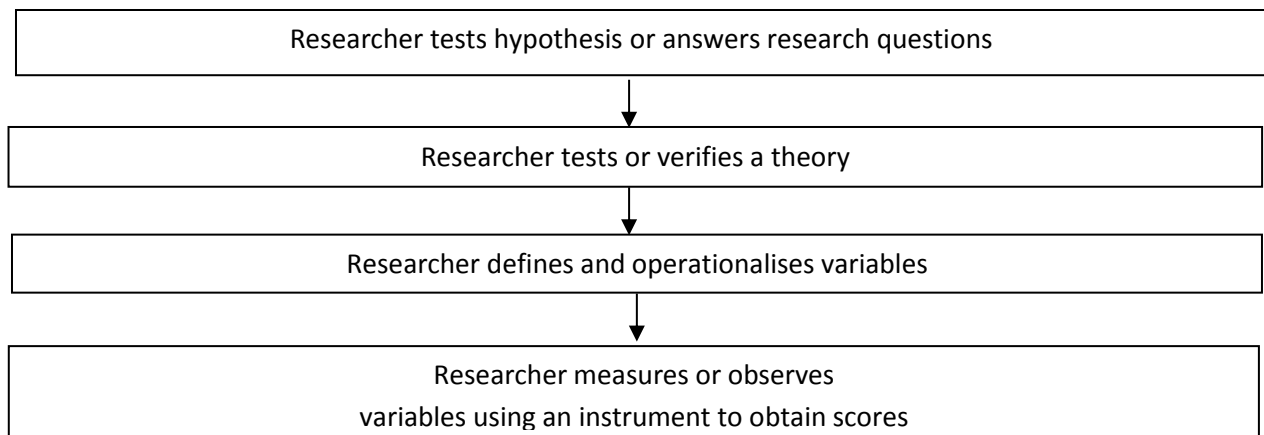
This chapter focuses on the theoretical knowledge and the understanding related to TEL. The theoretical framework helps us to explain why actions are performed in a certain way, based on the available learning theories. Furthermore, Savin-Baden and Major (2013) state that the theoretical framework can be defined as a lens through which a researcher views the world. It also helps the researcher to decide and explain the route he takes and why he uses certain methods and not others to arrive at a certain point. Different scholars might have tried similar methods before and have had different experiences using one route versus another and there may be some paths that have never been explored. It is imperative to discuss the theoretical underpinnings of TEL before we focus on the related literature and conceptualise what TEL is, and how it can be implemented at HILs. This is in line with Sinclair's (2007) proposal that at the start of any research study, it is important to consider the relevant theory underpinning the knowledge base of the phenomenon to be researched. Although the researcher believes that there is no single theory on which one can base TEL, it is possible to present the main theory that supports this study and several interconnected theories that have a bearing on the main theory. In subsequent sections of this chapter, the researcher explores three theories that have a bearing on the implementation of TEL. The researcher discusses constructivism as the main theory supporting the implementation of TEL and links the theory to others of similar nature.

#### 2.2 Understanding theoretical frameworks

Theories are found across the human and social sciences' disciplines of which education forms part and theories are the framework for an entire study or a phenomenon under study. Sinclair (2007) describes theory in layman's terms as a framework that can be thought of as a map or travel plan. The researcher has worked from Sinclair's (2007:39) definition of theory that states:

When planning a journey in unfamiliar country, people seek as much knowledge as possible about the best way to travel, using previous experience and the accounts of others who have been on similar trips. 'Survival advice' and 'top tips' enable them to ascertain the abilities, expectations and equipment that may help them to have a successful journey with good outcomes, to achieve their objectives and return to base safely.

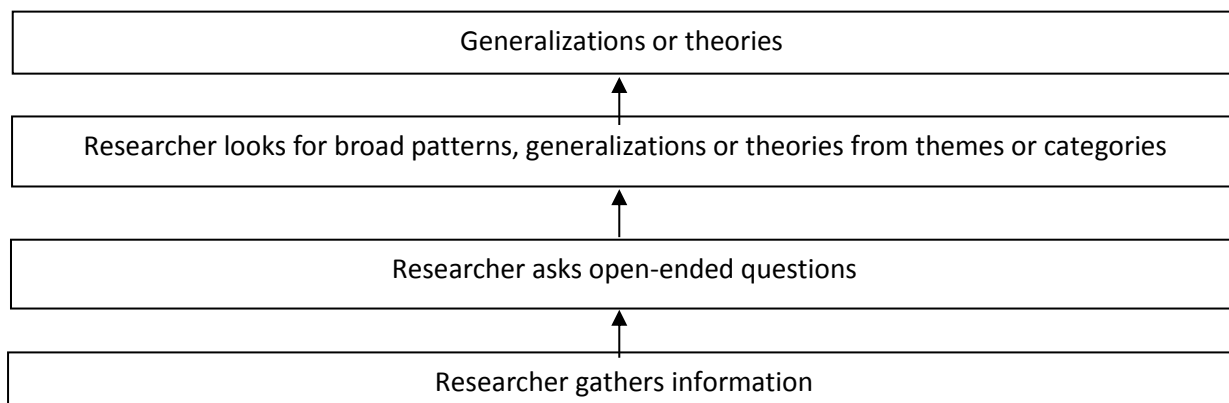
The researcher perceives the research as a journey with the aim of developing new knowledge contributing to practice. The researcher inferred that theories can be used as a guide to navigate a pathway through an unfamiliar field of study (Sinclair, 2007). Creswell (2003) further clarifies the argument by suggesting two approaches for the use of a theory underpinning a study, which are displayed in figure 2 below.



**Figure 2: Deductive approach** (adapted from Creswell, 2003:125)

The above approach is used in a quantitative study. The researcher, using this approach, advances a theory, collects data to test it, and reflects on the confirmation or rejection of the theory according to its results. The researcher tests or verifies the theory by examining the research questions derived from it. In a quantitative study, the researcher uses a theory to provide an explanation or prediction on the relationship among variables (Creswell, 2003).

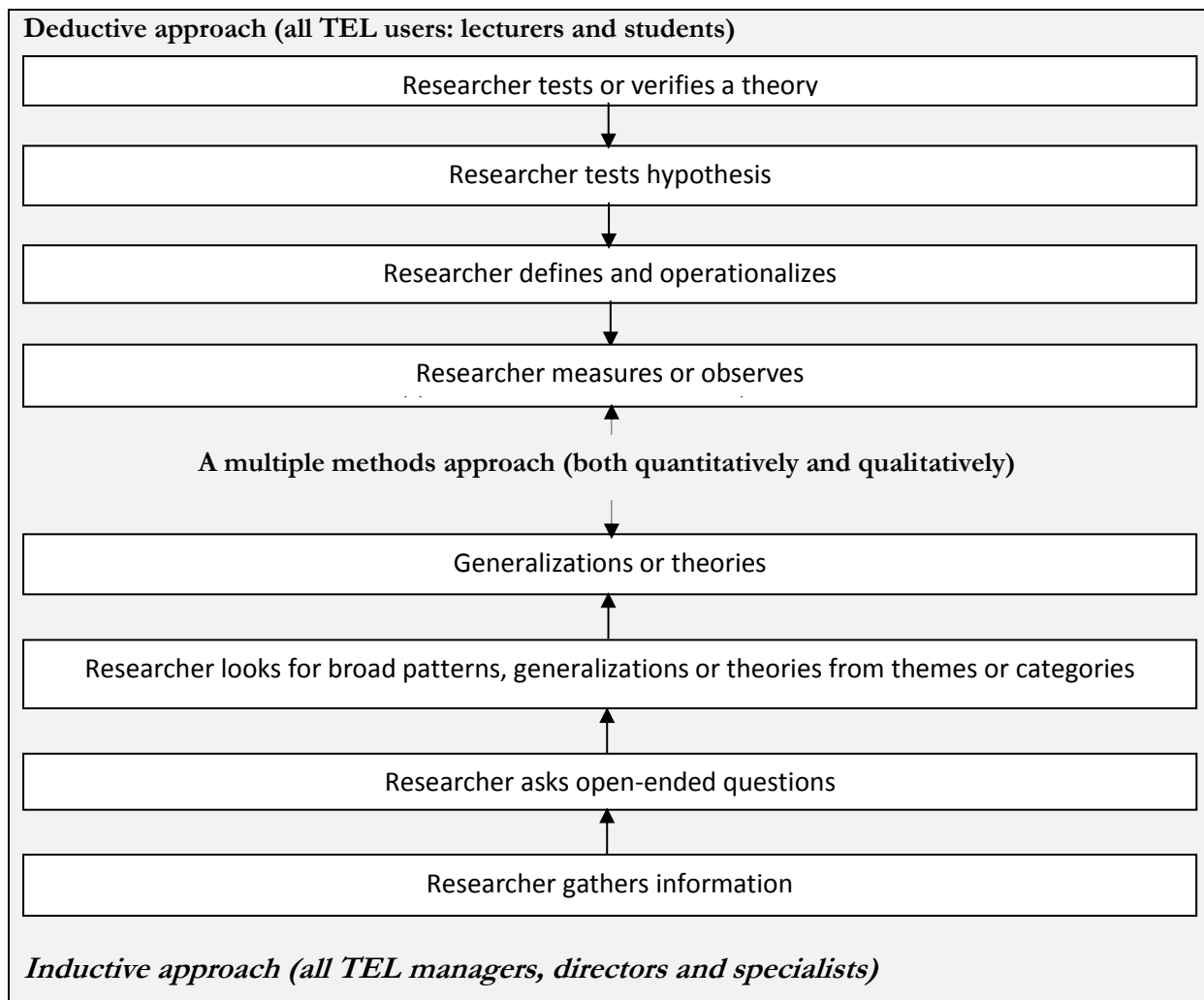
The inductive approach is used in a qualitative study. A theory in this approach appears as an end point, a generated theory, a pattern, or a generalisation that emerges inductively from data collection and analysis. At times qualitative researchers do not employ any explicit theory. They believe that no qualitative study begins from the pure observation that prior conceptual structure, composed of theory and method, provides the starting point for all observations (Creswell, 2003).



**Figure 3: Inductive logic approach** (adapted from Creswell 2003:125)

Multiple-mode research may look at theory deductively and inductively, the way in which this study was conducted in its approach to theory. Creswell states that in either situation, the use of theory may be directed by the emphasis on either quantitative or qualitative approaches (2003:136). Although it is said that the qualitative study may not use theory to explain the study, this study will look at different theories that do explain the study. Depending on the respondents and the information that the researcher elicits in this case, the emphasis is on both qualitative and quantitative approaches. The study elicited quantitative responses from students and lecturers, meaning that it has used the deductive approach; and qualitative responses from the Executive Dean, Executive Director of the CAE, Director e-Learning and specialist, meaning that it used the inductive approach. At the end of the study, based on what the researcher elicited from the respondents, the researcher will ascertain the theory for this particular study.

The deductive approach in this study is used to test the theories that form the basis of the study, whereas the inductive theory generated new ideas on how to implement TEL at Medunsa. In the inductive approach, the researcher looks for patterns in the data collected when analysing, with the aim of developing an approach that could explain those patterns (Blackstone, 2012). Both the inductive and deductive approaches can work together, according to Blackstone (2012), because they complement each other. Based on the above submissions, the study employs both of Creswell's deductive and inductive approaches, as the study uses a multiple-mode approach and finds synergy between the two approaches. The two approaches by Creswell are appropriate to this study; the deductive approach uses top-down and the inductive uses bottom-up approaches. The approach used in this study is illustrated in figure 4.



**Figure 4: Synergy between deductive and inductive approaches**

In response to the discussion above, the theoretical perspective of this study is presented in the following paragraphs. The study also considers theories propounded by other scholars that support this study. Creswell (1994) stipulates that in multiple-methods research, the researcher may both test theories and generate them. Myers (1997) notes that all research is based on certain underlying philosophical assumptions that guides research. He further suggests four assumptions for qualitative research: positivism, post-positivism, critical theory, and constructivism. With a theory as a foundation, instruction is structured around making learning highly effective. A learning theory helps us to understand the process of acquiring new skills and knowledge.

Donald, Lazarus and Lolwana (2006) state that one of the principles of the overarching theory, which in this case is constructivism, may be examined with an infusion of its related learning theories. In this study, as stated above, the researcher infused into constructivism the following

learning theories: behaviourism; social learning and cognitive theories embracing the seven e-Learning cycles; student-centred learning; zone of proximal development (ZPD) theory; dialogue theory; activity theory; and, inquiry-based learning. There are other theories that the study examined in conjunction with constructivism. These theories include the nearness theory. The study cannot overlook the fact that students at any HEI are considered as adults; therefore, the adult learning theory is also discussed together with the relevance of its principles to TEL students.

### **2.3 Constructivism theory and its implications in the use of technology enhanced learning**

This study advocates for the ability of students to construct knowledge for themselves and fit information together with what they already know to be allowed to take precedence. In his argument, Sjoberg (2007) speaks to the multi-faceted nature of the concept constructivism in terms of usage and meaning. The author emphasises that the term should be used with caution lest it be wrongly used. Nevertheless, Sjoberg's concern on the use of the concept in a different field may be misplaced. Even in the context of different authors, constructivism comes back to the same meaning, which is to construct. What is important is what Sjoberg is concerned with, which is "what to construct".

In support of Hein (1991), Meina and Mergel (2005) refer to constructivism as the idea that individual students construct meaning and knowledge for themselves based upon their perceptions of experiences. It also refers to the learner who interacts with objects and events and thereby gains an understanding of the features held by such objects and events. They further reason that constructivism theory focuses on preparing the learner for problem solving in ambiguous situations and thereby promotes a more open-ended learning. Biggs and Tang (2011) perceive constructive teachers as those who engage students in their teaching process in actively building their knowledge in relation to their existing understanding. Constructivism is a philosophy of learning founded on the premise that, by reflecting on our experiences and manipulating our environment, we construct our own understanding of the world we live in. Each of us generates our own "rules" and "mental models", which we use to make sense of our experiences. Constructivist theory advocates that students learn best when they are given an opportunity to construct meaning on their own, in an appropriate and supportive e-Learning environment. Ridge and Waghid (2000) take this concept further by stating that constructivism has a social dimension

because meaning is constructed in social contexts and is communicated dialogically through socially negotiated understanding.

Epstein (2002) attests to this argument when he postulates that constructivists perceive e-Learning as an active process in which meaning is accomplished on the basis of experience and a process of adjusting our mental models to accommodate new experiences. In essence, constructivists believe that meaning is constructed by the cognitive apparatus of the learner (Novak & Gowin, 1986; Resnick, 1983; Watzawick, 1984). Lecturers and teachers using this theory in their learning and teaching process emphasise active e-Learning over passive e-Learning, which is said to be extremely inefficient. This latter form of passive education fails to engage the learner in a given learning area. The researchers of these scientifically-proven findings also believe that one of the interpretations of active e-Learning that is generally accepted is found in the theory known as constructivism (Epstein, 2002). In short, agreeing with Land and Hannafin (2000:15), constructivists' environments scaffold thinking and actions in order to deepen understanding. They provide opportunities for students to amplify and extend their cognitive capabilities, as well as to reorganise thinking processes by altering the tasks available to them.

Students who use the TEL tool learn independently and autonomously from the facilitator of learning, and at their own pace as advocated by OBE. Ridge and Waghid (2000) define e-Learning as an autonomous activity by a student who independently engages intellectually with the content, the course developer and the feedback on in-text activities or assignments. An e-student interacts with no one else but the tools, and engages with the content without anyone's aid. Although such a student is thinking creatively, there exists the fundamental challenge of changing control over learning from the teacher to the student. In the South African context, this change is an immense one as people are accustomed to the pre-democracy education system, whereby learning and teaching were teacher centred (teacher-based and paced). The education system is now more inclined toward OBE principles that encourage education to move from the control of the teacher to that of the learner. Despite this, lecturers continue to use the past, traditional method of teaching, whereby a student is regarded as an empty vessel that needs to be filled by a full jug (the lecturer).

The constructivist approach to learning and teaching is based on a combination of a subset of research within cognitive psychology and a subset of research within social psychology. The basic premise is that an individual learner must actively build or construct knowledge. The construction

of this knowledge and skills is the individual's processing of stimuli from the environment and the resulting cognitive structures that produce adaptive behaviour rather than the stimuli themselves. The e-Learning process of knowledge is also the construction process of knowledge. This process is largely reliant on students as they are the main body of learning activity and they construct knowledge on their own initiative; teachers are the helpers and the drivers for students constructing knowledge (Huitt, 2009; Jia, 2010). Huitt (2009) further clarifies that constructivists suggest that teachers first consider the knowledge and experiences students bring with them to the learning task. The school curriculum should then be built so that students can expand and develop this knowledge and experience by connecting to new learning. When students access information from TEL devices, they construct their own meaning. Idrus (2009) points out that teaching and learning do not improve because of improved technology and content does not have meaning without context. Clarifying the argument, this author further states that context is not created by being before a computer reading content but learning is improved when it is grounded in practical learning theory, hence the researcher discusses the use of TEL underpinned by theories.

Biggs and Tang (2011) see constructivism as having a long history in cognitive psychology, dating back to Piaget's era. Moreover, cognitive development scholars do not come to the same conclusion on the environment being the stimulus for learning, while in the researcher's opinion, well known psychologists and scholars, Piaget and Bruner do share the same sentiments. Though the two psychologists mentioned above lived in the fairly distant past, they could foresee how education would be transformed to its present condition. Bentham (2002) presents Piaget and Bruner as advocating the principle that knowledge should be constructed; they regarded students as active participants, which gave birth to a concept of discovery learning which meshes with constructivism. Bentham (2002) further stipulates that cognitive development theorists argue that the manipulation of the environment comes with the individual's level of maturity and experience. If a student is mature enough and can take charge of his/her own learning, the student can manipulate the environment for learning purposes and develop new meanings, which the student will use in his/her experiences gained through the e-Learning years. According to Ibid (2002), Piaget believed that the individual operating at this level should be in the last stage of cognitive development, namely, formal operational where an individual is engaged in abstract thinking. If there is no delay in the cognitive development of a student, an HIL student should be operating at this stage as per the age allocation of this stage (11–adult).

Although there have been debates and criticism of Piaget's formal operational stage, scholars such as Keating (in Bentham, 2002), believe that Piaget has overrated the thinking capacity of children aged 11–12 years. She refers to Papalia (1972) and Rubin, Attewell, Tierney & Tumolo, (1973) who conclude that 50–60% of those from 18 to 20 years old use formal operations and that even some adults are unable to operate at this level. The arguments proposed by the scholars mentioned by Bentham are valid, although they happen in exceptional cases. The scholars might have had a point in the past, but this has changed dramatically with the introduction of technology. Young people of the age Piaget mentions in his formal operational stage can access whatever information they desire from the Internet at any time and from any place. Technology natives find it easy to navigate through the screens and do what they wish to. An example of a 13-year-old is Vuyo Mbuli's son, who without fail read a tribute to his late father on the tablet/iPad which most people born before technologies were common would find problematic.

The current generation, who might be referred to as the “techno-generation” whose lives are more centred on technology than the lives of their parents are, and thus can operate almost every technological gadget, are able to think and create their own meaning using information they have researched themselves. The techno-generation can be given any technological environment and they will manipulate it to their benefit without the limitations of time and space. A TEL environment offers students the opportunity to understand and manipulate their environment; it gives them space to construct their own meaning, and thus learning takes place effectively. In other words, behaviour is the result of stimulus and response, whereby a student responds to a stimulus by manipulating and managing his or her environment to achieve a desired goal. The behaviour is learnt from the environment. This notion comes from the observation that some theorists believe that there is little difference between the learning that takes place in humans and that in animals. The theorists, Skinner and Thorndike also used animals to determine by experiments whether or not behaviour is learnt from the environment. In believing that the best way to understand behaviour is to look at the cause of action and its consequences, they experimented by caging an animal in a box with a stimulus outside the box. The box had a lever, which when depressed causes the animal to obtain the reward. In its own time, the animal will repeatedly manipulate its environment in order to get the reward (Mergel,1998).

This study confirms constructivism because the emphasis is placed on student learning autonomously and encourages a learner to be innovative and construct his/her own meaning and understanding. In discussing constructivism, the researcher has based the arguments on Donald

et al. (2006) and the seven constructivist principles of practice that are central to learning and teaching at all levels. Donald et al. (2006) emphasise that these principles cannot operate optimally individually; they all overlap and interact. These principles are examined in the subsequent sections.

### **2.3.1 Process as well as content**

Process and content in lesson delivery work together for the good of the e-Learning and teaching process. The two are, and should remain, inseparable. Weimer (2008) proclaims that the facilitators of learning may improve their teaching through the development of their content knowledge. This author further proposes that the material, and a willingness to convey it in a particular manner relevant to students, only enhances e-Learning. In support of this explanation, Weimer (2008) uses the metaphor of a car and a road. Neither the car nor the road can be regarded as more important than the other to reach the destination; both are essential. She emphasises her arguments by postulating that what we teach and how we teach it are inseparably linked and very much dependent on one another.

Even though both are tightly linked, in most cases, facilitators of learning often are content-based and paced in their approach to learning and tend to neglect the process of learning by forgetting that what is taught and how it is taught are both important. Weimer (2008) further highlights that even professors assume that the content is far more complex than the process, although both are equally formidable. Facilitators of learning tend to separate the car from the road, yet they want to reach the destination (Weimer, 2008). This principle highlights an important fact, namely, that content in this era, is not the only imperative in learning and teaching settings, the process is also important (Clapper, 2009) particularly in this age where educational outcomes are important and technology is used in our education system. Adding to the argument, Weimer (2008) asserts that the best teachers and lecturers are not always those with the most sophisticated content knowledge, but those who know their material, and are also fully conversant with the process:

They never underestimate the power of the process to determine student learning outcomes (Weiner, 2008).

Hausfather (2002) finds that teaching by constructivist approach encompasses the process of leading learners to understand and use content. Hausfather further stresses that content does not exist outside the process of acquiring that content. Constructivism brings important insights that speak to pedagogical approaches to learning content.

The process of imparting knowledge to students has shifted from being based purely on content to a greater focus on the learner and the outcomes. This means that facilitators of learning need to search for new ways to deliver lessons without necessarily focusing on content but rather to suit the needs of students in this era, hence the introduction of TEL in most HEIs. In addition, the design of the online lessons is informed by content. Content is built into the LMS and therefore it is easier for students to access the content using TEL equipment. The processes of engaging with material and course content are easier for the techno-generation because that is the world they are familiar with.

### **2.3.2 Active e-Learning**

Facilitators of learning must create an opportunity for active e-Learning; this is the whole purpose of learning. Learners and students are able to think critically about the content they have to learn and in the process construct their own understanding, either by working in a group, in pairs or individually. This mainly happens when the learners or students are actively engaged in the e-Learning and teaching process. More often than not teachers and lecturers are deliverers of knowledge in a passive environment; hence Clapper (2009) feels that there is a need to move to a point where all learners are actively engaged in the construction of their knowledge. The activeness of the students in the classroom or learning environment may be enhanced by “flipping” the classroom. One of the major goals of TEL, according to Pundak and Herscovitz (2009:215), is as follows:

...to promote students' active e-Learning as a way to improve students' conceptual understanding and thinking skills.

A flipped classroom, which is a buzzword in the 21<sup>st</sup> century, is a construct developed by Eric Mazur in 1991. In this construct, students first gain exposure to new material and make sense of it before they come to the class, and during class time, they then assimilate that knowledge. What is of interest is the response Mazur voiced during the evolution interview on the subject, “The flipped classroom will redefine the role of educators”. Mazur was asked if the flipped classroom model becomes the norm across the higher education space in a decade, and how that would transform the role and responsibilities of professors and instructors in higher education. His response was:

It will change it absolutely dramatically. Rather than being the sage on the stage, the role of the instructor is going to be a coach or ... the guide on the side. And I think we will need to rethink our learning spaces too. Rather than having the amphitheatre, which puts the students in a passive mood immediately and the professor at the center of the attention, we need to design our spaces so they become student-centered. So, I think the role of the instructor, rather than

becoming the source and the deliverer of knowledge, will become much more that of a facilitator ... Rather than just telling you what I know, I'm going to probe your knowledge and push you to build your own knowledge. So I think that there is going to be a dramatic shift but, let me tell you, that shift is overdue (Mazur, 2013b).

The flipped classroom concept is now becoming the order of the day and indeed the role of the lecturer is changing hence in this study, lecturers are referred to as facilitators of learning. The introduction of TEL allows students to actively engage in the lessons, including those who may be shy to participate in the presence of others. If the study material is placed in the LMS, the students are able to access it in their own time, and in the comfort of the place where they reside. If they have access to the material before they attend a lesson, then they are able to participate actively in the class.

### **2.3.3 Connecting familiar to unfamiliar**

This principle emerged from the notion that teaching must connect with where students are, in their understanding. It connects the known to the unknown. This is what Piaget, Vygotsky and Bruner believed in. What this concept refers to is clarified by Hausfather (2002) who explains that learning relates to what the learner knows and what was taught. Learning recognises and connects prior knowledge with new information. What students know and the ideas they have before e-Learning new information helps them in their new constructions. Facilitators of learning should work with students' prior knowledge, connect to it or challenge it, and allow students to build from and onto this prior knowledge.

However, this is not a new concept. Even during the times when teaching was more teacher-centred, teachers moved from the known to the unknown. The only problem was that teachers were feeding learners with information without allowing them to think critically about what they were taught, so that they might construct their own understanding and meaning from the subject matter. Constructivist theory promotes using a curriculum that is customised to the students' prior knowledge and emphasises "hands-on" or participatory problem solving. The teaching strategies are tailored to encourage students to analyse, interpret and predict information. Facilitators focus on making connections between facts and fostering new understanding among students. As a result, e-students using the TEL tool are independent and learn to solve their own learning problems. TEL requires them to have prior knowledge before they can even access information

on a device. Without prior learning, it would be difficult for e-students to understand as they are e-Learning by themselves and lacking cognitive skills.

Eggen and Kauchak (2013) argue that cognitive e-Learning has a predominant framework for examining learning and teaching. Hence, the theory is imperative for this particular study. These authors outline five principles:

- First principle: Learning and development depend on experience; therefore, e-students differ in their thinking. TEL users differ in terms of their skills in using the technique depending on their prior knowledge which plays a role in their differences in knowledge of using the technique.
- Second principle: People want their experiences to make sense. Making sense of our experiences is a fundamental cognitive need. Therefore, the TEL environment aims at helping students to make sense of what they learn through learning the technique from their peers and instructors.
- Third principle: Learners construct knowledge. If the way we present knowledge is not meaningful to the students, then it will not make sense to them and the e-student will withdraw from the e-Learning experience and limit his or her participation in learning activities.
- Fourth principle: The knowledge that the learners construct depends on what they already know. An e-student relies on what he or she already knows when constructing knowledge. Prior knowledge influences our thinking.
- Fifth principle: Social interaction facilitates learning; the social interaction of e-students has an influence on learning and development. Students learn when they interact with others and they are at ease when they share knowledge with other students as they share the e-Learning space.

#### **2.3.4 Guided discovery and scaffolding**

These are two independent principles which are closely related. In this section, the two principles are discussed as one because of their overlap. The principles basically move from the premise that students cannot be expected to discover everything by themselves; they need guidance to key areas of discovery from their teachers. Their effectiveness emanates from the students' prior knowledge and understanding. Facilitators of learning must scaffold key knowledge structures and learning strategies for their students. By developing the students' understanding of the structure of a knowledge area, scaffolding helps the student to reach a more powerful level of understanding.

One of the theorists admired by the researcher who believes that he played **the** most pertinent role and whose theory bears reference to this study, is Vygotsky. His perspective on cognitive development is grounded on the notion that students do not passively gain knowledge from others, but that they actively construct knowledge for themselves (Eggen & Kaukacha, 2013). Vygotsky believed that social interaction directly promotes development, which is something needed by TEL end users, especially the novices in the field, to create a comfortable environment for them (Eggen & Kaukacha, 2013). Vygotsky believed that teaching should take place through the process called scaffolding and affirmed his belief by developing a concept, zone of proximal development (ZPD).

The ZPD is a Vygotskian construct that represents the place where the disorganised spontaneous conceptions of the students meet the systematic and logical reasoning of the knowledgeable others (Ravenscroft, 2001). Evidently, Vygotsky believed that the distance between the students' actual developmental level and the level of potential development, known as ZPD, can be covered under adult or teacher guidance or collaboration (Woolf, 2009). Of equal importance, Ravenscroft (2001: 141) stresses that "mental development does not precede instruction but depends on it". It is the teacher or the knowledgeable others who can assist in developing students' spontaneous concepts into scientific conceptions. Ravenscroft's explanation of ZPD, as indicated above, is the distance between the students' actual developmental level and their higher level of potential development. The growth of a student from the actual developmental level to higher levels is guided by knowledgeable others or achieved through collaboration with more capable peers. It is through this theory in TEL that the e-student will be taken through the teaching experience by knowledgeable others who may be facilitators of learning, or their knowledgeable peers, until where he or she succeeds and can actually achieve on his or her own (Bentham, 2002; Eggen & Kauchak, 2013). Vygotsky sees knowledge as being impacted by the more experienced adult to a lesser experienced one taking on the role of an apprentice.

This concept is drawn into the study to look at how the facilitators of learning or lecturers help e-students at Medunsa to ultimately think independently and critically. As mentioned earlier, South African HEIs include rural universities where the majority of students come from underdeveloped communities and have not touched or even seen a computer before entering university. These kinds of students need knowledgeable others to guide and support them through the TEL system until they are independent and can use the system without help. In summary, these theories speak to the interaction and relationship of the students and their environment including their facilitators

of learning and their peers. This interaction and relationship is established to bridge the notion of being walled into a limited space and time, and develops the student to become an autonomous and a critical thinker.

### **2.3.5 Cooperative e-Learning**

Facilitators of learning must create an opportunity for students to solve problems in pairs or small groups to promote one another's cognitive development. Cooperative e-Learning involves a social interaction. A student with understanding of one aspect of the problem may mediate another's shift to a higher level of understanding. Students in this case play a major role in learning and the educator becomes a facilitator (On purpose Associates, 2001). Jia (2010) adds to the above debate by suggesting that students should focus on explorative and cooperative learning by means of interactive actions with knowledgeable peers. This will assist students to continuously improve their cognitive skills.

The cooperative and explorative e-Learning (Jia, 2010) referred to above, is well articulated by behaviourists who believe that learning occurs as a result of experiences. This, according to Ertmer and Newby (2008), implies that people are born blank and whatever they learn is acquired through association and interaction with the environment, where they gain knowledge. Eggen and Kauchak (2013) further clarify this view by proposing that learning is an observable behaviour influenced by stimuli from the environment. Obviously, e-students learn a lot by collaborating with peers through online discussion forums. Ertmer and Newby (2008) elaborate by reporting that learning is accomplished when a proper response is demonstrated and students are influenced by stimuli following the presentation of specific environmental stimuli. The e-environment stimulates e-students to manipulate this environment and learn in the process. The process the student follows to manipulate the environment is irrelevant; what counts is the e-Learning experience the student goes through, hence, Ertmer and Newby (2008) concur that the behaviourists focus mainly on the importance of the consequences of those performances and contend that responses that are followed by reinforcement are more likely to recur in the future.

The recurrence of reinforced behaviour brings the possibility of lasting changes in one's behaviour in response to environmental and contextual stimuli (Bélisle, 2008). In an asynchronous environment, a student may repeat a certain action stimulated by the environment and the pleasure she or he is getting from playing with the technology. The more the student plays with technology, repeating what she or he is doing, the more the student learns. Learning happens when student

behaviour is shaped by reacting to situations that encourage actions which gradually conform to a fixed goal. TEL allows drilling and practising, and in addition, a greater individualisation of the whole process (Bélisle, 2008). The change in a TEL student is clearly visible, for the individual would not only gain knowledge of specific discipline but also acquire technological skills.

Students will not only gain academically but they would also have greater social contact with their peers and facilitators of learning. The South African White Paper on e-Education (SA, 2004) stresses the importance of understanding the social context of TEL, especially the new types and formations of community facilitated by computer systems. Communication technologies that mediate the communication process in higher education create social climates which are very different from the traditional classroom. In TEL-based classrooms, students are at liberty to socialise with other students and learn from them at the same time (Gunawardena, 1995), which bring the element of social learning into the picture. According to Tu (2000), social learning requires cognitive and environmental determinants; this implies that in social learning theory, the extrinsic motivation or environmental stimuli drive people as isolated influences. The social learning theory explains human behaviour in terms of a continuous reciprocal interaction between cognitive, behavioural and environmental determinants, all operating as interlocking determinants of each other. Tu further suggests that in social learning theory, a change of behaviours results from interacting with other people and their environments hence, Checkel (2001) emphasises social learning as a process whereby people's interests and identities are shaped through and during interaction. This interaction is referred to as social interaction. Social interaction is the key construct of how social presence affects social learning and socio-cultural learning. Social interaction between learners and online role models is required for social learning to occur. The students regard those whom they deem intelligent and their facilitators as role models and follow in their footsteps, interacting and collaborating with them online; interaction results in learning (where possible, write positive than negative statements\*) (Tu, 2000). In addition, Tu (2000) sees social presence as a dynamic variable, which makes online social learning more complicated and that should be scrutinised from a social presence perspective. Students must acknowledge and value the other person's online social presence; without this there would be no social interaction and collaboration and therefore, no social learning.

Tu (2000) proposes four processes of observational learning to explain the social learning model. These processes are: observing the relevant activities; coding of the modelled events for memory representation; retaining what was learned; and, generating sufficient incentive to learn. In an

online environment, if models and learners do not talk appropriately and if the models lack pleasing characteristics, there will be no social presence at all. The students will ignore and reject them. An attention to models occurs in the interpersonal relation, which is primarily influenced by the degree of online social presence in “e” settings. The student must be presented with an enhanced social presence to create an environment for social learning (Tu, 2000).

### **2.3.6 Language interactions**

Language in all its forms is an especially important tool in teaching and learning. It is the principal way people interact, and therefore, transmit knowledge. TEL makes it easier for the students to discuss with each other regarding the course content. TEL requires proactive students who are also inquisitive about matters; who will always communicate with their peers or direct to the facilitator if they need clarity on certain aspects; and who are not intimidated by a technological environment. In facilitating learning, the facilitators of learning should promote extensive dialogue among students.

The above discussion is clarified by Moore’s (2007) construct of transactional distance, which encapsulates dialogue as one of its components. Although many scholars classify this theory as a theory for distance e-Learning, the researcher finds it suitable for online e-Learning also, be it at residential universities such as UL, Medunsa campus or distance e-Learning institutions. When students are learning through TEL without the physical presence of a teacher or facilitator of learning, they may experience desolation and that is where dialogue comes in to decrease the distance. This theory describes the three variables, which are dialogue, structure and learner autonomy. The transactional distance theory advocates for an increase of dialogue, which will decrease both the structure and the distance. The dialogue is between the student and the facilitator of learning and between learners (Shearer, 2010). Dialogue theory is one that is popular in communication sectors, but not limited merely to an exchange of words. It considers that other communicators establish a living mutual relationship (Scholz, 1998). This dialogue theory was formulated by the philosopher, Martin Buber, in the late 1950s and was further developed by him and other scholars to its present structure. Buber perceived dialogue as the heart of the encounter that influences the final product produced by the learner (Itzhaky & Hertzanu-Laty, 1999). In other words, what Buber implies, according to Itzhaky and Hertzanu-Laty, is that the quality of the educational act depends mainly upon the dialogue itself, in essence on the relationship formed between the teachers/instructors and their students.

From the above notion, Huang et al. (1998) state that the goal of dialogue is to reveal the incoherence in people's thoughts and to enable students to reach a higher level of consciousness and creativity. This helps students to be in touch with thoughts and feelings. The dialogical high level, according to Nussbaum (2011), can be achieved through arguments unfolding in the manner that communicators respond to arguments with counter-arguments, refutations, elaborations and questions as happens between two or more participants. According to Gorsky and Gaspi (2005), dialogue theory recognises two categories, intrapersonal and interpersonal dialogues. Interpersonal dialogue is further categorised into social and subject matter. Emphasising the interpersonal dialogue category, Buber, according to Itzhaky and Hertzanu-Laty (1999) identifies two types of dialogues which are "I-Thou" relations defined by reciprocity and "I-It" relations which are more distant and are conducted out of necessity. They further propose that the "I-Thou" relationship allows an educational encounter that extends beyond the transmission of information or the development of skills with support from fellow communicators, in this case students. On the contrary, the "I-It" relations are the regular relations that occur in daily life between people, even if they are not friends and even if they do not know each other. In this type of dialogue, the teacher and the student speak because it is necessary and part of the role of the teacher and society's expectations. The communication between the communicators is routine and does not lead to real, mutual contact (Itzhaky & Hertzanu-Laty, 1999). The success of the collaboration is also enhanced by the group of e-students who build up a common basis for thinking together, based on the dialogue theorists (Huang et al., 1998).

What is interesting and bears reference to this study is that dialogue may be F2F or mediated by communications media; if mediated by media, it may be synchronous or asynchronous (Gorsky & caspi, 2005). There are five basic assumptions underlying the theory: (1) learning is an individual activity characterised by internal mental processes; (2) learning is mediated by intrapersonal dialogue; (3) learning is facilitated by interpersonal dialogue; (4) dialogue is enabled by structural and human resources; and (5) dialogue and learning outcomes are correlated. Although learning is seen as an individual activity, the assumption set forth above depicts dialogue as central to learning and the key to producing desired outcomes. The manner in which learning takes place through the use of TEL makes dialogue theory pertinent to TEL.

In addition to the debate on the principles of constructivism above, On purpose associates (2001) stipulate that TEL allows students to be independent and constructivist in approach. The authors work on the premise that constructivist learning includes the following concepts:

- **A search for meaning:** This principle argues that learning must start with the issues around which students are actively trying to construct meaning. Construction of meaning in this case is most vital.
- **Meaning requires understanding:** Wholes as well as parts must be understood in the context of wholes. Therefore, the e-Learning process focuses on primary concepts, not isolated facts.
- **Understanding of the mental models:** In order to teach well, we must understand the mental models that students use to perceive the world and the assumptions they make to support those models.
- **Construction of own meaning:** The purpose of learning is for an individual to construct his or her own meaning, not just memorise the “right” answers and regurgitate someone else's meaning.

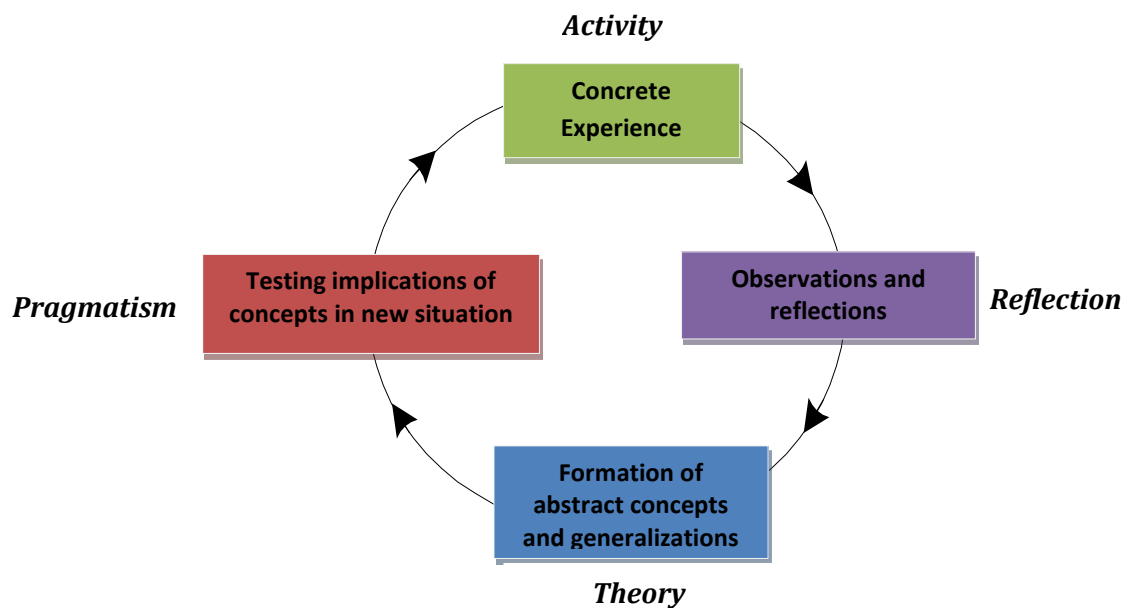
There are several models of learning that the researcher cannot overlook when discussing the theories underpinning this study. The strategies include: experiential learning model; seven e-Learning cycles; student-centred learning; and, the inquiry-based learning strategy. This section will show how the strategies impact on the thinking and the application of thinking in a constructive way for e-students. All these strategies that are discussed below depict how TEL develops the student to become a constructivist, and be cognitive in nature. The classroom has changed and this change has given birth to the concept of the “flipped classroom” as argued by Turker (2012:82):

...the core idea is to flip the common instructional approach: With teacher-created videos and interactive lessons, instruction that used to occur in class is now accessed at home, in advance of class. Class becomes the place to work through problems, advance concepts, and engage in collaborative e-Learning.

Students access the material before class, which gives them enough time to ponder upon it and apply their thinking in preparation for the F2F (\*indicate this acronym where you start using the term) contact with the teacher. For students to do this, they should be independent and disciplined.

Although Houghton (2004) finds that the principle behind the theory of learning styles is that different people learn in different ways and that many scholars attach an e-Learning style as a preference of an individual, experiential learning models portray the four learning styles as a learning circle. Figure 5 below, shows that student learning moves from one point to the other; as it cycles, it develops the student to be a reflector, a theorist, a pragmatist and an activist; and

then it starts all over again. This model represents learning in a virtual environment. TEL students cannot be pinned down to one e-Learning style; they satisfy all the roles outlined in figure 5 below. Houghton (2004) argues that students should not be labelled as having one fixed learning style. Teachers should adopt approaches to teaching that enable students who have different learning styles to learn effectively. Our learning and teaching should be designed with different learning opportunities to ensure accessibility. The TEL environment affords students an opportunity for such a learning process. Constructivism has the benefit of allowing students to learn using the four learning styles, as depicted in the experiential learning model below (figure 5).



**Figure 5: Experiential learning cycle** (adapted from Houghton, 2004:2; Rogers, 2007:26)

The above model (figure 5) indicates that students in a TEL environment come with some experience; they do not come into a learning environment blank. The students observe and reflect on their prior and new knowledge as they interact with the content and the equipment. They are able to observe how other students are dealing with the matter, as opposed to themselves. Going forward, they are able to theorise and formulate abstract concepts and consider what rule of thumb there is for using a certain technique. When they are content with the formulated concepts, they test the implications and might do so by revising their ideas in the light of everything else they know and work out how to apply what they have learnt to their own situation. The cycle starts all over again when returning to an activity adding new features to knowledge (Rogers, 2007). To encapsulate the deliberation above, Rogers (2007:26) displays it as follows:

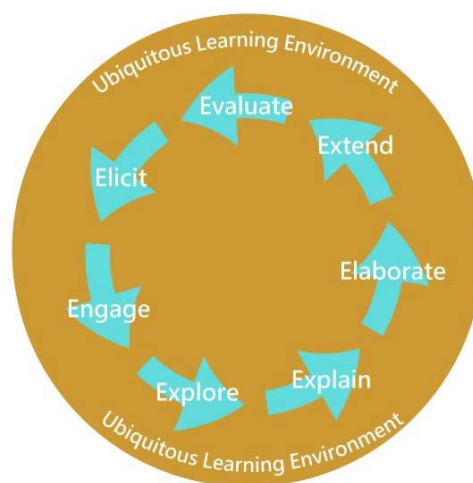
- Activity – doing something;
- Reflection – thinking about the experience;

- Theory – seeing where it fits in with theoretical ideas; and
- Pragmatism – applying e-Learning to actual problems.

The argument is also evident in the work of Hoadley and Jansen (2009) who believe that the students' competence is innate, therefore the knowledge is not imposed from outside. Moreover, they are of the opinion that the innate abilities of students encourage teaching that draws from the students' everyday knowledge and experiences and that ultimately, the student will use what he or she has learnt in everyday life and work. The experiential learning model depicted above closely coincides with the 7 e-Learning cycle as discussed by Polyem, Nuangchalerm and Wongchantra (2011: 258), which is built on the 5 e-Learning cycle model of Bybee (1997), as follows:

...the 7 e-Learning cycle emphasises examining the learners' prior knowledge for what they want to know first before e-Learning the new content...Learning activity management through seven steps is for students to search knowledge and experience meaningful learning by themselves.

Through observation, it is apparent that the techno-generation, or Millennials, does not need manuals to operate or work in a technological environment. From the way in which they operate the devices, it almost appears as if they were born with this ability. With TEL, teachers may draw from the experiences and knowledge the students have and work from there. The students in this case are able to manipulate and interact with their techno-environment and learn from it; it is certain that they will create meaning, increase their understanding and use the created meaning in conjunction with prior knowledge in real-life settings. Children can learn many things from interacting actively with their environment to construct new meaning better, as depicted in figure 6 below.



**Figure 6: The 7 e-Learning cycle** (adapted from Tuna & Kaçar, 2013)

The 7 e-Learning cycle above is constructivist in approach. It provides solid understanding and thorough comprehension of a new concept. According to Tuna and Kaçar (2013), the model targets the discovery of, and the association with previous knowledge of new concepts by students. These authors further stipulate that with well-planned and applied learning-teaching activities, students form themselves their own knowledge of a specific problem. This model suggests that students in a ubiquitous learning environment (ULE), if they follow the model, can work independently at any place without the presence of the teacher. TEL may be regarded as a ULE as it has invaded our education system and can be accessed globally. Learning in the above model can be accessed anywhere in the world since it is believed to be universal. Autonomy in this case is left to the student. The student takes charge of, and responsibility for, his/her own learning. The model encourages learning to be student-centred and the focus is removed from the teacher. Tuna and Kaçar (2013) also state that the model includes higher-order thinking skills and transmits the critical thinking skill; this implies that it stimulates students to explore, to inquire and to gain experience.

Tuna and Kaçar (2013) consider that student-centred learning (SCL) is accepted as the basic principle of learning designed according to students' interests, needs, talents and skills. They further suggest that the SCL environment creates successful individuals. From O'Neill and McMahon's perspective (2006), the paradigm in SCL moves away from teaching and puts greater emphasis on learning; the power is transferred from the teacher to the student. This is what Bernstein has been arguing over the years and that led to his codes theory of classification and framing which describes the power of the relationships between the content and degree of control in the classroom (Badger, 2010). The SCL approach develops a well-rounded, equipped and responsible citizen, as stipulated by the critical cross-field outcomes (CCFO) by the draft white paper of the Ministry of Education (SA: DoE, 2003). This is what TEL offers to students. Although most contact lecturers claim that they subscribe to SCL, in fact they merely engage students in the teaching and learning process. There is a very thin line between student engagement (SE) and SCL. Most scholars understand and experience the two concepts differently. Some scholars depict SCL as involving students actively; in this case the students are not passive but participate maximally in classroom activity. The researcher believes that the TEL environment actively involves and engages students in their daily classroom activities, but he aligns himself with those scholars who perceive SCL as an approach that goes beyond classroom activities. In this approach, the students take total control of their own learning in terms of time, what to do and

when to do it. E-students use both SE and SCL. Attard et al. (2010:5) envisage SCL in the following terms, stating that it

...represents both a mindset and a culture within a given higher education institution and is a learning approach which is broadly related to, and supported by, constructivist theories of learning. It is characterised by innovative methods of teaching which aim to promote e-Learning in communication with teachers and other students and which takes students seriously as active participants in their own learning, fostering transferable skills such as problem solving, critical thinking and reflective thinking.

Looking deeply into the definition by Attard et al. (2010), there is a sense that SCL is merely encouraging students to participate actively while the autonomy remains with the teacher. Contrary to what Attard et. al (2010) indicate, Hoadley and Jansen (2009) in reviewing Bernstein's theory, point out that Bernstein's competence approach is actually an SCL approach, and they suggest that:

The focus on the learner and everyday experience tends to affirm students and build their confidence, whatever their background... Learning, it is assumed, does and can take place anywhere: at home, at work, and at school...Students also have a large measure of control over: what they learn (selection); when they learn it (sequence); how quickly they progress through e-Learning (pacing)... Students take control of their own learning, and the teacher's role tends to be covert. Rather than directly transmitting learning, the teacher acts as a guide and facilitator. Pedagogy is personalized and process-orientated.

The researcher's understanding of SCL marries well with that of Hoadley and Jansen. The student is given responsibility and autonomy. The TEL environment is based on the SCL approach rather than on merely engaging students in a learning process. Understanding Hoadley and Jansen's definition of SCL, TEL students are perceived to be, due to the nature of their operation, involved in their learning process and with the role of the teacher in the whole setting. Following Hoadley and Jansen's definition, TEL students are often seen to be independent of their teacher or facilitator of learning. The students take total control of their own learning, they draw their own learning plan, which informs them when, what and how they will they activate their learning process. This learning process happens at the students' pace, time and location and the same students can measure the process. Bernstein explains the whole notion of SCL by packaging it through his code modalities, known as framing, whereby he clarifies the intensity of the autonomy of students in learning. Whitty (2010) describes framing as reflecting the distribution of control the students have over their learning, which Hoadley and Jansen (2009) refer to as competence. The greater the control of students over their learning, the stronger the framing is, meaning that e-Learning becomes more student-centred; the weaker it is, the less student-centred it is. The teacher, or the facilitator in this process, assists when needed by the students. The student

centeredness of this process develops the students to become inquirers in their learning. The section below discusses the e-student as an enquirer.

Inquiry-based learning (IBL) as defined by Justice et al. (2006) refers to both the process of seeking knowledge and new understanding by a student, as well as to a method of teaching grounded in this process. Clarifying the definition further, Saunders-Stewart, Gyles and Shore (2012) understand IBL to occur when a student describes the objects and events of his or her findings, asks questions, constructs explanations and tests them against current scientific knowledge, and then communicates these ideas to other students. In this process students use critical and logical thinking and consider alternative explanations. In this way, students actively develop their understanding of the subject area by combining scientific knowledge with reasoning and thinking skills. The TEL environment affords students an opportunity to search and engage with information found from different e-sources. The students apply their minds to the information they come across and have the opportunity to question what they see in order to develop their own meaning; ultimately they are able to share the information and their thinking with other students. Learning, depicted by Saunders-Stewart et al. (2012), is most favourable when individual students interact through discussions, ask questions, and actively construct their own knowledge. IBL affords e-students an opportunity to tailor some of their learning experiences to their own interests and curiosity. Justice et al. (2006), in a five-year experiment with teaching and evaluating IBL, have concluded that it is a potent pedagogical tool in higher education that encourages students to become self-directed and engaged. Above all, Saunders-Stewart et al. (2012) maintain that knowledge is constructed by activity. One learns through doing; thus, a problem-solving approach should be based on practical experience which brings the discussion to problem-based learning (PBL), a subset of IBL. Although PBL is used more often by the health sciences than by other disciplines, higher education adopted PBL around the 1990s and it has been applied globally since then in a variety of educational environments (Hung, Jonassen & Liu, 2008). PBL makes students assume responsibility for their own learning. When the instructor of learning poses a problem or a question to students, they research the problem and analyse data in a way that promotes independent enquiry and by so doing, students learn the process of acquiring knowledge, not merely its end product (Rogers, 2007).

## **2.4 Nearness theory and its implications in the use of technology enhanced learning**

In a lecture given by Professor Jonathan Jansen (21 November 2013), a new construct was presented on nearness as a theory and practice in African scholarship. This new development, according to Jansen, occurred because universities had not changed much since the birth of democracy in 1994 despite the development of new policies. He emphasised that the two, democracy and new policies, alone do not guarantee change. Jansen believes in changing the attitude of students despite their cultural background. In his endeavour to build this theory, Jansen outlines its seven components: nearness beyond physical proximity; nearness through mediated action; nearness in real time; nearness as communication; nearness as truth-telling; nearness by resemblance; and, nearness as courage or risk-taking. The researcher adopts this thought-provoking theory as one of the bases for the study. Jansen's inspiration to develop this theory was based on spirituality. He mentioned that he had thought much about the hymn "Nearer my God to thee" and started to explore the word "nearer", which implies coming closer to, or striving to get toward, someone or something. This theory fits perfectly with TEL and its seven components in relation to TEL are discussed in the subsequent paragraphs.

### **2.4.1 Nearness beyond physical proximity**

Nearness in this component does not refer to being physically close; in Jansen's words, it is "being so near but so far". The facilitator or the online instructor makes students feel closer, though they are physically and geographically far from the e-Learning centre. This may be achieved by creating an enabling learning and teaching environment. The presence of the teacher makes the learners feel that he or she is near to them. This speaks to the fact that students do not need to be physically close to learn or to participate in the learning and teaching process.

### **2.4.2 Nearness through mediated action**

Nearness through mediated action refers to the collaborative aspect of learning and teaching. Students and lecturers share e-Learning platforms. What Jansen emphasises is that the rules of the game must change. In TEL we experience this change. The norm is that the lecturer is seen as a "know-it-all" who feeds students with information. In the electronic environment where students take charge of their own learning, the roles change, which in turn changes the rules and norms of the teaching experience. This component embraces the concept of a flipped classroom, defined by Educause (2012) as a pedagogical model in which the typical lecture and homework elements of a course are reversed. Educause further describes a flipped classroom as referring to

concepts such as active e-Learning and student engagement. A flipped classroom transforms the traditional classroom into a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities. All these activities can be carried out in an electronic environment. During class sessions, lecturers function as coaches or advisors, encouraging students in individual inquiry and collaborative effort.

#### **2.4.3 Nearness in real time**

Nearness in real time speaks to the synchronous use of TEL. If students have connected in real time, they feel closer to each other and to their lecturer. When students feel the closeness of the lecturer and other students whom they may regard as knowledgeable on the subject matter, they feel secure and that help is at hand.

#### **2.4.4 Nearness as communication**

Nearness as communication is one way of making students feel at ease and relaxed around one another. One needs to come to their level and communicate at their level, and then they will open up and be ready to learn. The fact that the lecturer is communicating with students via a familiar medium, makes them more at ease and helps communication.

#### **2.4.5 Nearness as truth-telling**

Students who feel vulnerable can be assisted in their vulnerability as a result of a rapport created and built through the electronic environment. Students are able to share their frustration and encourage each other using the platform. The students may be able to open up to other students whom they feel share their vulnerability.

#### **2.4.6 Nearness by resemblance**

When a student finds another equally vulnerable student, he/she starts to see himself/herself in the other student; whatever assistance got will be shared with this other vulnerable student. Student statistics indicate that they collaborate with each other and share whatever information they find.

#### **2.4.7 Nearness as courage or risk-taking**

Because of the students' feeling of vulnerability, they tend to accommodate and embrace each other against expectation and against their history. Shearer (2009) emphasises the role played by TEL in reducing the distance between the student and the teacher and/or the institution of learning. She stipulates that

It is the idea of an educational exchange between participants, facilitated by technology that helps reduce miscommunication so the result is an effective educational transaction (Shearer, 2009: 20).

TEL can close the gap between students separated from their fellows and from their learning institutions (Benson & Samarawickrema, 2009). Through TEL, e-students can feel nearer yet far by following the seven components of Jansen's theory of nearness. The interaction between e-students and their environment and the open, positive participation of e-students and their collaborators decreases the psychological distance that the e-student may feel. If these interactions and collaborations are purposeful, constructive and are valued by each party, e-students ultimately feel a connection with the educational experience. In addition, the e-Learning experience becomes effective and efficient, leading to an improved understanding for the student (Jansen, 2013; Shearer, 2010).

## **2.5 Adult learning theory and its implications in the use of technology enhanced learning**

Adult learning theory or andragogy, referring to the science and art of helping adults to learn, was theorised by Malcolm Knowles in 1968 (Rogers, 2007). This approach differs from pedagogy, which is the art and science of helping children learn. Knowles, a pioneer in the field of adult learning, describes adult learning as a process of self-directed inquiry. Adult learners are very different from school-age children in so many ways. What makes adult learners different from school-age learners is the degree of motivation, the amount of previous experience, the level of engagement in the e-Learning process, the application of e-Learning and an adult's independence in learning. In other words, the adult learner brings to the e-Learning experience preconceived thoughts and feelings that will have been influenced by each of these factors. The approach is characterised by five principles as developed by Knowles (Merriam, 2001; Russell, 2006) to describe the adult learner. The adult learner

- has an independent self-concept and is a person who can direct his or her own learning;
- has accumulated a reservoir of life experiences that is a rich resource for learning;
- has learning needs closely related to changing social roles;
- is problem-centred and interested in the immediate application of knowledge; and,
- is motivated to learn by internal rather than by external factors.

This section looks at how the TEL student fits the profile of an adult learner based on the principles advanced by Knowles.

Adult learners come into an educational setting largely because they feel inadequate in coping with life problems; therefore they know why they come and what they want (Knowles, 1972; Rogers, 2007). These adult learners have already acquired the status of maturity. Higher education students may be regarded as adult learners not only because chronologically, they are at an age in which they are considered adults, but primarily because they now think differently from younger students on the FET level. Moreover, second-year students in HEIs are seen as mature students who know what they want and why they are at that level. Manson (2007) considers TEL to be the most suitable, flexible and a more appropriate teaching approach than the traditional one for adult education. Looking at the five principles of adult education by the father of Andragogy, Malcom Knowles (Rogers, 2007), it is evident that these principles mesh with the need of adult learners to be independent and to direct their own learning, as well as to build upon their accumulated experiences. This will help them as they interact with technology for learning. In the process of constructing meaning, these students will bring their experiences into their new learning environment. It is apparent that the changing social roles of the 21<sup>st</sup> century are characterised by informing students' e-Learning. Internal influence and the urge to succeed mainly drive these e-students to want to achieve. If they want to work on their studies even though it is late at night, they are able to access e-Learning platforms without the limitations of time, space and geographical setting. The researcher notes the argument by Waight and Steward (2005), who see the value of TEL for the adult learner encapsulated by the above debate. This value is also stated by Manson (2007) who attests to the fact that TEL supports a self-directed approach to learning rather than a teacher-directed approach.

## **2.6 CONCLUSION**

The theories discussed in this chapter speak to the interaction and relationship of students to their environment, which includes the facilitators of learning and their peers. Learning is a process whereby students construct their own cognitive structures and knowledge is constructed from the learner's experience, which Knowles (1972) argues, relays learning as a process of mutual, self-directed inquiry and not a process of transmitting knowledge. Students come to classrooms, not as empty glasses that need to be filled by a full jug, as expressed by one of the earlier scholars (Freire, 1972), but rather with a rich previous experience that they relate to new knowledge to

construct understanding of the phenomenon. The role of facilitators of learning is to organise and guide the whole e-Learning and teaching experience (Jia, 2010; Sjoberg, 2007). Learning in a TEL environment is an active process in which meaning is developed on the basis of experience and the manipulation of this e-Learning environment. Conceptual growth comes from the negotiation of meaning, the sharing of multiple perspectives and the changing of our internal representations through collaborative e-Learning.

In the case of TEL, students are given the resourced e-Learning environment from which they are required to search, understand and construct their own meaning of concepts. This interaction and relationship with the environment is established in order to bridge the geographical distance between the student and the institution by making them feel psychologically nearer. The emphasis in using this tool is placed on the student as an autonomous learner who uses initiative to become an independent learner and critical thinker (Benson & Samarawickrema, 2009). In this case, the students are not limited to space and time because they can learn anywhere at any time, on condition they have access to relevant resources. Fry, Ketteridge and Marshall (2009) develop this argument by proposing that a constructive mind continuously builds and amends structures in the mind, thereby implying that we acquire new understanding and knowledge that extend and replace the old.

The next chapter presents the literature that attempts to answer the questions posed by the study in chapter 1.

## **CHAPTER 3**

### **LITERATURE REVIEW**

#### **3.1 Introduction**

This literature study sets out to discover what has been done in one's field of study, or to learn from other scholars how they have theorised and conceptualised on issues and what they have discovered empirically (Mouton, 2002). To clarify the above statement further, Taylor (2005) sees it as an account of what has been published on a topic by accredited scholars and researchers. The researcher's view is that a literature review does not refer only to topics by accredited scholars and researchers, but also to scholars and researchers who are not accredited. The literature study conveys to the readers and other scholars what knowledge and ideas have been established on a topic and what their strengths and weaknesses are.

The researcher reviewed a variety of related relevant literature, using primary, secondary and tertiary sources. The sources include both published and unpublished materials, books, journals, magazines, newsletters, audio-visual material, word-of-mouth, and reports related to the study. The aim of this exercise is not merely to duplicate the work of other researchers in a review of literature, but to find out what has been done recently in other parts of the world in relation to the problem in question, and to ascertain what the most widely-accepted definitions of key concepts in the field are, and in addition, to look at what is available. Therefore, this section looks at the following: the changing landscape of learning and teaching in HILs and HEIs; the general overview of the TEL technique; the theoretical and conceptual frameworks; the implementation of TEL; the use of the technique; the training or support given to e-users; the policies for the implementation of the technique; and, the models of TEL techniques.

#### **3.2 The changing landscape of learning and teaching in higher institutions of learning**

This section of the study looks at how education has evolved in HILs over time, from traditional learning and teaching to what it is currently. Biggs and Tang (2011) serve as a base for argument pertaining to the change in the educational landscape, indicating that since 2000 HILs have experienced drastic change that may be attributed not only to high participation rates and diversity in the student population, but also to other factors, which have altered the main mission of HE

and its modes of delivery. Biggs and Tang perceive the rate at which the HE landscape is changing as a hectic one (2011). To support their argument, they cite a 2009 UNESCO report in which Altbach et al. (2009) conclude, after reviewing global HE trends, that HE developments in the past are as dramatic as in the 19<sup>th</sup> century, but in the 21<sup>st</sup> century, these changes are extensive and global.

Looking at how earlier scholars perceived learning, these authors see learning as a process by which behaviour is changed, shaped, or controlled. It is the same way students learn even in the 21<sup>st</sup> century. This simply means that learning has not changed, but the methodology has, and for this reason, there is still continuity in learning and teaching (Roffe, 2004). To an extent, the statement by Roffe is true, though the researcher does not agree with the entire statement. The researcher subscribes more closely to Samuel Johnson's words of 1887, quoted by Eric Mazur in a panel interview:

I know nothing that can be best taught by lecturers, except where experiments are to be shown. You may teach chemistry by lectures: you might teach the making of shoes by lectures! (Hardesty, 2013).

It might seem like decades since Johnson made this statement but it is still valid today. Lecturers described by Nussbaum-Beach and Hall (2012), who still ring the bell to signal the beginning and the end of the class and insist on cell phones being off in class with the desks in a straight rows so that they may lecture continually with students writing everything they say, are those defined by Johnson. These lecturers are described by Freire (1972) as full jugs, the only knowledgeable ones waiting to pour out and fill empty glasses, namely, the students. Learning has been in the hands of teachers and instructors; they have held command of the situation. The implication of this is that the teacher has been controlling the learning process. Consequently, learning and teaching has been a hostile exercise, seen by Noyoo and Matumba (2009:225) as a "sterile affair", and it did not allow any unconventional methods in the transition and acquisition of knowledge. However, Bruner and other scholars such as Eric Mazur, Sal Khan and Clayton Christensen, who are masterminds of innovative learning environments, differed and moved away from the perception of having stringent rhetorical classrooms (Knowles, 1972). They have placed learning more in the context of competency-development, where students can learn comfortably and are able to control the flow of information (Nussbaum-Beach & Hall, 2012). This notion by masterminds referred to above, is emphasised by this quotation from John Dewey:

...if we teach today as we taught yesterday, we rob our children of tomorrow.  
(Dewey, 1944: 167)

This cannot be regarded as growth, development of competencies, and fulfilment of potential.

There has been a drastic change in the methodology of learning and teaching from what it used to be to what it is today. This change is referred to by Warlick and Dewey (2014) as a significant change resulting from technological innovation. This is not the case in South Africa only; it is a worldwide reversal. Bitter and Legacy (2008) add that education in the US is also undergoing a transformation in its response to these changes. Makoni (2000) argues that the change in HE is attributed to a change in societal needs. He further strengthens his argument by asserting that teachers are to regard teaching and learning as corollaries to massification, globalisation and the reconstruction of society that have drastically changed the student profile. In addition, Boud and Solomon (2001) declare that HE is in the midst of unprecedented change and facing demands to increase the number and diversity of students. The World Bank Group (2002) takes the discussion further and has stipulated that over the past two decades, many countries have experienced a massive diversification of education in their HILs. They also mention that this might be due to the growing number of private HILs, which bring competition into tertiary education. Since the Minister of HE in South Africa, Dr Blade Nzimande, called for access to HE, diverse groups of students now have this access. This includes the so-called “underprepared students”, (students whom academics in HE consider not ready for tertiary education or not well prepared for HE by the schooling system). The diverse group mentioned above also refers to working adults with little or no formal qualification (this includes teachers whom the SA government after the commencement of democratic rule in 1994 regarded as under-qualified or unqualified and wanted them to improve their skills), and candidates from rural communities. The World Bank Group (2002) continue to emphasise that education in HILs is facing unprecedented challenges that emanate from the convergent impact of globalisation and the vitality of knowledge.

South African HILs are also embracing these changes. This is affirmed by Moll et al. (2007:29) who state that HILs are experiencing significant changes as a result of a number of contending forces and competing interests. These forces and interests include:

- Global pressure to ensure that education supports the global economy. This is often translated into market-driven programmes underpinned by a utility model of higher education with an emphasis on skills and applications-based research as well as demands to increase higher education throughput;

- National pressure to support the emergence of new democracies. This manifests in efforts towards reconciling the efficiency and fiscal discipline concerns that underpin the macro-economic policy framework with the principles of equity, access, redress and nation-building;
- Institutional pressure underpinned by the mission, values and historical context of institutions. Organisational factors such as how the institution defines knowledge production, what is viewed as the purpose of education as well as the historical context of institutions, impact on the curriculum reform process.

As the HIL sector makes a reversal in the learning and teaching landscape, South African HILs have also adopted the “big three” themes, which are globalisation, massification and internationalisation of education. The big three simply means the widening, the deepening and the spreading of the HE system including the interconnectedness of the WWW. As described by Van der Bly (2005:877), globalisation is

...a term popularized by M. McLuhan (1911–80) for the world in the age of high technology and international communications, through which events throughout the world may be experienced simultaneously by everyone...

The researcher has learnt that education has been opened to everybody from any part of the world regardless of his or her age, sexual preferences, status or geographical location. It is an interaction of economic and cultural changes and in the main strongly driven by economic factors (Huang, 2007; Marginson, 2007). The big three themes have become a discourse in HE around the world. The HE sector has experienced movements from one country to the other with HILs admitting different types of students in great numbers. The adoption of these themes has changed the composition of the student body in South African HE. Student enrolment has also increased and became more diverse in terms of race, language and age. As a result, we also have adult or older students, who register as a result of the demand by the new world economy that requires adults to be retrained over and over again in their working lives, as well as students with special needs (Geysers & Gravett, 2004).

Geysers and Gravett (2004:141), quoting from the National Plan for Higher Education (SA, 2001), state that apart from the graduate throughput of the HIL sector, HE puts a high priority on the importance of academic support programmes to improve the success of disadvantaged students. This support includes the use of TEL. A number of researchers have emphasised that there is a need for a transformation in the teaching and learning paradigm from that relevant to the industrial

age to the information age of today (Cannings & Frinkel, 1993; Geysler & Gravett, 2004; Sife, Lwoga & Sanga, 2007). They further argue that there are many pedagogical and socio-economic factors that drive HILs to use TEL which include information access, communication via electronic facilities, synchronous learning, increased cooperation and collaboration, cost-effectiveness and pedagogical improvement through simulations, virtual experiences, and graphic representations. Higher education has moved from blackboard and chalk, through overhead projectors and flip charts on to PowerPoint, and this, together with society's increasing use of television and computer games, has resulted in a culture that increasingly focuses on the visual (Savin-Baden, 2010). In affirmation of this argument, the World Bank Group (2002) suggests that new types of HILs, including traditional institutions, change their modus operandi and delivery systems to take advantage of the opportunities given by the new ICTs. This move is not necessarily a new support or intervention; the World Bank Group (2002) states that already in the year 2000, there were estimations of about 3000 TEL institutions in the US while today, almost all HILs offer some of their degrees using TEL, although seemingly in Africa the use of TEL gained its popularity only recently, in the early year 2000.

With the use of technology growing and new inventions of more computerised gadgets, there is a clear suggestion that today's techno-generation is alert to visual environments and often to social networks (SN). This is the reason why HILs should move from traditional teaching to online e-Learning and teaching. Most institutions are still organised to produce citizens who will fit into an industrial era. The mode of delivery of programmes has to be dynamic, flexible and responsive to the demands of particular enterprises and sectors. This is clearly depicted by Ellis and Goodyear (2010) who stipulate that students now have a wider range of places where they can study and learn due to the increasing availability and accessibility of ICT; this has created a greater flexibility in educational provisioning. Boughey (2000) takes it further and says that changes in HILs mean that the lecture, a teaching method that has been used in HILs for many decades, is no longer relevant. This calls for a change in the way teaching has been carried out in HILs. These changes have brought challenges for most HILs. The World Bank Group (2002) further sees opportunities emerging from the challenges. Teaching has moved from revolving around the teacher or lecturer and the syllabus and is now centred on the learner or student and on outcomes. To support the move from the teacher as a centre, to the student and outcomes being the centre, Boughey (2000) stipulates that the most significant educational trend operating in HILs in this era is that of OBE. In addition to the submission above, this author further clarifies that outcomes are what we want graduates to be able to do as a result of their learning. Geysler and Gravett (2004) state the keys

to having outcomes in learning and teaching as follows: developing a clear set of learning outcomes around which all of the programme's components can be focused and establishing the conditions and opportunities within the programme that enable and encourage all students to achieve these outcomes.

Prosser and Trigwell (2001) describe the nature of student learning in two quantitative ways. They indicate that some students use a surface approach to learning whereas others learn deeply. Students using the surface learning approach see given tasks as external irritations with which they have to cope. These students, according to Houghton (2004), accept information given by the teachers or lecturers and memorise it as isolated and unlinked facts. This leads to superficial retention of material for assessment purposes and does not promote understanding or learning, nor even long-term retention of knowledge and information. These students are extrinsically motivated and try to meet the requirements of the task with minimum effort. Students operating at this level will not do well, as in most cases whatever they read may remain unclear unless the student takes the initiative and studies more deeply to understand the concept he or she is reading. The approach, in fact, does not educate the surface students and it tantalises the students to search deeper. Most HILs in South Africa are moving from being teaching-based to research-based universities; this move will assert the deep learning approach and enable it to find its being within the university environment. This will also naturally flow onto the students, as they are trained to be enquirers and critical thinkers. In agreement with Prosper and Trigwell (1999), Houghton (2004:9) also shares the view that

...deep learning involves the critical analysis of new ideas, linking them to already-known concepts and principles, and leads to understanding and long-term retention of concepts so that they can be used for problem solving in unfamiliar contexts. Deep learning promotes understanding and application for life.

What Trigwell and Houghton explain about deep learning above is that students should be constructive by nature. The characteristics of deep learning are similar to those of constructivism. These characteristics are also depicted in an e-learner. Students committed to deep learning are identified by an intention to understand and seek meaning. Those who adapt to this approach attempt to relate concepts to existing understanding and can differentiate between new ideas and existing knowledge. As TEL students engage with their environment and come across new ideas and knowledge, they tend to critically evaluate and determine key themes and concepts. They do not simply read what they see without understanding. Deep students gain maximum meaning from studying as compared to surface students. There is no way in which one can work in an e-

environment and remain a surface learner (Fry, Ketteridge & Marshall, 2009). Students attempt to relate concepts to existing experiences, distinguishing between new and existing knowledge, critically evaluating, and determining key themes and concepts (Nicholls, 2002). Students who use the deep learning approach seek to understand ideas and meanings. Students are intrinsically motivated to carry out the expected tasks, enjoying this and doing it to satisfy their curiosity. The deep learning approach affords students the opportunity to be constructivists in their approach. These are the kinds of students envisaged at HILs who will survive in this technological era.

Teachers and instructors can teach to the point of exhaustion but the responsibility is that of the student; what students do and how they learn is more important than teaching. A student who has the characteristics of a constructivist, who is regarded as a deep learner rather than a surface one, is likely to succeed in a TEL environment. These characteristics are expanded by Ellis and Goodyear (2010) who regard such a student as an effective learner. They believe that for students to succeed and suit the profile of successful students, they must possess the following characteristics of good learning as depicted below:

**Learning is active:** A learner has to carry out a range of cognitive operations on new information, in order to make it personally meaningful. A learner or student is fully and actively engaged in his/ her own learning process and this will help the learner to grasp new information with ease.

**Learning is cumulative:** What learners already know plays a large part in determining what sense they can make of new information. The new information that the learner/ students acquired is confirmed by the knowledge the learner has and they learner makes decision based on amalgamation of the old and new knowledge

**Learning is individual:** Every learner constructs his or her own knowledge in a unique way, using past experiences and existing knowledge to make sense of the new information.

**Learning is self-regulated:** Effective e-Learning is characterised by the learners' awareness of their own learning activities and their ability to take action based on this awareness. Effective students often have a good idea about how they learn, and are able to use that knowledge to monitor and adjust their approach to problems.

**Learning is goal-oriented:** Clear goals are needed if learning is to be effective, and these goals need to be understood by the learner. The goals may be set by the learner or the teacher, or through the process of negotiation involving both.

**Learning is situated:** This impacts on learning with technology in three ways: it causes and helps us understand the various forms of collaborative and cooperative e-Learning ; it causes and helps us to understand “interactions” between individual students and groups of students and technological artefacts; it introduces as important constructs the ideas of practice, culture and community. Learning can be understood as induction into a community of practice in which appropriation of cultural tools and participation in cultural practices result in increasing recognition and status in a community.

**Learning is an experience of the student:** The importance of recognising that learning is fundamentally about the student has never been so crucial. With this, the students will always be at the centre.

The above characteristics of a good student suggest that students should set their own goals or do this with the help of the teacher, and that learners need also to take charge of their learning process. Students should become autonomous and direct their own unique learning process. They should be able to move and build on what they know to make sense out of what has been learnt. Learning in this case can also build a collaborative character and contribute to the community and the society in which students find themselves. This brings a sense of responsibility to students when working alone in an online environment and minimises the abuse of e-devices. The goals that the students have set will guide them and force them to focus on what they need to do rather than on accessing sites that might delay them in achieving those goals.

It is very evident from the literature referred to in the above section that the landscape in HILs has greatly changed and it had to, in order to be relevant to these times. Education has evolved from its conventional state in which students are passive and receive from the teachers to one where students take responsibility and are in charge of their own learning. This has also been affirmed by Njenga (2011: 38) who argues that “The information revolution and globalization have transformed the educational landscape.” If students take charge of their own learning, they may not easily forget what they have learnt thereby ruling out the possibility of learning being surface deep (cross-check sense\*). The lecturer’s role has completely changed from routine practice to be

that of a facilitator of learning, except for those who do not want to change and still see students as empty vessels who want to be filled. The subsequent section discusses in detail at what learning in an e-environment means and how learning has changed from traditional to TEL, especially in IHLs.

### **3.3 General overview of technology enhanced learning technique**

The concept of learning and teaching has always been delivered to students by a variety of methods and students have always employed a variety of modes of learning, including informal modes such as discussing subject material with other students. Nowadays students on their own ask questions and discuss schoolwork using SNs such as Facebook and Twitter. TEL has become increasingly used among the techno-generation and students learn through fun. The term “technology enhanced learning” refers to the use of electronic technologies to support and deliver some or all of the e-Learning and teaching for a particular unit of study. Given the complexity of the definition of TEL, to an extent, the researcher agrees with Stuparich (2001) and Catherall (2005), who promulgate that electronic technology is an electronic form of the learning experience, primarily to communicate through the Internet, to deliver an interactive e-Learning environment to students without constraints of time or geography. However, one has reservations when they narrow the definition down to being simply computer-based learning; something that limits the term. TEL should refer to any form of electronic means. Most researchers limit the definition to the Internet and forget that, apart from the net, we can use other electronic media such as tapes, videos and others, for learning purposes that give the same effect as that of the Internet. This notion is attested to by Noyoo and Matumba (2009) who consider that TEL uses a whole set of different parameters that deviate considerably from past didactic modes of instruction.

In summary, TEL is the convergence of learning and technology; not forgetting the use of the same technology for teaching. This means that it is where teaching and technology meet for the purposes of effective student learning. It is the use of the technology to design, deliver, administer and extend learning. TEL may also be mobile in the sense that some technological devices that may be used for learning can be used anywhere, for instance, palm select, computers and cell phones. Nowadays, there are many discussions around SNs, which is also a discourse among academics on its effectiveness in learning and teaching. Students, regardless of their geographical location, whether it is rural or urban, use SNs to communicate with each other because they are

quicker and a cost-effective means of communication. COM (2001) in Holmes and Gardner (2006:14) echoes the above argument by presenting an all-encompassing definition of TEL as:

...the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote changes and collaboration.

In agreement with the above, when analysing COM's (2001) definition, electronic technologies are viewed as a vehicle for education services and resources and also as relating to new multimedia technologies in which there is a collage of electronic technological means of learning and teaching. These electronic technologies include: mobile phones, CD-ROM, audio-visual devices such as radio, tapes, DVDs, TVs and videos, web-based technologies such as SNs, to mention but some. Agreeing with the argument is Howstuffworks (2005) when defining TEL or electronic learning as a system in which electronic applications are employed for teaching or imparting knowledge. The TEL system makes extensive use of CD-ROMS, network, Internet and Intranet. Lessons are disseminated in the form of text, video, audio and animation. TEL is not only a trend in schools or universities but it is also widely used within corporate organisations for training.

According to Donald et al. (2006), the use of technology is indispensable to the ways of working and is becoming of increasing significance. They further state that even though a combination of personal presentations and face-to-face interaction with students is still the best method of the teaching and learning process, the World Wide Web and email are of great value. They further proclaim that IT could spearhead improvements in HE. The future envisaged by the report is one of an increasingly active partnership between academia and industry, and of expansion in global markets. TEL technologies are perceived as the only way to efficiently address the huge increase in learning needs and numbers because of its distributed and flexible potential. In this century, TEL is commonplace in HEI, though some authors define TEL differently, but it amounts to the same thing, using technology in learning and teaching. TEL can be as rich and as valuable as the classroom experience or even more so. It is seen as the delivery of formal and informal learning and training through the Internet and other electronic means. With its unique features, TEL is an experience that leads to comprehension and mastery of new skills and knowledge, just like or even more than its traditional counterpart, face-to-face instruction does. Instructional design for TEL has been perfected and refined over many years by using established teaching principles, with many benefits to students. As a result, colleges, universities, businesses and organisations worldwide now offer their students fully accredited online degrees, vocational and continuing education programmes in abundance (Agriculture and Agric food, 2005; WorldWindowLearn, 2005).

There are challenges which impede the implementation of TEL in different HEIs around this country. Some of these challenges include: lack of knowledge and skill in IT; lack of sufficient resources and infrastructure; resistance to change due to fear of loss of jobs and being technophobic; lack of policy on TEL in some HEIs; and, lack of adequate planning and training in TEL (Centre for Research, 2003). Some of these challenges are attributed to attitudinal, cultural, social and economic factors. Other challenges to TEL are as follows: uncertain benefit; lack of opinion leaders; lack of computer skills and confidence; lack of interest; costs. Some staff consider themselves to be too old to use these technologies, thus they are technophobic, while others do not see the need to use media for learning. Even though there are challenges that inhibit the implementation of TEL in HE, there has been generally a large increase in the number of households with access to the Internet, which is important for TEL, and homes are also equipped with computers and other audio and visual technologies (Agriculture and Agric-food, 2005; Centre for Research, 2003).

TEL is likely to be the fastest growing method for delivering education and training. It gives the learner a chance to do the following: access the unit information and lecture content online; experience audio, video and multimedia as a means of learning; discuss issues with teachers and students in distant locations at a time that suits the learner; engage in real-time conversation with distant classmates and teachers; test knowledge through quizzes and other online activities; link to a wide range of educational resources on the web. Students have electronic access to the teacher and other students through email, electronic bulletin boards, online chat rooms, email lists, and so forth. The Ministry of Training Source (2003) states that this type of learning is beneficial for students who, because of distance, time, or physical limitations, cannot access traditional educational opportunities. A specific website is set up that allows students access to course materials and assignments in an “anytime/anyplace” learning environment. All the above definitions of web-based or online e-Learning reach one conclusion, namely, that this form of learning is an instructional event that can be accessed via the Internet or the web (Mackay, 2006). She further states that there are only two real disadvantages to this technique, and both will be overcome in the next five to ten years, when between 2011 and 2016, high bandwidth network connections become as common as telephones.

In responding to Mackey’s (2006) projections, South Africa is already increasing bandwidth and is trying its utmost to make network functioning faster. The first drawback, when compared to live

instruction, is the lack of human contact, which greatly impacts learning. The second major drawback is the lack of multimedia in many TEL programmes. Although Mackey outlines the disadvantages of TEL and stresses the fact that the technique is inhuman, there are many benefits and advantages of it. TEL can also be used together with face-to-face consultation, known as BL, which will be discussed later in the study. This is also affirmed by Holmes and Gardner (2006) when they postulate that rather than having one type of learning experience, a BL mode, which is a mix of conventional teaching and learning processes and this approach, should be followed. BL, which is also known as coordinated learning, is a combination of different modes of delivering and receiving learning such as classroom-based lectures or other forms of face-to-face tuition such as learner-content interaction, learner-instructor interaction, and learner-learner interaction, together with the electronic form of learning. This blended environment can also be an effective way to provide training, and might have better initial acceptance. In many cases, a blended type of learning may be the best way to provide training in a subject, for example in bricklaying, the practical training of how to lay bricks could be done in face-to-face hands-on sessions while some of the theoretical or design elements could be provided online (Centre for Research, 2003; Howstuffworks, 2005).

TEL comes in two forms that can be differentiated according to the types and amount of support that a learner is given and the opportunities the learner has to interact with peers and/or a subject matter expert during the e-Learning process. These forms include: TEL which is tutor supported (i.e. where online e-Learning dialogue between tutors and students plays an integral part in the online e-Learning and teaching experience) and TEL which is unsupported (i.e. where online dialogue of a tutor and students is not part of the online teaching and learning experience) (Centre for Research, 2003). These forms and types are: synchronous TEL, which includes social media (SM) such as Mxit, Facebook, Twitter, Skype, and many others, teleconferencing, Internet telephony, or even two-way live broadcasts to students in a classroom and asynchronous TEL, which means not in real time (De Vries, 2005; Howstuffworks, 2005). The two forms are discussed in-depth in subsequent sections (3.6.4).

### 3.4 Implementation of technology enhanced learning as a support tool for learning and teaching in higher education institutions

It is imperative to note that TEL does not imply that learning came with the invention of technology. It is a fact that Andrews (2011) stipulated that learning existed before technology and technology came into the picture to enhance learning. Learning and technology are reciprocal and co-evolutionary. It is public knowledge that the use of technology to enhance learning started during the times of psychologists such as Pavlov, Thorndike and Skinner. Even though these psychologists used animals for their experiments, they unanimously believed that the same is applicable to the human race. What these psychologists emphasised is that learning occurs through developing associations between events and the consequences of our behaviour informed by our interaction with the environment. If the same computerised equipment we have today were present in their days, they could have used it to illustrate the fact that learning takes place when we manipulate our environment. In the TEL environment, students are afforded the opportunity to manipulate and acquaint themselves with their own environment. As students explore their environment, learning takes place. Pavlov, Thorndike and Skinner used different technologies to convey the message, though Thorndike and Skinner's philosophies were the same (McLeod, 2007).

Contrary to Khan's (2009) view that TEL is an innovative approach for delivering a well-designed, learner-centred, interactive, and facilitated learning environment to anyone, at any place and any time, the researcher concurs with Shank (2007:27) who states that

...the use of technology for learning is quickly becoming ubiquitous. That is, people no longer see it as separate from "regular" learning, and it is viewed as part of the tools that trainers, instructional designers, instructors, and others who design or deliver instruction use to impact skills and performance.

TEL is no longer an innovation but a necessity for every HEI to engage in. TEL in HE has become inevitable and HEIs, with the kind of enrolment they are faced with, need to effectively and efficiently use TEL. The use of the Internet and technology in general is starting to have a great impact on everyone and everything in the world today. In South Africa, some of traditional healers (sangomas) have started using technology to consult with their clients. The *Daily Sun* newspaper (Wednesday, 4 September 2013) attests to the fact that technology is in everyday use for even sangomas use technology to consult with their clients and colleagues. A sangoma from a village in Modimolle, Limpopo Province of South Africa, who uses WhatsApp for consultation, states:

It is much easier for me to check up on my patients wherever they are and I am also more accessible to them, In fact most of them prefer to talk to me through this service because it is cheaper for them. Even though I am a sangoma I am still a young man and I also keep in touch with latest developments in technology. Previously my clients had to wait for me to finish a meeting before I could call them back. This has really made my life easier (Nkosi, 2013:2).

This was confirmed by one of his clients who indicated that he communicates regularly with his sangoma through the medium of WhatsApp. The client went on to say that his sangoma is a busy man but he does respond to the messages sent to him via this medium and is always available for his clients. Several Internet trends, including that in the above scenario, indicate that the environment is ripe for TEL. However, there are challenges that distract HEIs from implementing or using the technique effectively and efficiently. Some are based on societal issues and demographics; others stem from technological factors and sheer critical mass (Learnframe, 2001). According to the Centre for Research (2003) and Howstuffworks (2005), the effectiveness of TEL depends on the pedagogical skill of the designer of the e-Learning materials and the extent to which they can exploit the full capabilities of a visual learning environment (VLE). Like traditional forms of learning and training, the effectiveness of e-Learning depends greatly on the level of commitment and motivation of students. The study conducted by Learnframe (2001) on the use of TEL in the US depicts that the use of the WWW or Internet in the US increased by 53% between the years 1997 and 2002. In 2002, after a period of five years, the use of the Internet in the workplace escalated to 86% in the US and the study also shows that most of the US population surf the net more than any other activity at home. This is a sign that the US is ready for the use of TEL in HE. This study further exhibits some interesting findings that the education levels and the age of the Internet users are fairly diverse. It is also interesting to note that the users start using the Internet as early as high school, although the majority of users are in HEIs.

Howstuffworks (2005) finds that TEL can incorporate many elements that make e-Learning more fun. Making learning more interesting is what makes it more effective. This is what makes TEL valuable for so many types of learning. Howstuffworks further outlines the keys to successful e-Learning, as follows:

- **Varying the types of content:** Images, sounds and text work together to build memory in several areas of the brain that result in better retention of the material.

- **Creating interaction that engages the attention:** Games, quizzes and even just the required manipulation of something on the screen creates more interest, which in turn builds better retention.
- **Providing immediate feedback:** e-Learning courses can build in immediate feedback to correct misunderstood material. The more immediate the feedback the better the result, because each step of learning builds upon the previous step. If no feedback is given, then the next step may be building upon an incorrect interpretation.
- **Encouraging interaction with other e-students and an e-instructor:** Chat rooms, discussion boards, instant messaging and email, all offer effective interaction for e-students, and are effective in taking the place of classroom discussion. Building an online community significantly influences the success of online programs.

### 3.5 Technology enhanced learning: a bugaboo or a boon?

All inventions and innovations come with their own advantages and disadvantages, no matter how recent or good they are. TEL also has its own negatives and positives, regardless of its effectiveness and efficiency. This study looks at the disadvantages and advantages of TEL in HE and determines to what extent the gaps can be closed.

It is apparent that the use of technology to enhance learning has increased in HE and access to the Internet is also easy. That being the case, most South Africans are found in rural areas, where access to the Internet is a problem. Most students from rural places have difficulty in using computers, let alone surf the net. Some of them have never even touched or seen a computer in their lives. Some meet it for the first time at a university, and this makes it difficult for these students to make use of the TEL system away from an e-Learning site. This is not the case in South Africa only, but is also a United Kingdom experience, according to Catherall (2005). Students are not the only ones lacking ICT skills; academics in HEIs worldwide have the same experience. According to the researcher's observations at some universities he has visited, the majority of academics do not have basic computer skills, let alone the skill to open and read emails. Even though TEL is threatened by disadvantages as outlined by some scholars, there are many reasons why HEIs have to use TEL. They are discussed below and are supported by other scholars.

There are several advantages and benefits to the TEL technique stemming from the fact that access to the content is easy and requires no distribution of physical materials. TEL makes learning from

home a viable and attractive option. It has often been regarded as a development of traditional distance e-Learning and offers many advantages and benefits as compared to other modes of delivery for distance or contact students. This is not the case anymore; TEL is equally important to residential students, especially at HEIs. This will also help the institution to focus on research as it is required of them to increase the research output of their institutions. The multimedia approach has definite benefits over other modes of teaching and learning. The most obvious are the flexibility and the cost savings from not having to travel or spend excess time away from work; more especially in the cases where two merged campuses like Turfloop and Medunsa are far apart (Centre for Research, 2003).

Cannings and Finkel (1993) present one of the TEL technique benefits to students as that of being responsible for their own learning, which necessitates facilitators to relinquish some of their decision-making and involve students in discussions of classroom activities. This approach develops the student to be an independent learner as well as a collaborative learner; and promotes ownership of the learning and teaching process. Students take charge of their own learning, and learning becomes learner-centred rather than teacher-centred. Cannings and Finkel (1993) further state that the lessons are student-centred, which is an approach to teaching and learning in today's OBE, and the computer becomes the support mechanism. The Draft White Paper affirms the above discussion in "On e-Education" (SA, 2003) when it depicts TEL as teaching and learning philosophies and methodologies within the context of OBE, using ICTs in the e-Learning environment. This statement is further supported by Edutools (2006) when substantiating that there is a recent practice that is being adopted among institutions, called outcomes-based assessment (OBA), which has influenced the organisation of TEL classes. The TEL classes are organised with a clear sense of curricular, in such a way that they accommodate some of the OBA purposes, which are; supporting teaching and learning, and driving the curriculum and teaching (Reddy, 2004). The above is in support of what Clark (1997) notes that although feedback is limited in using multimedia technology, students become more independent and learner support is crucial. It can also benefit students who are home-bound and migrant students. They can learn at any given time, independent of their schedules, and paper work is reduced.

Many academics are threatened by the introduction of TEL in HEIs as they think that TEL is introduced to replace them or take over their academic responsibilities. This probably is the reason they do not welcome the initiative. To allay the fears of teachers and lecturers with regard to losing their teaching posts, the Draft White Paper on e-Education (SA, 2003:14) affirms that TEL will

not replace teachers. It will only enhance the quality of learning and teaching processes and reduce the time spent on administrative chores for them to focus on increasing their research output. It actually serves as an effective supplement to face-to-face teaching. The statement affirms what the Draft White Paper on e-Education states when it indicates that one of the benefits is to connect students and teachers with each other; facilitating access to professional support services and providing a platform for learning. The Draft White Paper on e-Education also sees this technique as a mechanism used to improve the quality of learning and teaching across the education and training system (SA, 2003:14).

In emphasising the importance of the technology, Rakoma (2004) indicates that students usually learn more in less time when they receive computer-based teaching. Lecturers are also able to spare time for other duties such as research and publications because the teaching/assessing workload decreases. For example, they do not always need to mark assignment scripts by hand; they do not need to present lectures in the lecture halls. Because South Africa as a developing country still have some miles to go technologically, it is important to encourage, nurture and motivate lecturers so that they feel proud and confident to act as pioneers in technology. Rakoma further advocates for the use of TEL as she points out the following main motives to improve the quality of learning: to provide students with information technology skills needed for their professional development; to widen access to education; to respond to the “technological imperative”; and to reduce costs and improve cost-effectiveness.

According to Maguire and Matejka (2005), the use of TEL has increased the opportunities for groups of geographically dispersed students to participate in formal professional development. In case of failure, this technique minimises the embarrassment that may be felt by a student in front of fellow students. This tool will not only help in professional development but it will also help in reducing costs associated with student and facilitator travel to instructor-led workshops. In addition, it eliminates the inconvenience of getting the instructor and students together in the same place (Mackay, 2006). The approach will also help to reduce the possibilities of misinterpretation because the information delivered will be the same to all users (students of a particular module). It can also help with developing information with the individual user in mind and the courses can be created to deal with each individual’s strengths and weaknesses. The content of the module or course can be easily changed or updated by the developer. This increases the rate at which knowledge is acquired (Learnframe, 2001).

### **3.6 Conceptualisation of the study**

This section of the literature review focuses on clarifying and defining the abstract constructs in terms of this study to bring similar understanding and agreement on matters relating to the implementation of TEL in HE. The section specifies the researcher's observations and fits the discussions within the theoretical framework discussed in chapter 2. The study draws on literature relating to the implementation and the status of TEL in South African higher education. A number of HEIs have implemented some form of TEL initiatives but there are still some obstacles to be overcome. In this section, the researcher will also indicate why he tries a particular path, based on the experiences of others, and on what the researcher would like to explore or discover. The purpose of this section is to highlight connections, gaps and contradictions found in other studies of similar nature. This section also links literature, core concepts and the study's research question.

#### **3.6.1 Realities of technology enhanced learning in South African higher institutions of learning**

The sooner education sectors accept the use of TEL, the better the advancement of the education system in South African HILs. This argument is based on Young's (2007) exclamation:

e-Learning is here to stay...Therefore it is time to step back, re-evaluate the place of e-Learning in our organizations, and focus on a strategy to support the conception, design, and development of successful e-Learning initiatives and programs.

E-Learning is not only here to stay but also it is a phenomenon that is growing at an extraordinary rate. Corry and Watkins (2007) add to the exclamation above, predicting that TEL is likely to be an expanding component both now and in the future and that HILs need to be prepared to successfully meet the challenges of learning through these high-end technologies. In support of the above views, Njenga (2011) reports that the use of technology in institutions leads to changes within those institutions. However, in the last few decades and also bearing in mind that ICTs have brought revolutions in e-Learning institutions, TEL in South African HILs is confronted by many realities, which differ from each other because this is such a diverse country. South Africa comprises both rural and urban HILs, where even within each institution there are diverse communities who are socialised differently, based on their geographical settlement, religion, culture and race. This diversity brings a different flavour to the use of TEL in South African HILs. In this section the researcher looks at these realities based on the following aspects: users' skills; facilities, infrastructure and resources; users' attitudes; bandwidth; access and affordability of TEL.

### **3.6.1.1 Technology enhanced learning users' skills and training**

Catherall (2005) argues that although IT is becoming more prevalent, with people owning computers and having access to the Internet, it should not be assumed that users will automatically possess ICT literacy or familiarity with the Internet; they need training. Even though Assareh and Bidokht (2010) depicted through their study that learners' confidence and expertise in using technology is related to their age, home and educational backgrounds, this approach differs from that of Morgan (2003) and Catherall (2005), who agree that despite the belief that young people are technologically knowledgeable and use instant messaging and email to communicate with each other, a study conducted at the University Wisconsin System on Faculty Course Management System has illustrated that many students of the faculty are not proficient in technology. The findings agree with those of Tshephe and Dichaba (2014) in their study at Medunsa, on the BSc extended degree programme on the use of TEL in learning and teaching. This study shows that some students are not sufficiently trained to use TEL to enhance their own learning process, which contributes to their lack of interest in using the technology to learn.

Training in the use of technology is one aspect most institutions are neglecting, with the assumption that academics and students can use technology. For the successful implementation of TEL, Warlick and Dewey (2014) postulate that HILs need to ensure that all staff and first-year students have the digital skills and attributes necessary to successfully use these new technologies, and incorporate them into course delivery. Training of the end users in the use of ICT gadgets provides learning and knowledge opportunities to address the needs of various members of the HE community involved in the TEL product life cycle (Young, 2007). This is not the case at Medunsa only. A study by Alqahtani (2010) reveals that in the Kingdom of Saudi Arabia when they introduced TEL they had to train the lecturers who had a problem in using technology. Odunaike, Olugbara and Ojo (2013) summarise the importance of training in TEL skills vividly when they state that adequate training is an important enabler of TEL implementation because technology does not teach by itself. Training provides capacity, skills and knowledge that drive e-Learning as an instructional offering. Lack of training results in resistance to change.

The training needs of the stakeholders should be looked at when developing a TEL strategy. To create a successful, holistic training solution, the requirements of the audience to be reached and the different knowledge components of the resources should be considered. Stakeholders should be empowered with the ability to become increasingly self-sufficient during the TEL project life cycle. Training methodologies should also be relevant to the content, context and needs of the

audience (Young, 2007). Nevertheless, learning to use the technology alone, even though it is important, is not enough for mastering TEL. There are several skills that users need to acquire from their classroom or lecture experiences, such as critical thinking skills that one uses when taking notes, new communication skills when working with virtual teams, time management, critical reading skills and other skills that have led to success in the traditional training classroom to ensure an equivalent success in the TEL environment (Corry & Watkins, 2007).

In addition to all the skills discussed above, Watkins (2004b:28) indicates that it is to the benefit of learners and teachers to ensure the development of study skills for TEL students. This will equip students with skills and strategies to study online. This author continues:

...building skills for communicating effectively when using email, synchronous chat rooms, or asynchronous discussion boards, are among the basic study skills that many online learners must adopt to be successful in the high-tech classroom.

### **3.6.1.2 Technology enhanced learning facilities, infrastructure and resources**

Generally, resources and facilities in most institutions whether they are for learning or otherwise, are a problem, not to mention the role of technological facilities. Access to technological facilities in places suitable for learning and training purposes is an important consideration when assessing the readiness of an e-Learning institution to support TEL. The structures for TEL can vary greatly from just an ordinary personal computer (PC) to complex learning laboratories with servers and networks. Many companies considering TEL are concerned about a lack of the necessary infrastructure. Infrastructure is a serious concern in HE in terms of implementing the TEL strategy and it is not cheap. This is also evident in the report of the World Bank (2002:32):

The adoption of pedagogical approaches and modes of delivery that rely significantly on information technology have far-reaching implications, both positive and negative...with respect to the institutions. The new technologies require considerable investment in equipment and in cable or wireless networks, followed by high costs of infrastructure maintenance, training, and technical support.

In contrast to the above argument, i.e. TEL is expensive in most developing countries, however, in the UK, technology has proved to be a source of major savings. The cost of producing graduates at the Open University is about one-third of that used at the traditional university. The Centre for Research (2003) and e-Compete (2004) point out that the success of the TEL initiatives in the UK may be attributed to the availability of resources and infrastructure that help students to access the Internet for learning purposes. They further indicate that there are centres such as the UK online centre, which is an important part of the government strategy, under the Department for

Education and Skills, that increase access to computers and the Internet, which helps with the accessibility of TEL facilities. This centre provides supported access to the Internet and email and, in some cases, more developed training for these purposes. The centre works in partnership with Learn Direct and is designed to act as a stepping-stone to the e-Learning opportunities provided by the latter; it is found in a variety of public spaces and community resource points. Even though there are TEL systems, which operate from local files accessed, for instance, from a CD-ROM, DVD, tape recording, video, and so on, most TEL today uses some form of networked systems. The World Bank (2002) stipulates that the library also is evolving into a multifunctional information centre as digitisation of information transforms their core work. Libraries are now preserving educational materials in digital form.

According to the Centre for Research (2003), most Internet users gain access using ordinary analogue telephone lines because they are readily available. However, the problem encountered by users in the UK is that they offer only very slow access to web pages, especially those with complex graphics or animation. This may also cause a difficulty in viewing videos or listening to music. Contrary to the argument by the Centre for Research, e-Compete Wales (2004) reports that access to the Internet can be provided through a dial-up modem over an ordinary telephone line and that TEL is much more effective with a broadband connection allowing faster access times, the transfer of larger files and better two-way communication. Although in the past, broadband was expensive, it is now available in most areas of Europe and the price is rapidly falling. The South African experience differs from that of Europe in that here the majority of households are using cellular phones for communication, especially in the rural areas, rather than landlines. Much of the connection to the Internet would not be from a landline but from a mobile connection (especially cellular phones). This shows how important it is for e-students to have access to facilities even outside the institution, so that they are able to learn on their own at their own time and at their own pace. TEL infrastructure demands for modern technologies are far less difficult to meet (e-Compete Wales, 2004).

### **3.6.1.3 Attitude of technology enhanced learning users**

The attitude of TEL users in this case is looked at with the same eye as Njenga (2011) paints it, and confirmed by Mbengo (2014) as the overall affective reaction of TEL users to using a TEL system and the degree to which TEL users negatively or positively value the use of e-Learning. The users' attitude toward TEL has a significant influence on its implementation. A positive attitude yields a positive influence on implementation while a negative attitude gives birth to a

negative influence. To start with, it is worthwhile to note that the attitude of facilitators of learning may influence the students' attitude toward TEL, and ultimately affects students' enthusiasm and participation (Lee, Yoon & Lee, 2009). The argument of Lee et al. emanates from a statement by Selim (2007) that the attitude of facilitators of learning is the most critical factor in the success of TEL. There are many factors that influence the attitude of both the facilitators of learning and the students toward the use of TEL in HILs. Selim (2007) states that factors influencing the attitude of learners are the IT infrastructure and university support. Sun et al. (2008) add that TEL course quality is also a factor that influences the attitude of the user.

Tuparova et al. (2006:1759) declare with confidence in a study they conducted across Bulgarian universities on the teachers' attitude toward e-Learning that:

...as a whole, academic lecturers definitely have a positive attitude toward using computers and Internet in their work.

As a result, lecturers in Bulgarian universities appear to be using multimedia presentations widely in the learning and teaching process. Bearing in mind that one cannot pour new wine into an old wine skin, without preparing the skin for the new wine, lecturers who have served for long periods at these universities are found less inclined to develop and apply TEL materials (Tuparova et al., 2006). In a study conducted in Zimbabwe, Mbengo (2014) also notes that despite the fact that TEL is still in its infancy in Zimbabwe, facilitators of learning in state universities in Zimbabwe have a positive attitude toward the use of TEL. Emphasising the importance of attitude toward TEL, Mbengo (2014) indicates that the success of TEL requires lecturers to develop a positive attitude toward it. He further indicates that his study, conducted at Zimbabwean universities, suggests that attitude plays a significant role in determining the use of TEL. The study looks at the attitude of both facilitators of learning and students.

In support of the above reports, the students' attitude is also influenced by several factors. In the study conducted by Njenga (2011) on e-Learning adoption in eastern and southern African HEIs, the researcher found that the students' attitude toward TEL is positive. Students find TEL easier to use and relatively advantageous in comparison with other modes of lesson delivery. Lee, Yoon and Lee (2009) also identify a positive attitude on the part of students in a study conducted at South Korean HILs. This positive attitude was born as a result of the positive characteristics of the facilitators of learning, the design of teaching materials and the improvement of TEL service quality. Although some positive attitudes are noted in several HILs, as indicated above, a study conducted by Tshephe and Dichaba (2014) with students registered for the BSc extended degree

programme at the Medunsa Campus of UL, reveals that these students are not interested in using technology for learning and they are not even sure what e-Learning is.

#### **3.6.1.4 Connectivity, broadband and bandwidth**

Connectivity is very easy with several ways in which users can connect to the Internet; the challenge comes with the speed at which the connection happens. Users can connect to the internet using a traditional standard telephone line, which is less expensive but slow or uses broadband connection which is faster than the telephone line. Broadband is the medium used to transmit or transport the bandwidth (signals) that can be through cables or wirelessly. Broadband communication services are: ADSL that convert a home telephone into a bandwidth channel; a satellite channel; and a cable modem. All these channels can also be accessed wirelessly except for a cable modem (Shelly et al., 2008). According to Roffe (2004), bandwidth determines the speed of the technology and dictates the time needed to receive a message. In simpler terms, bandwidth measures the information-carrying capacity; the less the capacity the slower the message is received and the higher the bandwidth, the faster the message is received because it determines the amount of data and speed of connectivity. The data and the speed are determined by broadband. This can be a fixed connection at home, where one connects the device to a modem with a cable, or connects the device with a wireless connection to the local telecommunication network. All these connections are available even for the South African community. The only challenge that South Africa and other African countries are faced with in utilising all these channels is the affordability for those in poor circumstances and the lack connectivity in rural areas, of which South Africa has a large number.

Although connectivity through the broadband makes it easy for HILs to implement TEL, it comes with challenges of slowness brought by congestions in the bandwidth. Companies and homes are no longer using standard telephone lines to connect to the Internet; instead they use bandwidth due to its fastness. South Africa has also fallen into the trap of congestion in the bandwidth and according to Chetty et al. (2012), many Internet Service Providers (ISPs) have imposed a data “cap” or monthly data limit on their subscribers. The use of more data requires a higher payment. The capping of data has had an enormous impact on the broadband households’ Internet users with 480,000 subscriptions for the population of 49 million in South Africa. It limits the users on how they design and deploy networked technologies and content (Chetty et al., 2012).

The challenges stated in the paragraph above move Njenga (2011) to state:

The availability, quality, quantity and cost of bandwidth in Africa are still prohibitive and beyond the reach of many HEIs and individuals.

This notion came as a result of his interpretation of Hawkins (2007) who recognises that an average university in Africa has a lesser bandwidth than a similar institution in Europe or the US. Bandwidth in Africa is always strained; higher in cost than that paid by a typical US university and of a low quality. In addition to what Njenga learnt from Hawkins, Njenga also notes from Steiner-Khamsi (2004) that lack of skills and policies with regard to bandwidth management in African institutions, signifies that the bandwidth is not effectively used by African HEIs.

### **3.6.1.5 Access to technology enhanced learning tools**

Access is one important aspect in any sphere of life, including learning hence Matheson and Matheson (2009:129) state:

Without access, there can be no learning and without accessibility, there is exclusion.

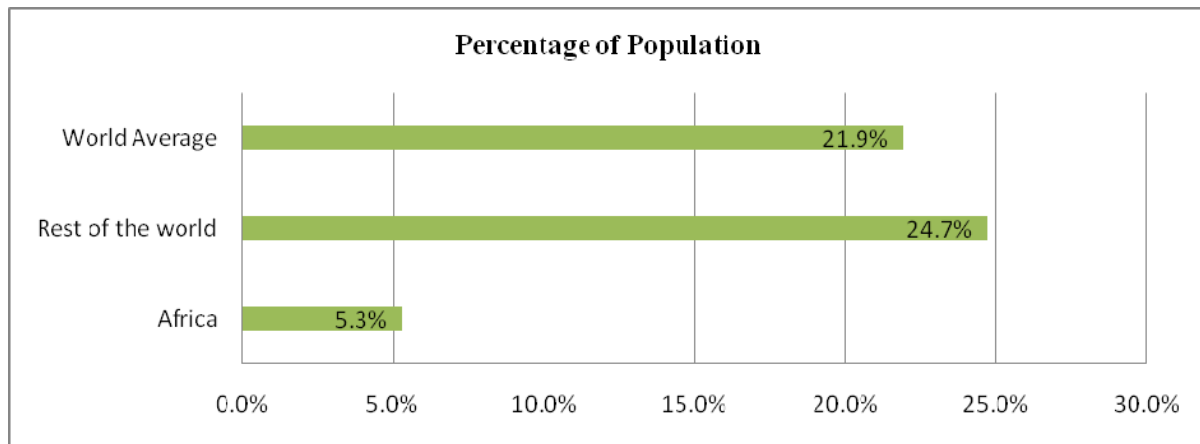
In line with the definition by Aldrich (1996, in Matheson and Matheson, 2009), stating that access is the freedom and ability to participate in an activity, accessibility and widening the participation with reference to access could not be omitted. Matheson and Matheson (2009:132) further outline the factors that determine access and accessibility as:

the nature and extent of the provision available at a particular time; and wealth, social class, sex, age, ethnicity, and physical and mental ability.

Equally important is access to the ICT infrastructure and resources, including TEL tools, which Njenga (2011) highlights as access to the technology; access to resources to invest in the technology; access to training and expertise; and access to market information, among others.

Assareh and Bidokht (2010) could not overemphasise the importance of access to IT facilities in ensuring the success of TEL implementation. They further state that before starting implementation of TEL, the accessibility of facilities at students' place of residence needs to be checked because it is one of the most important factors for students' communication. Njenga (2011) states that access to ICT in African countries, South Africa included, is very limited as compared to access in parts of developed countries and this raises a major concern. The graph

below, sourced from the Internet World Stats (2008), depicts African access to ICT and Internet as compared to the rest of the world.



**Figure 7a: Internet access as a percentage of the world population (Njenga, 2011)**

Looking at the graph above, clearly there is a significant difference in technology access between Africa and other continents. It should be a worrying factor for TEL developers to learn that only a minority of people access IT infrastructure in Africa since Matheson and Matheson (2009) strongly stipulated that the first step on the road to accessing TEL is to have access to computerised technologies. Seeing that the use of computerised technology in Africa is relatively new, the reason for the low use of technology may be due to various barriers that Matheson and Matheson (2009) categorically stipulated as external and internal factors. These authors (2009:132) explain external barriers to be as follows:

Situational barriers; which include financial cost, time and family commitments, and lack of qualifications; and,

Institutional barriers which can be as a result of unwelcoming institutions, lack of support and services for students, and a lack of feedback and teacher contact leading to or reinforcing a sense of alienation and isolation.

The second category described by Matheson and Matheson (2009:132) is internal barriers, which are:

Academic barriers such as negative attitudes, lack of confidence in the ability to learn, lack of relevance of learning opportunities and a negative experience, socio-cultural barriers such as a lack of a sense of entitlement, a sense of powerlessness; a perceived lack of ability to control life and anticipate the future.

In developed countries, TEL facilities are accessible anywhere and everywhere nowadays and are affordable as compared to conditions prior to the 21<sup>st</sup> century. Whally, Welch and Williamson

(2006) state clearly that in the UK, as in other parts of the world, like South Africa, quality equipment for TEL, which may have been expensive in the past, today costs far less. They cite as an example a top-of-the-range computer that comes with a DVD burner, scanner, printer, digital still and video camera, microphone, complete with all software, which might have cost tens of thousands of pounds, and is now less than a thousand rand. This clearly attests to the fact that users can afford gadgets that can be used to access TEL.

Although the cost of TEL facilities might be a problem for individuals who are from poor backgrounds, it should not be a problem to South African HILs. HILs in South Africa have several sources of income. The South African government, through the Ministry of Education, funds public HEIs. There is a formula that the Ministry uses to appropriately finance the activities of HILs in South Africa. The HILs in South Africa obtain funding from tuition fees, a subsidy based on the number of students enrolled and graduated and from their third-stream income. The DoHET also awards a teaching development grant (TDG) for all deserving institutions. The TDG needs to be applied based on the relevant criteria, as indicated by Professor Nan Yeld at the Higher Education Learning and Teaching Association of Southern Africa (HELTASA) 2014 conference held at the University of Free State, Bloemfontein campus, who noted that institutions should develop innovative ways to develop their learning and teaching (Yeld, 2014). This innovation includes the use of TEL.

### **3.6.2 Technology enhanced learning environment**

It is imperative to pay attention to the learning environment (LE) hence Janz, Graetz and Kjørlien (2012) emphasise that LE supports interaction. They further point out that for a long time, the lecture hall has been the gold standard for defining campus learning space. Supporting the notion by Idrus (2009), Janz, Graetz and Kjørlien (2012) also note that the learning environment (LE) has been in continuous change from traditional LE where teaching was done face-to-face (contact teaching), to wire virtual learning and from that point it is now working toward wireless virtual learning largely due to the evolution of technology. This change has to happen due to changing times, as indicated by Idrus (2009) who explains:

The transformation of the e-Learning environment is a crucial element in the definition of technology as it signifies the power and function of information and communication technologies and their use in the teaching and learning process.

The introduction of this virtual learning does not replace face-to-face; it combines both and comes up with blended learning (BL), whereby the student learns virtually and attends some class sessions. Wireless LE will allow the student to access e-Learning material and communicate with lecturers

and other students anywhere at any time. Although students may use technology in a four-walled room at the campus, as shown by figure 7b below, they are not restricted by physical structures.



**Figure 7b: TEL classroom** (Janz, Graetz & Kjorlien, 2012:125)

Figure 7b above depicts the flipped techno-generation classroom, a concept coined by Eric Mazur in the 1990s as an instructional technique whereby class time is dedicated to practice activities designed to promote higher-order thinking (Davies, Dean & Ball, 2013). Technology plays a pivotal role in facilitating this LE. This learning is also possible through the use of mobile devices such as cell phones; hence Anderson (2010) refers to it as ubiquitous learning (u-learning).

TEL seems to provide a highly motivating learning environment for both students and facilitators. More specifically, it provides a source of ideas, a supplier of tools, a source of diverse data, and a diverse audience. It also provides an interactive environment in which ideas can evolve. The TEL environment is very friendly and TEL students enter it as a risk-free environment in which they can try new things and make mistakes without exposing themselves. The environment allows students to go back and try again if they fail, without embarrassment of failure in front of other students (Learnframe, 2001).

### **3.6.2.1 Characteristics of technology enhanced learning environment**

The e-Learning environment of the 21<sup>st</sup> century is a wall-less, networked community-learning centre. It is an environment where reliable high-bandwidth networks allow institutions of learning to be more than a physical location, and where the institution becomes a learning hub. The

classroom is both physical and virtual. A TEL environment supports lifelong learning that goes throughout and beyond the stages of studying, and in and beyond the physical environment of the institutions and their geographical location. E-Learning can be provided and delivered in a number of forms, but in its most developed form it emulates the classroom experience, with all teaching and learning activity taking place online, including dialogue or interaction between tutors and students (Centre for Research, 2003; SA, 2002).

### **3.6.2.2 Building an enabling technology enhanced learning environment**

According to Magwenzi (2005), the environment of the classroom and the school has a powerful effect on learning. Many students experience profound personal growth while at school. It is, therefore, the duty of a lecturer to expose students to positive and meaningful learning experiences that harness learner potential and foster positive attitudes and personal growth among students. In addition, this author states that creating a positive climate for learning is one of the most challenging tasks facing teachers today. She indicates that students in the classroom need a learning environment where they experience the following:

- They feel respected;
- They have a sense of belonging and acceptance;
- Their efforts and accomplishments are applauded and recognised; and
- They are aware of order and security.

Magwenzi (2005) further stipulates that creating an atmosphere to foster learning is one of the most important tasks of teaching. Building an enabling TEL environment requires teachers to employ many different strategies, to motivate students to increase opportunities to learn, to help students learn and maintain appropriate behaviour, to promote student self-responsibility, and to foster accountability. By creating a positive environment for learning, students and adults will feel comfortable, safe and happy to be a part of the school. A positive climate in the school does not just happen. It occurs as the result of a belief in and a commitment to ensuring that the school is a wonderful place to be by staff, students and parents. The caring and supportive environment comes through the following:

- Events and activities which focus on families and school spirit;
- A positive behaviour plan which focuses on becoming proactive and positive; and
- Character education, a school-wide approach to teaching and reinforcing values and desired character traits.

As much as the classroom environment needs to be prepared for learning to take place, an appropriate TEL environment, conducive to learning, also needs to be created and prepared. The Centre for Research (2003:8-9) considers that the effectiveness of TEL depends on a well-created and well-prepared TEL environment which should have certain attributes. It is a mistake to assume that TEL is a remedy and can satisfy all training and learning needs. Students should have access to the Internet at locations conducive to learning and teaching, which include the workplace, home and other suitable places easily accessible to the public. A place where TEL is conducted should have computers with specifications that can support TEL with a fast and reliable connection to the Internet in order to support multimedia content. Learning materials should be relevant to training or learning needs, easily accessible and satisfying quality standards. Lecturers in the TEL technique need to have an understanding of the pedagogical issues specific to TEL.

### **3.6.3 Technology enhanced learning strategies**

According to Moore (2007), institutions of learning are in a battle to meet ever-changing educational needs. Since the world is now dependent on technology in this 21<sup>st</sup> century, HILs need TEL that is robust, innovative, and timely and that pushes institutional boundaries and takes learning and knowledge development to the next level (Yong, 2007). Moore (2007) further avows that for these institutions to meet those needs, they require a clear, concise, and documented strategy for improvement, which Young (2007) stresses should be a solid strategy that can assist in adding value to the learning programme.

Managing and improving the educational system and supporting learning and teaching in HILs is a journey rather than a destination, and, as such, requires careful thought, allocation of resources, and support from every stakeholder. The institutional learning strategy document should describe the system for learning and teaching across the institution. This change toward improved learning and teaching using technology on the one hand presents tremendous challenges in HILs and, on the other hand, represents a necessary paradigm shift to adequately prepare students for their future (Moore, 2007).

#### **3.6.3.1 Online e-Learning strategy**

According to Moore (2007), the development of an online strategy as a component of the TEL strategies is a critical success point. However, it is unfortunate, in the opinion of the same author, that many institutions cannot justify the need to put content online. The inability to demonstrate

this need has been a misfortune in the areas of online learning hence such institutions are seen to lack solid learning strategies. It is only through a clear, concise, and measurable strategy that the institution will have a value-based approach to TEL that needs to be followed and evaluated. Moore (2007) further stipulates that TEL strategies should include methods for designing and deploying learning solutions, change management, communication planning, performance support solutions, and knowledge management services and technologies.

Shank (2007) points out one major reason for a clear strategy is that it would afford learners scattered around the globe better access to learning if course work is available in self-paced modules online.

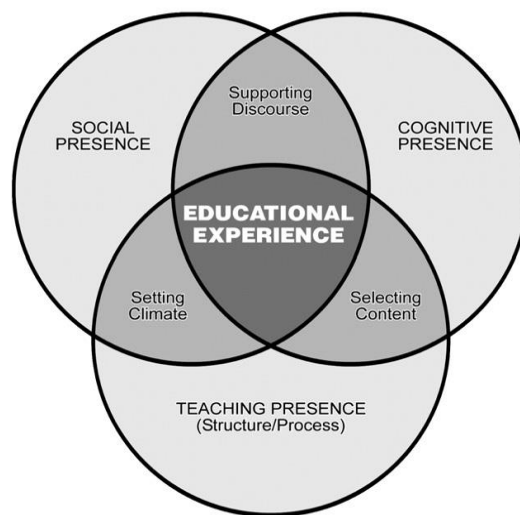
### **3.6.3.2 Blended learning strategy**

BL has become common terminology among TEL scholars in and outside South Africa and in Africa at large, and one that is regarded as the best combination of both worlds, face-to-face and online e-Learning. Bonk and Graham (2006) make the same observations on BL and take the discussion further when they note that this term is being used with increased frequency in both academic and corporate sectors; it has become a “buzzword”. Having a BL approach is critical as one can identify various delivery styles (Moore, 2007). BL has played a major part in the landscape of training, learning, and instruction. BL is a combination of different modes of delivering and receiving learning such as classroom-based lectures or other forms of face-to-face tuition such as learner-content interaction, learner-instructor interaction, and learner-learner interaction, together with electronic forms of learning. Singh (2003:52) claims the original use of BL as:

...often associated with simply linking traditional classroom training to e-Learning activities, such as asynchronous work (typically accessed by students outside the class at their own time and pace). However, the term has evolved to encompass a much richer set of learning strategies or “dimensions.” Today a blended learning program may combine one or more of the following dimensions, although many of these have over-lapping attributes.

This blended environment can also be an effective way to provide training, and might have better initial acceptance (Centre for Research, 2003; Howstuffworks, 2005). Garrison and Kanuka (2004) describe BL as both a simple and a complex phenomenon and further refer to it as the thoughtful integration of classroom face-to-face e-Learning experiences with online experiences. Garrison and Kanuka distinguish BL from other forms of learning that use online e-Learning, for example, enhanced classroom and fully online e-Learning, although it is not clear from the literature how much or how little the technology should be incorporated into students’ learning.

In many cases, a blended type of learning may be the best way to provide training in some subjects. Practical training on how to do things could be presented in face-to-face, hands-on sessions; some of the theoretical or design elements could be provided online (Centre for Research, 2003; Howstuffworks, 2005). The effectiveness of BL, according to Garrison and Kanuka (2004), comes as a result of the effective integration of technology with the most desirable and valued characteristics of face-to-face tuition. For the effectiveness of BL, Garrison and Anderson (2007) do not fail to notice the pivotal role the quality and quantity of the interaction plays, as well as, the sense of engagement in a community of inquiry (CoI) and learning achieved through the effective integration of Internet technologies. These communities of inquiry consist of (1) social, (2) cognitive, and (3) teaching presence elements, illustrated below by Garrison and Anderson (2007).



**Figure 8: Community of inquiry** (Garrison & Anderson, 2007)

Since the shift from norm to criterion reference, learning has been more about collaboration than competition. This has been the case at school and HE levels. It is therefore important to create a community of learning. HE (Garrison & Anderson, 2007) has always and consistently viewed community as essential in supporting collaborative e-Learning and discourse associated with higher levels of learning. Figure 8 (Community of inquiry) depicts how online e-Learning and face-to-face learning blend. Figure 7 above and table 1 below bring clarity to the whole picture of CoI. Studying the figure above and the table below, the researcher will discuss the three presences as shown by Garrison and Anderson (2007).

**Table1: Community of inquiry: elements, categories and indicators**

<b>ELEMENTS</b>	<b>CATEGORIES</b>	<b>INDICATORS (examples only)</b>
<b>Social Presence</b>	Open Communication Group Cohesion Affective Expression	Risk-free expression Encourage collaboration Emoticons
<b>Cognitive Presence</b>	Triggering Event Exploration Integration Resolution	Sense of puzzlement Information exchange Connecting ideas Apply new ideas
<b>Teaching Presence</b>	Design & Organization  Facilitating Discourse Direct Instruction	Setting curriculum & methods Sharing personal meaning Focusing discussion

Adapted from (Garrison & Anderson, 2007)

### 3.6.3.2.1 Social presence

Social presence (Garrison & Anderson, 2007) is described as the ability of students to project themselves socially and emotionally; by so doing the students will be seen as “real people” because they can socialise and, most importantly, have emotions. Gunawardena and Zittle (1997) support this notion by indicating that social presence is affective expression, open communication and group cohesion. As students collaborate, this awards them greater opportunities for increased social presence and a greater sense of online community, which also tends to improve the socio-emotional climate in online courses. It takes time to find a level of comfort and trust in an online community. These positive social climates support more rapid mastery of the “hidden curriculum” of the technological aspects of distance education. Social presence evolves from open interaction to open communication, and finally, to achieving a feeling of good relations. Social presence must move beyond simply establishing socio-emotional presence and personal relationships. Students are challenged first to become acquainted with the instructor and students, next to understand the expectations, and then to feel some comfort communicating openly online. Consequently it should not stop at that; the increased sociability in course participation leads to increased interaction and this means that social presence is necessary for the development of cognitive presence. The intersection of social and cognitive presences makes the students recognise that they are not there for socialisation. This form of learning develops a student to be a constructivist whereby they are not merely acquirers of information. If learning activity at the social presence stage is information acquisition and there are no collaborative assignments where students can benefit from the perspectives of others, social presence is rendered less important (Anderson,

2002; Arbaugh, 2004; Benbunan-Fich & Hiltz, 2003; Beuchot and Bullen, 2005; Garrison and Arbaugh, 2007; Picciano, 2002; Richardson & Swan, 2003; Rovai, 2002; ).

### 3.6.3.2.2 Cognitive presence

Cognitive presence is described as the platform whereby students are able to construct their own meaning through sustained reflection and discourse (Garrison, Anderson & Archer, 2001). According to Garrison & Arbaugh (2007), the primary issue regarding cognitive presence worthy of further exploration relates to the progressive development of inquiry in an e-environment. Cognitive presence has long been a pivotal stage for HE students and Garrison et al. (2001) characterises this stage as a four-phase process, which can be linked to the 7E Learning cycle (Eisenkraft, 2003) modified from the 5E Learning cycle and instructional model by Bybee (1997). The four-phase process comprises: a triggering event, exploration, integration and resolution. Figure 8 depicts the link between the e-Learning cycles and cognitive presence.

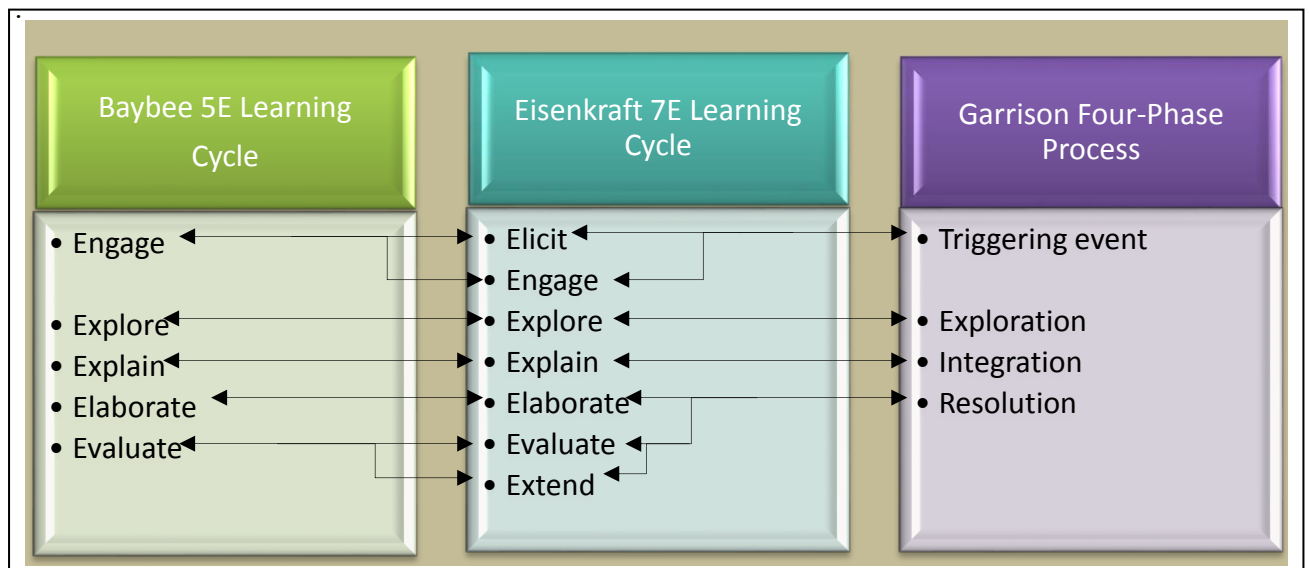


Figure 9: e-Learning cycle and cognitive presence

- **Triggering event**

Garrison (2001) states that the triggering event is an issue or problem that has been identified for further inquiry. The student on his own, working independently, identifies a problem that requires further investigation or inquiry. This phase marries well with Bybee's (1997) concept of the engage stage and Eisenkraft's (2003) focus on using prior understanding and engagement. The difference is that in the elicit stage, students are guided to identify the problem. In this phase, the aim is to

capture students' attention, get students thinking about the problem, raise questions in students' minds, stimulate thinking, and access prior knowledge (Eisenkraft, 2003).

- **Exploration**

Exploration is Garrison's (2001) second phase. Students at this phase, explore the identified problem, both individually and corporately through critical reflection and discourse. Eisenkraft (2003) states that students think about the identified problem critically by observing, recording data, isolating variables, designing and planning experiments, creating graphs, interpreting results, developing hypotheses and organising their findings.

- **Integration**

In this phase, students construct meaning from the ideas developed during exploration. It is also proposed that the integration phase typically requires an enhanced teaching presence, where the teacher is able to explain, probe and diagnose ideas so that students will move to higher-level thinking (Garrison et al., 2001). Eisenkraft (2003) emphasises the argument above stating that students at this stage summarise the results explored in the above stage. The role of the teacher in this whole scenario is to guide students toward coherent and consistent generalisations, help them with distinct scientific vocabulary, and provide questions that help students use this vocabulary to explain the results of their explorations.

- **Resolution**

At this phase, the students develop their ideas further and apply the newly-gained knowledge to educational contexts or workplace settings (Garrison et al., 2001). Tying Eisenkraft's (2003) stages of elaboration, evaluation and extension to this phase, Garrison (2001) further explains that it provides an opportunity for students to apply their knowledge to new domains, which may include raising new questions and hypotheses to explore, although the evaluation is not explicit.

Garrison and Arbaugh (2007) stipulate that interactions between the phases should have clearly defined parameters and be focused in a specific direction. Clarity in defining the parameters calls for the third presence, named "teaching presence". These authors describe teaching presence as the design, facilitation, and direction of cognitive and social processes. Garrison and Arbaugh (2007) further state that teaching presence must consider the dual role of both moderating and shaping the direction of the discourse, because both are essential for a successful CoI. Garrison

and Kanuka (2004) indicate that the teaching presence comes in as a result of challenges experienced with regard to the social and cognitive presence. Most probably, the challenges are created by the fact that the two presences mentioned (social and cognitive) can be seen as some kind of independent learning strategies, whereby the student learns on his/her own through an online environment, although the cognitive presence can be both. Unlike the two, Garrison and Kanuka (2004) further propose that the teaching presence manages the environment and focuses and facilitates learning experiences. With this presence, the teacher or the facilitator of learning guides and directs the students during the face-to-face contact. Teaching presence is conceptualised (Anderson et. al, 2001) as having three components: (1) instructional design and organisation; (2) facilitating discourse; and (3) direct instruction.

Soliciting Garrison and Kanuka's (2004) words, the researcher concludes that the advantages of BL are as follows:

A blended learning context can provide the independence and increased control essential to developing critical thinking. Along with the increased control that a blended learning context encourages is a scaffolded acceptance of responsibility for constructing meaning and understanding.

#### **3.6.3.2.3 Why blended learning**

Institutions of learning need to use the BL approach in their strategies to get the right content in the right format to the right people at the right time. BL promotes learning and application-learned behaviour. BL programmes may include several forms of learning tools, such as real-time/virtual collaboration software, self-paced web-based courses, and knowledge management systems. This often is a mix of traditional instructor-led training; synchronous online conferencing or training; and asynchronous and self-paced studies (Singh, 2003). The blend of learning should take both synchronous and asynchronous formats and technology and traditional learning into account. The concept of BL, as postulated by Singh (2003), is rooted in the idea that learning is not simply a one-time event—learning is a continuous process. Blending provides various benefits over using any single e-Learning delivery medium alone. This section considers the following topics for advocacy of blending the e-Learning experience: extending the reach; optimising development cost; and time.

#### **3.6.3.2.4 Extending the reach**

Learning is mostly limited by a single mode of delivery and confines students to a single mode of learning. Teaching in a classroom limits students to space and time; students who miss the class

session may not have access to the lesson presented in a traditional way. A virtual classroom event is inclusive of remote audiences and, when followed up with recorded knowledge objects (ability to play back a recorded live event) can extend the reach to those who could not attend at a specific time (Singh, 2003).

#### **3.6.3.2.5 Optimising development cost and time**

Singh (2003) indicates that combining different delivery modes has the potential to optimise the e-Learning programme, costs and time. On the other hand, a totally online, self-paced, media-rich, web-based training content may be too expensive to produce (requiring multiple resources and skills), but combining virtual collaborative with simpler self-paced materials, such as documents, case studies, recorded e-Learning events, text assignments, and PowerPoint presentations, may be just as effective or even more effective.

#### **3.6.3.2.6 Improved learning effectiveness**

Studying Figure 10, it is evident that each practice, be it traditional classroom learning (TCL) or TEL, has both strengths and weaknesses.

FACTORS	Traditional Classroom Learning	Technology Enhanced Learning
Content creation	<ol style="list-style-type: none"> <li>1. Text, audio, image, video</li> <li>2. Cost is low</li> <li>3. Difficult to preserve and update</li> <li>4. Retrieval of learning materials would be restricted in time and place</li> <li>5. Interactive ability is not high</li> <li>6. Cognitive-oriented</li> <li>7. System-oriented</li> <li>8. Difficult to integrate because content formats are different</li> </ol>	<ol style="list-style-type: none"> <li>1. Animation, Image, Audio, Video, Text (Web-based teaching materials)</li> <li>2. The cost is high</li> <li>3. It is easy to preserve and update</li> <li>4. The retrieval of learning materials would not be restricted in time and place</li> <li>5. The interactive ability is high</li> <li>6. Problem-oriented learning</li> <li>7. Exploration-oriented learning</li> <li>8. Be integrated by content integrated system (Asset, SOC, CA)</li> <li>9. Easy to integrate all learning material and open source in Internet</li> </ol>
Content packaging	<ol style="list-style-type: none"> <li>1. Print and binding</li> <li>2. Video manufacture</li> </ol>	<ol style="list-style-type: none"> <li>1. Print and binding</li> <li>2. Video manufacture</li> </ol>
Content delivery	<ol style="list-style-type: none"> <li>1. Face-to-face delivery</li> <li>2. One-to-many distribution</li> <li>3. Takes a long time</li> </ol>	<ol style="list-style-type: none"> <li>1. Synchronous or asynchronous delivery by web pages or LMS</li> <li>2. One-to-one or one-to-many distribution</li> <li>3. It would take a short time</li> </ol>

**Figure 10: Differences in content** (adapted from Wua, Tennyson, Hsia & Liao, 2008)

Blending of learning (Singh & Reed, 2001) improves learning outcomes by providing a better match between how a learner wants to learn and the e-Learning programme that is offered. No single mode of delivery is sufficient by itself; the use of multiple modes of lesson delivery, if used innovatively, will yield the desired outcomes. Figure 10 above illustrates the differences in content creation, content packaging and content delivery using different delivery modes, between the TCL and TEL. The most important aim of blending the e-Learning experience in the light of figure 10, is to enhance the weaknesses of one's own practice by the strengths of another. This approach will suit every learner as it addresses all learning styles.

### 3.6.4 Forms of technology enhanced learning

There are several forms of TEL, of which LMS is a part. When the e-Learning or TEL concept is mentioned, most people think of LMS but it is not the only TEL used, especially in the 21<sup>st</sup> century.

These forms may be classified into two types of TEL: synchronous and asynchronous TEL. Some TEL is delivered at the same time which is also referred to as real time. Students can access LE at the same time at different places with the instructor online. The other TEL includes CD, DVD, audio tapes, and all these devices that can be used in one's own time. There are those that can be used synchronously and others asynchronously depending on the intention of the user. In this section, some of the forms, under the two types are discussed.

#### **3.6.4.1 Synchronous**

Synchronous means at the same time. Synchronous TEL is done in real time with a live instructor facilitating the training. Students from geographically dispersed areas access the same website at the same time as their facilitator and can communicate directly with the facilitator and with other students. In this form, students need to schedule their time around the predetermined plan of the facilitator. This type of training usually takes place via Internet websites, audio- or video-conferencing. Synchronous TEL takes place in real time with a live instructor facilitating the training (De Vries, 2005; Howstuffworks, 2005).

#### **3.6.4.2 Asynchronous**

Asynchronous means learning that happens not at the same time. The communication between stakeholders is not in real time. There are several methods that are used in this form of TEL, which are e-mail, online bulletin boards, news groups, weblogs, and discussion forums (Olojo, Adewumi and Ajisola, 2012)

With regard to the above-mentioned forms of TEL and having summarised the pros and cons of these forms (cf. Table 2 on page 96), Shank (2007) finds synchronous instruction to be more compelling than asynchronous instruction, if the two had to be compared. This author asserts that for successful use of the synchronous form, facilitators of learning should know how to use synchronous systems to their best advantage. To have a little of both worlds, Shank (2007) suggests that use of both synchronous and asynchronous forms of TEL often makes the most sense because it provides the benefits of both while mitigating the challenges as exhibited in the table below.

### **3.6.4.3 Learning management system (LMS)**

The origin of LMS dates back to the 20<sup>th</sup> century when the use of the Internet gained popularity in distance education and created a revolution in learning. The advantages of Internet use, not only in distance e-Learning but also in residential institutions, was that it made collaboration in learning possible and facilitators of learning could send material to students promptly. The development of the LMS was due to the successful use of the Internet in distance education (Cheng et al., 2010). Since the move toward TEL, different HILs adopted different LMS to enhance teaching and learning. Cheng et al. (2010) define LMS as software purely designed and developed to support the teaching and learning process in all educational environments. They further clarify it to be software that is web-based and used to plan, deliver and manage e-Learning events within institutions of learning and teaching. Being web-based software, LMS can be used both synchronously and asynchronously, depending on what is used and how the teacher or instructor of learning wishes to use it. Although Cheng et al. (2010) depict LMS as a technique that was developed in the 20<sup>th</sup> century as a distance e-Learning tool, the focus has moved from that one-sided approach and in the 21<sup>st</sup> century, it is used also in residential institutions across HE to enhance teaching and learning. The new developments in technology have necessitated an increased use of LMS in HE classrooms. The LMS plays a pivotal role in the success of TEL projects in any institution. It is of the utmost importance to ensure that TEL is effectively managed and delivered to students to ensure the success of the programme (Young, 2007).

South African HILs have a choice, based on the needs of individual HILs, to use open or commercial source software. Young (2007) believes that the choice of the source software is dictated by the size and forecast growth of the institution, and how the institution uses TEL for learning and teaching. HILs should ensure that they review the features, functionality, and cost of the various options on the market, as well as the ability of institutions to refine and customise the solution to meet institutional needs. Open-source software has made strides and a great impact in the accessibility of learning and teaching. Open-source software is available for users free of charge and the use and ownership thereof is governed by an open-source licence. Goetz (2003) stipulates that in open source, the collaboration is open to all and the source code is freely shared. Dougiamas and Taylor (2003) further explain that open-source licences explicitly allow anybody to freely use, modify, redistribute and even sell the software on condition that the open-source licence is maintained. In general, this means that user modifications are absorbed into the main software project, and so the software evolves to embody the values of the user community, even

as that community itself evolves. Most South African HILs are using both Moodle and Sakai as open sources and some have bought a Bb licence.

#### **3.6.4.4 Audio-visual**

Audio-visual is learning with a stand-alone computer. The learner can access instructional events via such a computer, mainly using the CD-ROM. According to Cotton (1991), computer-based education (CBE) and computer-based instruction (CBI) are the broadest terms and can refer to virtually any kind of computer used in educational settings, including drill and practice, tutorials, simulations, instructional management, supplementary exercises, programming, database development, writing using word processors, and other applications. These terms may refer either to stand-alone computer learning activities or to computer activities which reinforce material introduced and taught by teachers.

Maroja (2003) postulates that teachers usually use the term “audio-visual” to cover usage of gadgets such as video tapes, cassette recorders, so on. Looking at the rate that technological innovations move in this era, audio-visual, among other gadgets, may include DVD, DBD, films and computers. Audio-visual is learning through the vision and hearing senses. This type is critical mostly for audio and visual students (i.e. students who understand best through seeing and hearing).

#### **3.6.4.5 Mobile e-Learning**

Cheng et al. (2010) define m-Learning as learning and teaching strategy that uses mobile devices that can be carried around, such as mobile phones, tablets, PCs, personal digital assistant (PDA), iPods and any other wireless mobile technologies. Mobile e-Learning (m-Learning) has become a popular means of TEL that is accessed through mobile devices, PDAs or smart mobile cellular phones, which are imperative for people who cannot afford a PC or other devices, such as DVD/DBD players, and so on. This has become possible as these devices have become more powerful, networking standards have improved and the ability to provide Internet content to mobiles has increased. Mobile devices are relatively cheap and their invention is growing at an astounding rate. In this era, the Internet is also easily accessible on most kinds of cellular phones at a cheaper rate, such as the Blackberry smart phone, so on can be accessed free of charge. Because of all these facts, learning can be accessed at any time on such devices. They provide access to people far from their institutions of learning, from where it is not possible to provide access to computers or access to the net through a mobile connection (e-Compete Wales, 2004).

This is echoed by Cheng et al. (2010) who find that although mobile e-Learning is still a research challenge, in future, mobile m-Learning will allow students from anywhere around the globe to collaborate with anyone at any time. Holmes and Gardner (2006) allude to the fact that education in this era uses technology as a vehicle for education services and resources. They also relate to “new multimedia technologies” in which they include a collage of electronic technological means of learning and teaching. These electronic technologies include: mobile devices such as notebook computers, tablets, handheld computers, personal digital assistants, smart phones and others. These technologies are Internet-enabled, meaning that they can connect to the Internet wirelessly. Such devices can connect to such social networks as Dropbox, Google docs, Facebook, Twitter, MySpace, and other Internet-based technologies (Shelly et al., 2008).

#### **3.6.4.6 Social media**

The term “social media” has two phrases, which are social and media that may be described as follows: the word “social” is an adjective that comes from the noun “society”, referring to the involvement of allies or members of a group. It means that these people are united in a relationship and live together in an environment, sharing common values and principles, having the same interests and activities. “Media” refers to a communication channel or means of communication (Berube, 1995). The above concepts are clarified by Schejter and Torish (2012) who indicate that SM is a communication technology that enables the maintenance of the links between individuals and the personal and cultural networks to which they wish to belong.

In SM, users share a common space and common interests and share or promote ideas, experiences, and insights as well as simply to talk to, and connect with others, if for no other reason than to make a new friend or just have someone to talk with. This brings us to the conclusion that SM refers to the use of web-based communication channels by a group of people (friends) who share same interests, activities, values and principles. There are concerns raised by Reinecke and Trepte (2013) on the rise of SM with regard to research on computer-mediated communication (CMC) and the questions are: How do users of social media communicate online? What implications does the use of social media have and how does it affect psychological health and well-being? In this section, the researcher discusses SM’s effects on learning and teaching with the concerns raised above in mind. Wilson, Gosling and Graham (2012) note that over the past few years, some SN sites have received massive scholarly attention.

Social media can be a powerful learning environment for HEI students. Some students do not experience difficulties in the use of this environment and they enjoy it because they are accustomed to it (Lenhart et al., 2010:17). This argument is also strengthened by Shelly et al. (2008:367) and Gonzales (2009) who report that the “now generation” like to live, work, and play in digital settings and interact with each other through common websites and specialised areas within those websites, such as chat rooms, discussion groups and news groups for the purpose of sharing, gaining, propagating and discussing all manner of information. The students share common space and common interests to exchange or promote ideas, experiences, and insights as well as simply to talk and connect with others. Lenhart et al. (2010) further allude to the fact that not only teenagers but also adults use SM and the most prominent used is Facebook with few of them using LinkedIn. It is clear that people who are at the post-school level have smartphones, computers and/or laptops and have access to Internet on their smartphones, at their tertiary institutions and some in their homes and that the majority of them access the Internet daily.

The “Fokotsa gee radio show”, on Motsweding FM (SABC North West) hosted by Felix “the Cat” and KB Molopyane (19 October 2011:15h00–18h00) discussed the effect of SM on their studies. Many high school and HE students called in and admitted that they do “chat” while studying but this does not really disrupt their momentum and, to the surprise of the researcher, they indicated that chatting through SM refreshes them. The SM used more than others is MIXIT. This depicts how glued to SM is the “techno-generation”. It is clear that people who are in HE have smartphones, computers and/or laptops and have access to the Internet on their smartphones, at their HE institutions and some at home. This is clarified further by Savin-Baden (2010) when she indicates that in her findings, staff and students indicate that they use social networks such as Facebook and Twitter rather than their university’s LMS.

The social networking phenomenon continues to multiply. If anyone is not on any social networking platform, it is as if they do not exist for the Internet. Membership of a social network has its advantages and, perhaps, its disadvantages. The interconnectedness of the world, 24/7 throughout the year, makes platforms like Twitter or Facebook, a powerful source of information to people anywhere in the world, which has created a network of collaborators for whom SNs are a tool for increasing the audience of any media company. Although these platforms are regarded as advantageous and a source of information to strangers anywhere in the world, they do not permit one person to view another person’s profile without his/her permission. The major problem posed by social networks is that despite the vast possibilities new technologies offer, there

are multiple generations who are not familiar with the Internet; this is called the digital divide. Small (2008) adds to the above debate in stating that the Internet is a social network par excellence. Small also notes that SNs have become the standard of the web 2.0 environment by bringing together blogs, wikis and chats. From the perspective of existing media and new media, SNs have become an increasingly important mass phenomenon that want to be known and exploited. Links to the means provided by the company itself or by the users of social networks allow a higher penetration rate in the media sites and a greater knowledge of the supply of media.

Students have easy access to Internet in this era, a social network par excellence, meaning that SNs do not exist if there is no Internet. Most institutions of learning have computer laboratories with access to Internet free to both students and staff. In addition to the institution's resources, the Internet can also be easily accessed through smartphones and other mobile technologies. This is supported by Lenhart et al. when clarifying that the Internet is no longer accessed through a desktop and a laptop only, but users can go online through multiple devices and can connect wirelessly. These days some institutions are wireless making access easier, especially for students who reside in institutional residences and who can access the Internet even at night if they own a PC or laptop. For students who live at home, an Internet café gives easy access to the public at a lower rate while some homes are equipped with PCs and can connect to the Internet using a variety of networks such as Telkom, Vodacom, MTN, Cell C. Cell phone manufacturers also play a pivotal role by manufacturing cell phones with a cheap Internet access. Lenhart et al. (2010) have found that most people own cell phones with easy access to SNs, hence they conclude that cell phone ownership and the use of Internet are almost ubiquitous. This is affirmed by Tshephe's (2010) study when he concludes that the majority of students at the Medunsa Campus of the University of Limpopo own smartphones and use them to access the SM, although some do use other media.

Facebook, being the most utilised SN in the world was founded in 2004 by Mark Zuckerberg (Phillips, 2007). Facebook (2013) states its mission as a tool that gives people the power to share and make the world more open and connected. People use Facebook to stay connected with friends and family, to discover what is happening in the world, and to share and express what matters to them. Phillips (2007) states that within one month of its creation, half of the Harvard student population, where Mark Zuckerberg studied, had signed up on this SN. Facebook quickly expanded the list of approved networks, the last major network expansion occurring in 2006, which allowed access to anyone over the age of 13 with a valid email address (Brown, 2008;

Phillips, 2007). In light of the discussion above, as at June 2013, there were about 1.15 billion active monthly users of Facebook (2013) with the majority of new growth occurring internationally and with Facebook available in over 70 languages (Facebook, 2012; Schonfeld, 2010). Facebook originally targeted college students but the typical age of Facebook users has shifted over the course of years. Facebook has experienced a growth in the global diversity of users. In 2010, the fastest growing demographic group was users over the age of 34, representing 28% of users (Fletcher, 2010).

Gonzales (2009) sees Facebook as more of a personal networking site, promoting the reconnection of alumni and old friends. This view is supported by Vivar and Aguilar (2010) who perceive Facebook as a network of generalists whose main mission is to connect people and make them visible and to maintain contact with friends or acquaintances. But taking into consideration its origin, a resource meant for college students, this researcher believes that it could be used for learning and teaching purposes. This belief is informed by an analysis made from Van Balkom's argument (2010) when proposing that the e-Learning and teaching process is an art and a creative experience, and we need to enjoy and behold it. It is important to appreciate the fact that our teaching is related to those we reach and that it also depends on who we are. The medium we use to reach our audience or students should be able to attract students and get them involved with what we teach for learning to take place. It is evident that our youth and children (students) are fascinated by technology and spend more time on the Internet using either a laptop/PC or their smartphones. Even though Vivar and Aguilar (2010) see Facebook merely as a tool to connect people and to stay "in touch", their slogan stating: "Facebook gives people the power to share and make the world more open and connected", means that people using Facebook can share any kind of knowledge they wish to, including academic knowledge. Facebook keeps the thread going and people sharing valuable ideas. Besides offering the possibility to talk and send messages to individual contacts, it allows the creation of groups to which Internet users can attach links or pages within the application so that users become fans.

Vivar and Aguilar (2010) further define Facebook as a free SN originally created for students of Harvard University. It clearly shows that Facebook was developed for a university community to be used in an academic setting. Alsagof (2010) discovered that in Malaysia, both staff and students share the same sentiment, that Facebook can be used for learning and teaching at the International Medical University, where 67% of the staff and 68% of students responded positively to a question that asked: Should we use Facebook for learning at IMU? This was also echoed by staff and

students at the Medunsa Campus of UL in a study conducted by Tshephe (2011). It was actually found that there are academic departments that are using Facebook to enhance the learning and teaching process.

Despite some claims to the contrary, SNs, like the world of blogs, have a great influence. One should keep in mind that part of the triumph of US elections is due to expertise in SNs that have made communication strategists of President Barak Obama. Yet SNs are not a panacea. They contain hazards, especially for the younger generation, who are prone to fall into paedophile networks or pornography. In Brazil, where the Orkut social network has been consolidated, several studies suggest that in this network, the number of paedophiles who act covertly under the guise of that platform is growing. Finally, with regard to training in SNs, the problem is still that universities and companies do not assume the change that is generating the network. As has been analysed and debated in a variety of forums, these changes affect not only the methodology of journalism, but the content itself. In addition, there exists the challenge of keeping readers who are users on one hand, but who also generate their own content by participating in the selection, distribution and modification of content. Table 2 below, adapted from Singh (2003) and Shank (2007), summarises the strategies and the TEL forms discussed above together with their benefits and challenges.

**Table 2: TEL strategies, benefits and challenges**

<b>Strategy</b>	<b>Face-to-face</b>	<b>Online</b>	<b>Blended</b>
<b>Forms of TEL</b>	Synchronous physical formats	Synchronous online formats (live eLearning )	Asynchronous/synchronous formats
<b>Examples of TEL Programmes</b>	<ul style="list-style-type: none"> <li>• Instructor-led Classrooms and lectures</li> <li>• Hands-on Labs and Workshops</li> <li>• Field Trips</li> </ul>	<ul style="list-style-type: none"> <li>• Online Meetings</li> <li>• Virtual Classrooms</li> <li>• Web Seminars and Broadcasts</li> <li>• Coaching</li> <li>• Instant Messaging</li> <li>• Conference Calls</li> </ul>	<ul style="list-style-type: none"> <li>• Documents and web pages</li> <li>• Web/Computer-based Training Modules</li> <li>• Assessments/Tests &amp; Surveys</li> <li>• Simulations</li> <li>• Job Aids &amp; Electronic</li> <li>• Performance Support Systems (EPSS)</li> <li>• Recorded Live Events</li> <li>• Online eLearning</li> <li>• Face-to-face</li> <li>• Communities and Discussion Forums</li> <li>• Distributed and mobile e-Learning</li> </ul>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Immediate feedback and support</li> <li>• Social aspects</li> <li>• Immediacy of feedback</li> <li>• Easy to see performance</li> </ul>	<ul style="list-style-type: none"> <li>• Easily scalable</li> <li>• Possible to customise</li> <li>• Easier tracking</li> <li>• Easier standardization</li> <li>• Potential for increased participation</li> <li>• Incremental cost is lowered when spread over wide audience</li> </ul>	<ul style="list-style-type: none"> <li>• Real examples, not made up</li> <li>• Immediate feedback and support</li> <li>• Able to see the full complexity of job skills</li> <li>• Mentoring or coaching over time is possible</li> </ul>
<b>Challenges</b>	<ul style="list-style-type: none"> <li>• Usually linear, more time-bound</li> <li>• Participation is limited by available time and need to “cover” content</li> <li>• Travel greatly increases cost</li> <li>• Not easily scalable</li> </ul>	<ul style="list-style-type: none"> <li>• Boring when not enough consideration is given to interaction needs</li> <li>• May be challenging to use</li> <li>• Delayed or nonexistent feedback and support is common</li> <li>• May feel “remote”</li> </ul>	<ul style="list-style-type: none"> <li>• Non-standardized quality of on-the-job trainers and training process</li> <li>• Can be time-consuming</li> <li>• May need to limit practice for safety and other concerns</li> <li>• Learner may be overwhelmed</li> </ul>

(Adapted from Shank, 2007; Singh, 2003)

It is also important to note that synchronous and asynchronous learning do not refer to the use of technology only, but also to face-to-face contact. When a teacher offers lessons in class that is also regarded as synchronous because it is happening in real time.

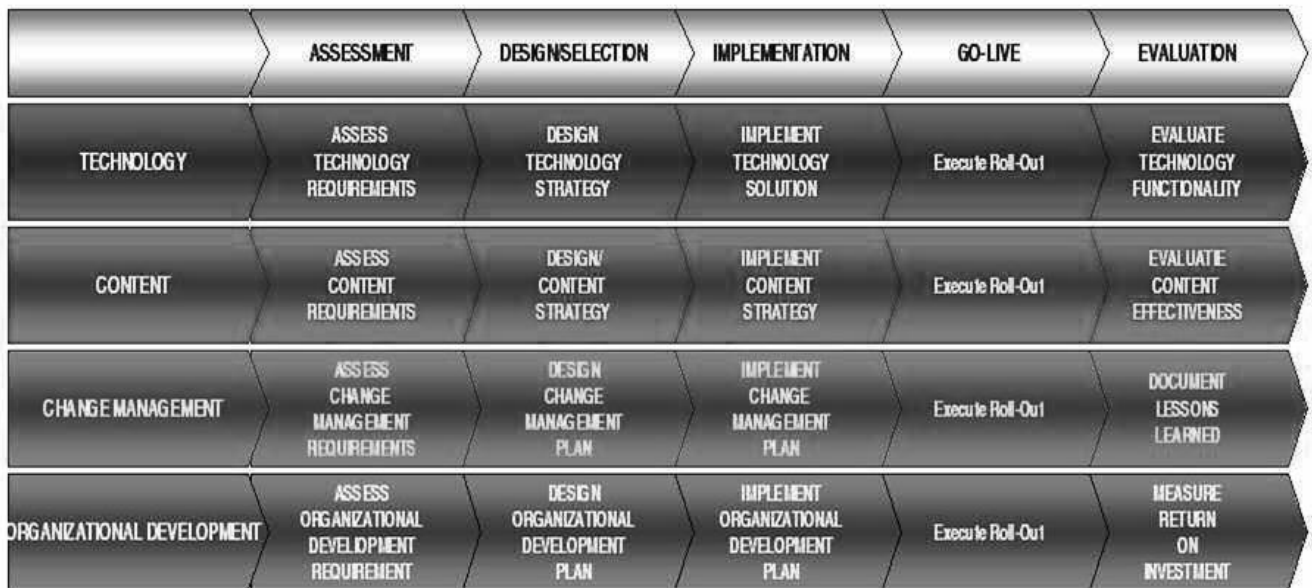
### **3.7 Learning models and approaches for implementation of technology enhanced learning**

There are a number of dynamic approaches and models for the implementation of TEL developed for HE. These approaches and models are not static but continue to evolve from classroom-based teaching toward incorporating technology in learning and teaching issues (Suhail & Mugisa, 2012). A TEL model depicts the process of instruction and learning and it can be analysed using the following: educational environments, course development, teaching and learning interaction, collaborative e-Learning, and evaluation and assessment activities (Forman, Nyatanga & Rich, 2002; Govindasamy, 2001; Lepori, Cantoni, & Succi, 2003; Raab, Ellis & Abdon, 2001; Sloman, 2001). According to Young (2007), a solid strategy can add value to the TEL programme while lowering the stress levels of the colleagues who are responsible for TEL at an institution.

The researcher has discussed the theory underpinning this study and other related theories that have a bearing on this study, in chapter 2. This section is specifically looking at the models and approaches for the implementation of TEL as an enhancement tool for learning. The models and approaches are discussed with a greater emphasis being placed on the implementation of TEL in HE in relation to the theories discussed. There are several models used by different institutions for the implementation of TEL. This section discusses a few of these models in detail that are and/or can be used for TEL techniques in HEIs. The aim of this section is to look at some of the approaches and models, and suggest the relevant approach for implementation of TEL at Medunsa, based on the literature and the empirical study conducted.

#### **3.7.1 Transition phases**

TEL implementation can be challenging because of the many different aspects to be considered as depicted in Figure 11 below. Failure to properly manage such a strategic change can be costly, at best delaying positive returns on the investment. A successful implementation can take a considerable period of time. The figure below divides implementation into five phases (Hanfland, 2007).



**Figure 11: Transition phases** (adapted from Hanfland, 2007)

### 3.7.1.1 Assessment

Assessing the needs of the institution is the most important phase because the results thereof provide answers to some basic, but crucial questions, such as how long the project will take, how many resources might be needed, the size of the budget, and what success might look like. In order to arrive at a solution that works at optimum levels for the institution, technology requirements focus on the LMS needed which requires a combined technological strategy. When assessing content requirements, the team needs to bear in mind that content requirements vary greatly. Content creation, conversion, and the purchase of new content continue while implementing the new system, because for TEL to be effective, there must be content. Many-a-time, change management is often the most neglected part in many institutions; yet it plays an important role in the use of TEL. Deploying a new TEL strategy represents change, and people are naturally afraid of the unknown. The institutional development assessment not only establishes the current state of the institution but should also identify any opportunities that need to be addressed through the use of TEL (Hanfland, 2007).

### 3.7.1.2 Design and selection

At this stage, the implementation team can begin to design how to fulfil the needs they have become aware of during the assessment phase. It is in this phase that the team starts to select the LMS product and other technologies they would want to use and design the methodology and processes the institution would use to populate the TEL solution with content that aligns with the

institution's requirements. It is in this phase that the team develops the change management plan to address the basic change management, including preparing for change, managing change, and reinforcing change. The phase should also include assessments to evaluate how well the change management plan addresses the institution's needs. There should be an institutional development plan that specifies the tasks and methodology that ensure that the use of TEL aligns closely with the institutional structure. The design not only focuses on processes, but also on how resources are organised and used (Hanfland, 2007).

### **3.7.1.3 Implementation**

This is the phase in which the team brings the plans and designs to implementation. The team works together with system vendors and the institution's in-house ICT department to ensure that the assessed technology needs will be implemented as designed. At this phase, the team should populate the system with data. This data consists of users, institutional structure, the course catalogue, and every other type of data that was identified through the assessment phase. The data need to be transformed to fit the needs of the system. It is critical to validate that this process has not compromised data integrity. Testing and validation of the system against the design documents is of importance from time to time. The implementation team has to check with the end users if the developed product aligns with the real-life tasks that are to be performed. This is a good time to demonstrate the system's capabilities to end users and stakeholders. New content might have to be developed and be ready for go-live if this deployment is completely new. Developers might need extensive coaching and close project management if a new development methodology is deployed, such as rapid learning. During this phase, communication with stakeholders and end users becomes more critical, and training activities take place. There is a need to build the support structure for the new system at this time. The implementation phase can be hectic and overwhelming for any involved person. A good design plan and solid project management will ensure that the deployment stays on track. This phase can also be exciting, because months of planning become reality (Hanfland, 2007).

### **3.7.1.4 Go-live**

This phase is probably the most anticipated phase of all and in most institutions, it is in this phase that the end users become aware of the use of TEL. If all aspects of the project have been analysed thoroughly, all design has been thoughtful, and all implementation has been completed thoroughly, there is no need for excitement and working into the wee early morning hours on the day of go-live. Go-live should simply consist of enabling the one file or setting that allows end users to

access the live system. Every other aspect should have been completed during an earlier phase (Hanfland, 2007).

#### **3.7.1.5 Evaluation**

During evaluation, the system is analysed. Some of the questions the team may ask themselves in order to evaluate the system are: Is the functionality as expected across all functional areas? Are there any bugs? Are there workarounds for bugs or deficiencies? Is the reporting of data as expected? The team needs to evaluate content against the performance model chosen during the design phase. Does the content provide the expected results in participants? In addition, there may be minor inconsistencies between content and real-life processes and procedures that may need to be fine-tuned. In evaluating change management, the team needs to look at how the user population reacted to change communications and the system implementation. What impact (either positive or negative) did vendor relations have on the project? What were the major obstacles, and how were they overcome? Did training occur for the correct audiences when needed? It is important to also evaluate institutional change. As this is the last phase, the team has to check the return on investment, if the implementation of TEL is worthwhile. The return on investment may be calculated in two ways: quantitative and qualitative benefits. The quantitative benefits include the money spent and time saved and used while the qualitative looks at its impact on the users. The evaluation phase proves the effectiveness of the project and records the lessons learned (Hanfland, 2007).

#### **3.7.2 An e-Learning framework**

An e-Learning framework was developed by Badrul H Khan. This framework's development is based on the notion of answering the question Khan (2009) asked: What does it take to provide flexible e-Learning environments for students worldwide? This framework was developed after Khan talked to e-Learning stakeholders from high schools, HE and corporate sectors around the world. The octagonal framework was developed to create effective LE for diverse students. The framework will help a TEL community to jump out of their closed system learning designs, to which they are accustomed and change their mindset. Khan (2009) states that the purpose of this framework is to help implementers to think through every aspect of what they are doing during the steps of the e-Learning design process.



**Figure 12: An e-Learning framework** (adapted from Khan, 2001)

Khan's framework as shown in Figure 12 is clustered in eight dimensions: pedagogical, technological, interface design, evaluation, management, resource support, ethical, and institutional. According to Khan, implementers of TEL should be thinking about these eight aspects when designing their TEL. The above framework is supplemented by table 3 depicted below, to expand and clarify the framework. Concurring with Khan (2009), the researcher considers that this e-Learning framework could be applied to a TEL of any scope, if all stakeholders play their role well, without overstepping it and intruding on that of another. Successful implementation is preceded by team work and one vision. Every stakeholder in the institution has a role to play in making sure that TEL is implemented effectively. The success of TEL implementation can be tied to Young's (2007) interconnectedness of five main elements: tools, training, processes, support, and people. All these elements are expanded and clarified in the framework.

**Table 3: Dimensions of e-Learning framework**

<b>Dimensions of eLearning</b>	<b>Descriptions</b>
Institutional	The institutional dimension is concerned with issues of administrative affairs, academic affairs and student services related to e-Learning.
Management	The management of e-Learning refers to the maintenance of the learning environment and distribution of information.
Technological	The technological dimension of e-Learning examines issues of technology infrastructure in e-Learning environments. This includes infrastructure planning, hardware and software.
Pedagogical	The pedagogical dimension of e-Learning refers to teaching and learning. This dimension addresses issues concerning content analysis, audience analysis, goal analysis, medium analysis, design approach, organisation, and learning strategies.
Ethical	The ethical considerations of e-Learning relate to social and political influence, cultural diversity, bias, geographical diversity, learner diversity, digital divide, etiquette, and the legal issues.
Interface design	The interface design refers to the overall look and feel of e-Learning programs. Interface design dimension encompasses page and site design, content design, navigation, accessibility and usability testing.
Resource support	The resource support dimension of the e-Learning examines the online support and resources required to foster meaningful learning.
Evaluation	The evaluation for e-Learning includes both assessment of students and evaluation of the instruction and learning environment.

(Adapted from Khan, 2009)

The above framework depicted in Table 3 and Figure 11 requires letting go of some of the control an individual may be accustomed to, and allowing all stakeholders to share a stake according to their terms of reference (Young, 2007). Young emphasises that when these elements are recognised and utilised by all stakeholders, a successful e-Learning programme is certain.

### 3.8 Conclusion

This chapter focused on literature that has a bearing on the problem discussed and answered some questions. Chapter 3 started off by showing how the HE in South Africa had taken a turn from what it used to be to fit in the global trends in HE which are, globalising education, massifying and internationalising it. Due to these new trends and change in knowledge delivery, where heutagogy has been the order of the day, a need to use TEL emerged.

The use of TEL in HILs presented itself with more benefits over the traditional, walled classroom. The chapter highlighted those benefits, which some of the key benefits are; access to the learning content is easy and requires no distribution of physical materials, students take charge of their own learning where learning became learner-centred rather than teacher-centred, students are able to learn more in less time and TEL offers opportunities for groups of geographically dispersed students to participate in formal learning. Chapter 3 also discussed the challenges faced by the implementation of TEL in HILs. Some of the key challenges noted by this chapter are influenced by attitudes, culture, social and economic factors. These challenges include; lack of knowledge and skill in IT and confidence, lack of sufficient resources and infrastructure, resistance to change due to fear of loss of jobs and being technophobic and lack of policy on TEL in some HEIs.

The chapter also discussed different TEL strategies that can be followed by different HILs. The institutions of learning need to adopt strategies that best suit their profiles, not every strategy can work in every institution. Two strategies were discussed in this chapter which are; pure online learning and blended learning together with the two categories of TEL which are synchronous and asynchronous. The chapter also noted the different models and approaches that HILs use in implementing TEL, to add value to the TEL programme while lowering the stress levels of the personnel who are responsible for TEL at an institution. The models discussed amongst others are; transition phase and an e-Learning framework

The related literature reviewed, professed that TEL is here to stay. TEL is a phenomenon that is growing at an extraordinary rate in HE, not only in developed countries but also in developing countries such as South Africa. The sooner South African previously underprivileged education sectors accept the use of TEL, the better for the 21<sup>st</sup> century students. In the next chapter, the research methodology used to collect primary data from respondents is discussed.

## **CHAPTER 4**

### **RESEACH DESIGN AND METHODOLOGY**

#### **4.1 Introduction**

The purpose of this chapter is to discuss and give a detailed description of the research design and methodology used to investigate the implementation of the TEL technique as a support tool for the e-Learning and teaching process at the Medunsa campus of UL. The research design and methodology are seen by the researcher as the plan and the structure of this investigation. The chapter looks at the methods and the approaches that help answer the research questions stated in the orientation of this study. This chapter also looks at the population and sampling of the study in depth and how the data collection instruments are structured. Furthermore, the section seeks to indicate how the theoretical aim and objectives of the study could be put into operation. Finally, the trustworthiness of the study and the ethical aspects relating to research are discussed.

#### **4.2 Research design**

To lay the foundation of what constitutes a research design, Terre Blanche, Durrheim and Painter (2006) state that it is a strategic framework for action that serves as a bridge between research questions and the execution of research. There are plans that guide the arrangement of conditions for the collection and analysis of data in a manner that aims to combine relevance to the research purpose. A research design is a programme that describes the procedures of conducting the research, which includes how the research is set up, what happens to the subjects and the methods of data collection. The primary purpose of the research design is to specify the plan to draw conclusions from empirical evidence (McMillian & Schumacher, 2014). It is also a model of proof that allows the researcher to draw inferences concerning causal relations among variables under investigation. The discussion above coincides closely with assertions by Bark (2004) that research design is seen as the “blueprint” that enables the investigator to come up with solutions to the problem and guide the investigator in various stages of the research. Furthermore, it can also be seen as a tool that gives readers a clear indication of the medium in which one hopes to achieve the research aim, objectives and questions and outlines an appropriate procedure indicating the sources of data that is to be used. Research design can also define the domain of generalisation, that is, whether obtained interpretations can be generalised to a larger population or a different situation (Bark, 2004). Mouton (2001) summarises it clearly when stating that a research design is

a plan or blueprint of how the researcher is intending to conduct his or her study, a bigger picture that leads to completion of the research project. This plan, according to Terre Blanche et al. (2006), defines the elements which are variables and the participants, their interrelationship, and methods such as sampling and measurement that constitute the piece of research.

In light of the above description of what the research design is, a brief design is presented to indicate how the researcher addresses this section. This brief research design enables the researcher to anticipate what the appropriate research decisions should be in order to maximise the results that should be valid, accurate, trustworthy, and credible.

#### **4.2.1 Research approach**

Different approaches are used by different researchers, however, in this study, an approach that combines both qualitative and quantitative approaches is used, which Hofstee (2006) refers to as a multiple-mode approach. The multiple-mode approach attempts to gather rich descriptive data with the intention to develop an understanding of what is being researched. The approach will focus on how the respondents view and understand a phenomenon. Other types of multiple-mode approach are firstly, a sequential explanatory design whereby the quantitative processes are followed by the qualitative phase. Conversely, the sequential exploratory design, is whereby qualitative processes are followed by quantitative processes. Unlike, the preceding approaches, this study considered McMillan and Schumacher's (2014) concurrent triangulation design. In the triangulation design, the researcher collects the qualitative data and the quantitative data at the same time. This type of multiple-mode approach helps in validating the collected data and makes it reliable by ensuring that the strength of one approach offsets the weaknesses of the other so that they together provide a more comprehensive set of data (Maree, 2007; McMillan & Schumacher, 2014). The multiple-mode approach is considered because of the qualities characterising each of the approaches (qualitative and quantitative approaches) and the advantages each approach has.

The use of this approach ensures that this study conforms to deductive and inductive reasoning, as discussed in chapter 3 above, which are the two ways of arriving at a conclusion in science. This multiple-mode study follows both deductive and inductive reasoning due to its nature of using the best of both. The study is more open-ended, which is one of the characteristics of inductive reasoning and the study also follows deductive reasoning because of its narrowness and the fact that it is generally used to answer the research questions. The use of both inductive and deductive

reasoning is not exclusive to this study as most social research involves both inductive and deductive reasoning throughout the research process (Babbie, 2001; Shuttleworth, 2008). This study has not looked at the two approaches (qualitative and quantitative) as separate units because they are combined and used together in this study. They will be looked at as a whole hence in this study, the approach is referred to as multiple-mode approach.

#### **4.2.2 Rationale for conducting a multiple-mode approach**

Thomas (2009) confirms that qualitative and quantitative approaches are not in opposition to one another but that they complement each other. A multiple-mode approach is used to provide an additional source of validity or data trustworthiness and also compensates for limitations with the use of a single approach. The two approaches work well when blended and help the researcher learn more about the research topic. In addition to the above benefits of this approach, the multiple-mode approach provides data that is more comprehensive (McMillan & Schumacher, 2014; Padgett, 2004). The researcher is aware that most researchers using this approach tend to use one method superficially, judged by McMillan and Schumacher (2014) as a disadvantage. The study used the quantitative research instruments on the larger population and qualitative instruments on the smaller population. The analysis of data from the two instruments is given equal and fair opportunities and the amount of time each deserved.

McMillan and Schumacher (2014) allude to the fact that using both quantitative and qualitative approaches in the same study is the best approach to answer the research question. In this study, an overarching integrated research question has been presented. This study intended to answer the following research question: To what extent has the University of Limpopo, Medunsa campus, implemented the TEL technique as a support tool for learning and teaching? The overarching integrated question is supported by more specific qualitative and quantitative questions presented as follows: To what extent do TEL users have access to TEL facilities and resources? What are the perceptions and expectations of users in the implementation of TEL? What are the factors that promote or inhibit the implementation of TEL? What strategies can Medunsa campus use to promote the implementation of TEL? Both quantitative and qualitative data was collected and analysed separately though at the same time. The results thereof are compared to see if they confirm or disconfirm each other, which makes this study close to the concurrent triangulation design type of multiple-mode approach (McMillan and Schumacher, 2014) or convergent parallel design of the multiple-mode approach (Creswell, 2014) in which the qualitative and the quantitative

data are simultaneously gathered, analysed and interpreted to provide a better understanding of a phenomenon of interest.

### **4.3 Research context**

In most research, human action is strongly influenced by the setting in which it occurs, which means that there are environmental factors that may influence the research process and the objectives under study. Some of these environmental factors include geographic location, the physical environment, social factors, and demographic factors (e.g. age, sex, income) hence, it is important to describe the context of this study. The description of the context of research in this study is linked to the research question that guides the study; this description helped the researcher to examine the relationship between theory and related practices (Instructional Assessment Resources, 2007; Mokwena, 2004).

The study targeted UL. This university was a result of the merger of two historically disadvantaged universities, namely, the then-University of the North (UNIN) and the Medical University of Southern Africa (Medunsa) in 2005. These two universities were born out of the preoccupations of apartheid and were established in 1959 and 1976 respectively. The two institutions were established as racially exclusive and catered only for black students (Robins, 2005). Medunsa was established to train black health professionals and included doctors, dentists, veterinarians and allied health professionals who would be able to meet the demands of the South African health system; at the time more than 90% of medical personnel were white. Since then, this institution has been producing health workers, initially black health professionals based on the policy of the government of the day. Over the years the institution has started to accommodate students of all races, a practice followed to this day (Robins, 2009).

Due to dissatisfactions and complaints from the Medunsa campus community, a commission was established to investigate the merger of these two institutions. It is public knowledge that the Department of Higher Education and Department of Health Ministers, Drs Blade Ndzimande and Aaron Motswaledi deemed it fit, after the recommendations of the commission set to investigate the UL merger, to unbundle the University. A new health sciences university, Sefako Makgato Health Sciences University (SMU) was established. This newly-established university occupies the old Medunsa campus premises and has incorporated Medunsa resources and facilities

and its staff. The new university is expected to expand its offerings and increase its student population over a period of 10 years from the date of unbundling and incorporation.

Although the institution enrolls students from all races, it is predominantly black, with most students coming from the rural areas of Limpopo. From the researcher's observations, the institution is still disadvantaged in terms of skilled human resources in the field of technological implementation, and also because it is dominated by students from rural areas, many of whom have had scant experience of working on a computer. In light of what Whally, Welch and Williamson (2006) propose about the increased use of technology, especially in learning and teaching, Medunsa needs these skills to keep pace with change.

#### **4.4 Research methods**

In 4.2 above, this study defines and explains what research design is and clearly depicts the study's observance of this design. Every plan requires a strategy on how to proceed; the research methods are those strategies, a step-by-step process of answering the research questions. This is echoed by Hofstee (2006) when he states that it is the essence of the matter, where the researcher explains in detail the process followed. A research method is a strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection. The choice of the research method influences the way in which the researcher collects data. Specific research methods also imply different skills, assumptions and research practices.

In an attempt to achieve the main aim of this study, which is to investigate the implementation of the TEL technique as a support tool for the learning and teaching process at the Medunsa campus of UL, the researcher used the following two methods: case study method and survey method as discussed in the subsequent paragraphs.

##### **4.4.1 Case study**

The case study method is employed as this study has its focus on the Medunsa campus, as a health sciences faculty campus of UL only. Maree (2007:75) interprets a case study as a "systematic enquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest."

This study fits perfectly into this definition as it looks at the implementation of TEL at Medunsa campus as a case. Maree further clarifies this method as an investigative means of a contemporary phenomenon within its real-life framework. When looking at this study and its intention, it seeks to investigate how the TEL technique is implemented at Medunsa campus. As one of the strengths of case studies, this study uses multiple sources and data-gathering techniques to answer the question of this study. Although this method has been criticised by many scholars as a method that is incapable of providing and generalising conclusions, the researcher uses this as one of the methods that helps in gaining an insight and understanding of the dynamics of the implementation of TEL as a learning and teaching tool in an HEI with reference to health science faculties. The other possible loopholes of this method were attended to by other methods that will be co-used with this one in this study, as outlined below (Maree, 2007).

#### **4.4.2 Survey method**

McMillan and Schumacher (2014) in support of Coleman and Briggs (2002) indicate that the survey method is a method of collecting data by asking a set of pre-formulated questions in a predetermined sequence given to a sample of individuals drawn so as to be representative of a defined population. Of importance, McMillan and Schumacher (2001) and Crowther, Smit and Herbst (1994, in Maree, 2007) state that the data collected through the survey method describes and explains the status of a phenomenon to trace, change and draw comparisons, which this study intended to do. Due to the large population size, the researcher chose a sample from a population of the students and staff members at Medunsa to represent the larger population. After the selection of sample, the researcher administered the set questionnaires and interviews to collect data. No variables of interest or data relating to all variables were manipulated. The researcher was, according to Hofstee (2006), essentially trying to elicit information from a limited number of individuals who are presumed to have the information for which he was seeking.

#### **4.5 Population and sampling**

##### **4.5.1 Population**

Neuwenhuis (2010) defines population as a totality of persons, events, organisation units, case records and any other sampling units, on which the research problem relies. Neuwenhuis' definition is much broader and considers every sampling unit as population, unlike the definition of Coleman and Briggs (2002:97–98) that confines itself to a set of individuals about which the researcher wants to be able to generalise. What the researcher likes in the definition given by the

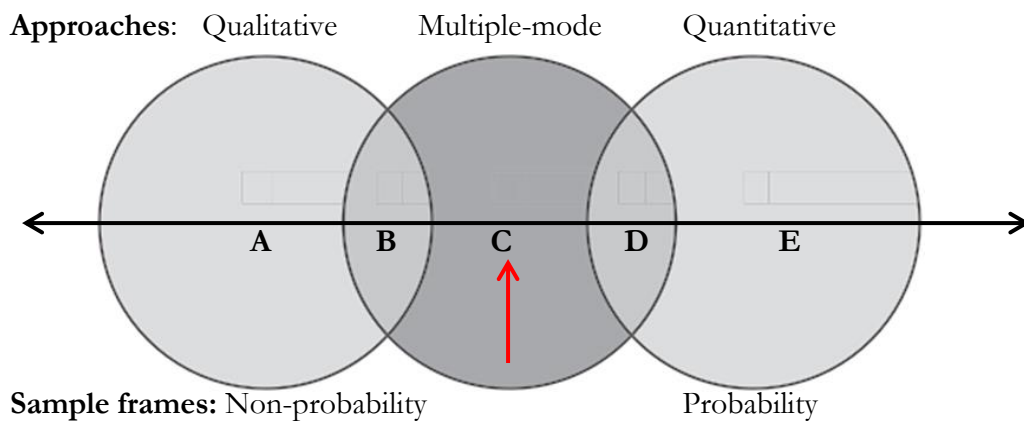
latter authors is the inclusion of a generalising statement. Identifying the relevant population is an important part of developing a research question. The above definition is affirmed by Macmillan and Schumacher (2006) when they attest to the fact that population is a group of elements or cases, whether individuals, objects, or events, that conform to specific criteria and from which we intend to generalise the results of the research.

The population of this study is drawn from the 2012 first-year cohort of students of the Medunsa campus of UL. The Medunsa campus comprised 887 enrolled first-year students, excluding the extended degree programme (EDP), in 2012. The EDP students were excluded because they were used to pilot the data collection instrument. The first-year student enrolment in 13 programmes, per programme was categorised as follows: MBChB 214; BSc 235; BSc (Physiotherapy) 54; BSc (Human Nutrition and Dietetics) 40; B Occupational Therapy 55; B Curr 76; B Pharmacy 69; B Speech, Lang and Audiology 25; BDS 46; B Dent Therapy 21; University Diploma in Oral Hygiene 12; B Oral Hygiene 08; B Radiography (Diagnostic) 32. The university has introduced all the first-year students, including the EDPs, to one component of TEL (i.e. UL LMS which is Bb). The study also looked at a total population of 642 academic staff. In addition to this population, the study targeted the 3 senior managers and 1 specialist/facilitator. A total of 4 officials were supposed to be interviewed.

#### **4.5.2 Sampling frame**

This study follows mainly the non-probability sampling method; however, the study has some elements of the probability sampling frame. From the probability framing, the study used some characteristics of stratified and cluster sampling. Maree (2007) indicates that the non-probability sampling frame does not make use of random selection of population elements and the researcher did not randomly select his subjects. The researcher did not decide on this sampling frame merely because this is educational research but because this frame is more popular than others in educational research. The nature of this study dictated that this sampling frame be used. The researcher wanted to cover the wide spectrum of the targeted population, especially the direct beneficiaries of TEL, namely, students and lecturers. A convenience sampling technique was employed for the students and a purposive sampling technique for the staff at the Medunsa campus. In this study, the researcher used subjects who happened to be accessible and represented a group of the population (McMillan & Schumacher, 2014). The schematic representation adapted from Teddlie and Yu (2007) below depicts where the researcher located his choice of sampling

frame as opposed to the approach he used. The diagram below depicts that the researcher's choice of approaches and sampling frame are integrated, shown by the arrow pointing at Zone C



**Note:** Zone A consists of qualitative Approach with non-probability sample frame whereas Zone E consists of quantitative approach with probability sample Frame. Zone B represents primarily qualitative approach, with some quantitative components. Zone D represents primarily quantitative approach with some qualitative components. Zone C represents totally integrated multiple-mode approach and sampling. Movement toward the middle of the continuum indicates a greater integration of research approaches and sampling frames. Movement away from the center and towards either end, indicates that research approaches and sampling are more separated or distinct (Teddlie & Yu, 2007)

**Figure 13: Sampling frame continuum** (adapted from Teddlie & Yu, 2007)

Evidently, most scholars in the available literature have not underpinned a particular research sampling frame to a particular research approach. It is in the work of Marshall (1996), with whom the researcher aligns himself, that the researcher noted that sampling frames are attached to research approaches. Marshall (1996) argues that given the fact that probability frames afford the population equal opportunity to participate in a study, samples for qualitative investigations tend to be small. Even if a representative sample were desirable, the sampling error of such a small sample is likely to be so large that biases are inevitable. Moving from Marshall's (1996) notion that the probability sampling frame used for quantitative approach is rarely appropriate when employing qualitative approaches, the researcher used that in figure 11 above to categorise with certainty the sample frame in this study. Having discussed the sampling above, it is clear that this study, although leaning more toward non-probability framing, took the best of both and, as indicated, straddles the two frames. The two sampling techniques mentioned here are discussed in detail below.

#### **4.5.2.1 Convenience sampling technique**

The study intended to draw the sample from the 887, 2012 first-year students' cohort at the Medunsa campus. By giving an opportunity to every student to participate in this study, the researcher decided on the convenience sampling technique. In using this technique, the study borrowed some characteristics from the probability sampling frame, in particular, the stratified and cluster sampling techniques. Both techniques from the probability frame have an element of identifying groups of individuals from the population. In identifying groups, it is worth noting that researchers using these techniques to identify convenient, naturally-occurring groups based on variables chosen by the researcher (McMillan & Schumacher, 2014).

Although the sample from the student population at Medunsa was selected based on the fact that students were conveniently available (Maree, 2007) in their clusters, i.e. according to their programme of study, the researcher developed an online questionnaire through Monkey Survey and administered the questionnaire to all respondents according to their cluster. The researcher did not expect a certain number or percentage of responses from the cluster but worked on the responses received. McMillan and Schumacher (2014) emphasise that caution must be taken when generalising the findings of a study whose sampling technique was convenience. Having said that, this research is a case study of Medunsa and the results and findings of this study cannot be generalised to other HEIs. However, due to the generally good response rate from the clusters and the results of the pilot study, the generalisation became apparent for Medunsa campus students.

#### **4.5.2.2 Purposive sampling technique**

It was also the intention of the study to administer the questionnaire to lecturers and interview five senior managers and 1 specialist/facilitator. The mentioned population was sampled purposively. Teddlie and Yu (2007) perceive the purposive sampling technique as primarily used in qualitative studies and that it may be defined as selecting units (e.g. individuals, groups of individuals, institutions) based on specific purposes associated with answering a research study's questions. The purpose of the purposive sampling technique, as stated by Maree (2007:178), is a method of sampling that "is used in special situations where sampling is done with a specific purpose in mind". The researcher targeted particular respondents from the population who appeared to be appropriately informed and knowledgeable about the problem of interest. The selection of the sample was made on the basis of the researcher's knowledge of the population (Maree, 2007; McMillan & Schumacher, 2014).

One of the concerns raised in the problem statement was that there is no clear structure, which includes the housing of TEL, whether it is housed by the CAE or ICT, hence, the researcher interviewed the CAE and the ICT Executive Directors, who were asked, among other questions, where they thought TEL should be housed and why. The Executive Dean of the Faculty of Health Sciences, the only faculty on the Medunsa campus, was also sampled for his views on the implementation of TEL in his faculty. The only specialist dedicated to the Medunsa campus and the Director e-Learning were also a sample for this study. These two staff members were selected because of their in-depth knowledge of TEL and daily involvement in TEL matters, e-Learning being their full-time responsibility. With regard to the lecturers, the researcher included fourteen (14) who teach the larger groups of each cluster. All selected lecturers were required to respond to the online questionnaire (see Appendix D).

Congruent with the arguments of the scholars referred to above, for the two frames used above, the researcher selected the sample on the basis of the lecturers' availability and because the researcher judged from personal experience that they are representative of the larger Medunsa academic community. However, in dealing with what is believed to be the disadvantage of this frame (some members of the population have no chance of being sampled), especially with regard to student respondents. The researcher managed to give all members of the population an opportunity to participate in the study by administering the questionnaire to all members in each cluster hence, every student had an equal chance to participate. Those who did not participate chose not to do so. Other participants were purposively sampled because they were the sole office-bearers in a particular department.

#### **4.6 Data collection instrument and procedure**

There are numerous instruments that researchers use to collect data from a sampled population. These research instruments are defined by Goddard and Melville (2001) as devices used by researchers to collect data about, and from, people or subjects they are studying. Maree (2007) and Goddard and Melville (2001) display a list of the most common instruments used for the collection of data. These include tests, experiments, interviews, questionnaires, observations, oral history and document analysis. If the instruments are not well constructed, the data will be questionable and may not be accepted by the readers or research community. This study discusses instruments that were used in eliciting responses from the population and how they were developed. This study used four research instruments: questionnaires, interviews, documentation

reviews and a participant observation checklist. Questionnaires were administered to students and lecturers. Five (5) Senior Managers and 1 Specialist were interviewed. TEL policies were studied and the researcher closely observed their implementation. The above-mentioned instruments are discussed in detail in the following paragraphs.

#### **4.6.1 Data collection instruments**

##### **4.6.1.1 Questionnaires**

According to Hofstee (2006:132), a questionnaire is:

a form of structured interviewing, where all respondents are asked the same questions and are often offered the same options in answering them (yes/no, ranked on a scale).

In addition, McMillan and Schumacher (2014) state that this is a widely-used, economically viable instrument, that contains identical questions for everyone and ensures anonymity. A questionnaire consists of items to which the respondent supplies answers or reactions. It is completed by the respondent without the assistance of an interviewer. This is done by distributing the questionnaire and collecting it once it has been completed. Answering a questionnaire focuses the respondent's mind on a particular topic and on a certain way of approaching the topic. Bias is avoided when constructing a questionnaire and a respondent has to react or respond to very tightly-focused questions (closed-ended questionnaires). When a respondent has to respond to a more loose set of questions (open-ended), bias remains, but is, most probably, more deeply hidden. Hofstee notes that open-ended questions can be difficult to interpret and/or analyse, hence some researchers recommend having few open-ended questions to have a sense of control. Two sets of questionnaires were developed and administered to students (see Appendices B and C) and lecturers (See Appendix D). The students' questionnaire was administered using two strategies, i.e. online questionnaire and manual questionnaire which Maree (2007) refers to as group administration of a questionnaire. Below is an account of how the questionnaire was developed.

##### **4.6.1.1.1 Construction of questionnaire**

The questionnaires consisted of both closed-ended questions, where the researcher provides a set of alternative choices from which a respondent can choose and open-ended questions to obtain specific data on different topics, where no options are provided for the respondent. The closed-ended questions can be answered quickly, allowing the researcher to obtain a lot of information in a short period of time. However, respondents may rush through the questions and not take enough time to think about their answers. Moreover, the researcher's choices may not include the

answer a respondent prefers. For this reason, in this study, the researcher provided within the closed-ended question, a space for an alternative answer which might not be on the list but could be relevant to the question. Respondents had to consider their own responses and describe them in their own words. If respondents take time to reflect on answers to the question, the researcher can obtain more meaningful information than is possible from closed questions. Very few open-ended questions were used so that the majority of questions were closed-ended questions.

Both questionnaires consist of six sections and what is different are the questions asked of the two categories, students and lecturers. In all sections of both questionnaires, questions were set to find out what respondents know, do, feel and think about TEL. The sections of the questionnaires are as follows:

- Section 1: Biographic and demographic data
- Section 2: Access to TEL facilities and resources
- Section 3: Level of literacy and interest
- Section 4: Training and use of TEL technique
- Section 5: Preferred teaching and learning mode
- Section 6: Opinion question.

In clusters for which the researcher used Survey Monkey, the respondents submitted their responses electronically.

#### **4.6.1.2 Interviews**

An interview is a two-way conversation, or questioning, for the purpose of eliciting information. It is also seen as a conversation with an individual or individuals held in order to elicit information about the respondents' background and other personal biographical data, their attitudes and opinions (Brainy Dictionary, 2005; Medical Dictionary, 2002; Nieuwenhuis, 2010). Mokoena (2004) refers to an interview as one of the probes for testimonies that allows for a rich collection of data. She further postulates that interviews assist the researcher to gain insight into the respondents' responses. To support Mokoena's argument, Maree (2007) and Punch (2009) consider that interviews are a good way to access people's perceptions, meanings, and definitions of situations and constructions of reality. Interviews are two-way conversations in which the interviewer asks the interviewee questions in order to collect data. Punch (2009) further suggests that an interview is not simply a matter of asking and receiving answers to questions; there is a further dimension. Maree (2007) adds that the aim of an interview is to see the world through the

eyes of the participant, and to obtain rich descriptive data that helps one to understand a participant's construction of knowledge and social reality. Interviews are particularly useful for uncovering the story behind a participant's experiences. The interviewer can pursue in-depth information around a topic. Interviews are useful as follow-up with certain respondents after they have completed questionnaires, e.g., to further investigate their responses. Usually, open-ended questions are asked during interviews. Before starting to design interview questions and the process, a researcher should clearly articulate what problem or need is to be addressed using the information to be gathered by the interviews. This helps to keep a clear focus on the intent of each question (McNamara, 1999). In a nutshell, an interview, according to Thomas (2009), is a discussion with someone from whom a researcher tries to get information.

The study employed what Hofstee (2006) refers to as in-person interviews, and McMillan and Schumacher (2014) name in-depth interviews, as held with the Directors of the CAE, Executive Dean and the e-Learning specialist (See Appendix D). These in-person interviews were semi-structured whereby topics and questions were predetermined, but the researcher decided on the sequence and rephrasing and rewording of the questions during the interview (McMillan & Schumacher, 2014). The researcher opted for semi-structured interviews as opposed to the other two (structured and unstructured) because this type provides the best of both structured and unstructured interviews to validate data collected through other instruments (Maree, 2007). Semi-structured interviews allowed the interviewer to probe, ask for clarification of responses and ask follow-up questions on the ones already scheduled. The researcher felt in full control of the discussion and could guide it in a productive way. The set of predetermined questions scheduled for discussion had four categories: access to facilities and resources; perception of, and expectations on, the implementation of TEL; factors inhibiting or prohibiting the implementation of TEL; and strategies of implementation of TEL at the Medunsa campus. The questions did not include those where a dichotomy exists, in which a respondent answers with "yes" or "no".

In addition to the above type of interview, and depending on the context and purpose of this study, the researcher selected the elite interviewing strategy for the key informant interviews, career and life interviews and phenomenological interview strategies. The role of the chosen strategy was to verify and extend ideas developed by other participants and the researcher. The strategy was meant for respondents whom the researcher considered influential and prominent, for example, the Executive Dean and the Executive Directors, and well-informed respondents at Medunsa such as the e-Learning Director and specialist. The elite respondents chosen as subjects of the study

are familiar with the overall perspectives and the management of e-Learning at the university and they contributed insights and meaning to the study because they were fully at ease in the realm of ideas, policies and generalisations (McMillan & Schumacher, 2014).

#### **4.6.1.3 Complete observations**

Observation is a powerful systematic tool that is flexible and real, which is used to record the behavioural patterns of participants, objects and occurrences without questioning them. It is not dependent on respondents' personal views but seeks explicit evidence through the eyes of the researcher either directly or through a camera lens (Coleman & Briggs, 2002; Maree, 2007). Maree (2007) further states that observation is an everyday activity whereby we use our senses (seeing, hearing, touching, smelling and tasting). The researcher used most of the senses listed here. In addition to the reasons displayed in this paragraph, the researcher used the observation to triangulate and recheck and reconfirm the responses given by the respondents. This technique was instrumental in collecting data because as an observer, the researcher had witnessed proceedings at Medunsa, including the implementation of TEL in the Health Sciences Faculty and had seen what the institution had done to meet challenges. The researcher opted for a complete observation because the researcher was a non-participant who was looking at the situation as an outsider (Maree, 2007). Although Maree (2007) raises the point that a researcher's lack of immersion in the situation is a limitation, in this instance, the researcher was an employee at the Medunsa campus and therefore, fully cognisant of the campus environment.

The researcher used the structured method of observation where a systematic structured template was created on what to observe (see Appendix E). The experiences of the researcher at Medunsa helped him to create this template. Before the researcher observed, he made sure that he had defined the purpose and focus of the observation, which helped in knowing exactly what he wanted to observe. The researcher made notes and recorded what he saw and heard. Punch (2009) clearly stipulates that observers do not manipulate or stimulate the behaviour of those whom they are observing. As an observer, a researcher should not contrive the situation being observed for research purposes.

In response to the research questions and the objectives of the study, the researcher looked for the following as his observation points: the extent to which the users have access to TEL facilities and resources, factors that affect the implementation of TEL and the implementation of TEL

policies for the success of TEL at MEDUNSA. Specific questions relating to the observation points mentioned were asked in a structured systematic template created.

#### **4.6.1.4 Document analysis**

Document analysis is one of the most powerful tools a researcher can use to look at data. Although Maree (2007) and Lekalakala (2013) find that data analysis and literature review have some overlaps, Nieuwenhuis (2010) argues that the two are different. In a literature review, the researcher tries to find out what other scholars of the same interests say about the problem in question, whereas with document analysis the researcher interrogates the document to see what works and what is not working and how the document could be improved. In a literature review, general secondary and primary data are considered but with document analysis the researcher scrutinises specific documents, be it policies or the important texts of an organisation (Maree, 2007).

This study analysed two of the university's important documents, namely, the e-Learning policy and the teaching, learning and assessment policy. The rationale behind analysing the two documents was that the researcher wanted to see if these documents were similar in their approach on the use of TEL as a tool for learning and teaching at UL. The analysis of the documents was important for triangulation. The study also looked at the purpose or the intent of the document and the context in which it was produced; it guarded against selectivity, unfair treatment of authors, misinterpretation of authors' ideas and selective interpretation to suit the argument of the study (Maree, 2007; Punch, 2009). The researcher developed a document analysis schedule used to analyse the two documents received from the university.

#### **4.6.2 Procedure**

After being given permission to conduct the study at Medunsa by the Medunsa Research Ethics Committee (MREC) (see Appendix G), the researcher secured an appointment with the directors of schools (School of Health Care Sciences, School of Oral Health, and School of Medicine and School of Pre-Clinical and Pathology) to assist in selecting the respondents needed for the study. Subsequent to the meeting with the school directors, the researcher had a meeting with each cluster and the cluster heads to discuss the consent form and how they would like the questionnaire to be administered to the students in that cluster, given the fact that the researcher had developed two formats of the same questionnaires; one on Survey Monkey and the other a hard copy (see Appendices B & C) respectively. Some clusters preferred the hard copy questionnaire and others

the online questionnaire due to lack of resources and connectivity. The students studying MBChB, B Pharmacy, B Dental Therapy, BDS, B Oral Hygiene and the University Diploma in Oral Hygiene chose an online questionnaire and the BSc, BSc (Physiotherapy), BSc (Human Nutrition & Dietetics), B Occupational Therapy, B Cur, and B Speech, Lang and Audiology, B Radiography (Diagnostic) chose hard copy. The researcher requested a list of students with email addresses from each cluster head and emailed the following web link [https://www.surveymonkey.com/s/STUDENTS\\_eLearning](https://www.surveymonkey.com/s/STUDENTS_eLearning) to all students on the lists (see Appendix H, email to students).

For those who required the hard copy questionnaire, the researcher consulted with the cluster heads to organise the students in their clusters. The researcher met with the students in those groups for group administration of the questionnaire. Maree (2007) defines the group administration of a questionnaire as a method where the researcher waits while a whole group of respondents completes it. This method was used for two reasons: many respondents can complete the questionnaire in a short space of time; and the response rate is optimal. Before administering the questionnaire to the students with the help of field workers, the researcher went through the consent form with the students which they then signed. A few students declined to participate in this study and were excused after which the researcher, together with the field workers, administered the questionnaire. The questionnaires were collected from the students immediately after they were completed. The completed questionnaires were given to data capturers to be captured onto the Survey Monkey. A different questionnaire but with similar themes was administered to the 14 academics selected (see Appendix D). The questionnaire was developed online using Survey Monkey and the web link <https://www.surveymonkey.com/s/MCLecturers>, different from that of the students, was sent via email (see Appendix I, email sent to lecturers) to the fourteen lecturers. All lecturers were required to complete the online questionnaire and submit it online.

In terms of the interviews, the researcher was supposed to interview 3 senior managers and 1 specialist. The interviews were held as planned with the exception of the one Unit whereby the Executive Director who by the time of the interviews had resigned along with the Deputy Director. By that time, UL had appointed two acting heads of department (HoDs) for that Unit, one for Turfloop and one for the Medunsa campus. The researcher decided to conduct a focus group interview with the two acting HoDs, who were members of staff before their appointments. The researcher had an interview with one of the senior managers who later resigned from the

institution. The researcher then decided to also interview the new manager who took over the managerial responsibilities of the one who resigned. Two senior officials were interviewed separately. The researcher decided on the focus group interview based on the notion:

...that group interaction is productive in widening the range of responses, activating forgotten details of experience and releasing inhibitions that may otherwise discourage participants from disclosing information...focus group interviews produce data rich in detail that is difficult to achieve with other research methods (Maree, 2007:90).

The researcher recorded the interviewees' responses by writing the answers down and at the same time making use of a recording device to record the discussions, with the permission of the interviewee, in order to capture the data. The interviews lasted from an hour to an hour and 20 minutes with the focus group interview being the longest. The device-recorded data was transcribed and analysed. Notes taken by the researcher helped in reflecting on the responses and in asking follow-up questions. The interviewer did not dominate the interviews but allowed interviewees a chance to respond to the questions, bearing in mind the key points of successful interviewing that good interviewers are good listeners who do not dominate the interview (Maree, 2007). This does not mean that the researcher was quiet and spoke only when asking questions; the researcher from time to time where necessary threw in some clarification probes to check if his understanding of what had been said was accurate. This was done through paraphrasing what the researcher thought the interviewee had said to confirm his understanding (Maree, 2007). The researcher observed the non-verbal cues because there was much to read from them, and also took care that his own non-verbal cues did not lead the respondent (Maree, 2007). The researcher was neither judgemental nor critical of the interviewee's responses.

Basic requirements for observation, as stipulated by Maree (2007:84), were taken into consideration before the researcher started to observe at the Medunsa campus, to see how the TEL tool had been implemented. Maree states:

...you begin to build relationships with the participants in the setting... make sure that you have defined the purpose and focus of the observation and that you know exactly what you want to observe...Define your terms or key constructs to be observed...adopt a relatively passive role...observe events as they occur in the natural setting...Remain a researcher and do not become a therapist, and always

protect the participants' integrity and anonymity. Explore how participants normally deal with the situation, and be frank and truthful about your role as observer.

Regardless of the fact that the researcher was employed at the institution under research, where he had established sound professional relationships with the community of the institution, and notwithstanding the fact that the researcher might be familiar with the challenges the campus is faced with, the researcher remained a researcher throughout the study. Even though tempted to be a therapist and try to solve the participants' challenges, the researcher managed to resist this temptation. To stay focused on the cause, the researcher defined the purpose and the focus of the observation, which was to observe how TEL is implemented at the Medunsa campus focusing on the infrastructure, resources and the support. The researcher recorded his observation, not using a single strand of recording but dual strand. The researcher used the structured observation strand and running record strand that Maree (2007) describes, thus, the structured observation is a strand whereby the researcher identifies predetermined categories of behaviour he would like to observe. The categories are developed into a checklist. The researcher then scored the predetermined action. The running records strand that has been described as the recording of observed events was detailed and sequential. The recordings not only described the context in which events occur but also the situation (see Appendix E). While noting and recording the field or observation notes, the researcher dated every note and identified the context. The researcher synthesised the field notes immediately after leaving the observation site so that he was able to analyse the notes while their content was still fresh in his mind (McMillan & Schumacher, 2014).

#### **4.7 Pilot study**

A pilot study is a preliminary evaluation for the purpose of developing the foundation for a future, more comprehensive study. Thus, a pilot study might test feasibility, collect initial data, refine methodology or evaluate critical factors that would influence the ability to conduct a larger study (Program Announcement, 2005). Thomas (2009) clarifies that to pilot means to conduct a much smaller study to prepare for a larger one. Terre Blanche et al. (2008) stipulate that this process is conducted to identify the potential problems and refine or modify research methods and design, particularly the research instruments. This study piloted using a subsample of the proposed sample and the participants of this small study did not participate in the main study. The study used the 2012 cohort of MBChB EDP students to pilot the questionnaire. Through their Study and Information Management (SIM) subject lecturer, the researcher administered the questionnaire to

a sample of 11 students. The students were allowed to ask questions for clarity purposes while answering the questions. At the end of the questionnaire, the students were also allowed to give their comments on the clarity of questions and structure of the questionnaire. All the questions and comments of the students were noted and considered while finalising the instruments of data collection.

The piloting of this study helped in modifying the instruments, if need be, to be user friendly. Piloting or pre-testing the instruments helped the researcher to ensure that no offensive language was contained in the instruments, as well as to check the clarity of the instruction and questions. The researcher found that there were questions which were not clear and others were a double-barrelled form of questioning. The researcher clarified such questions on the questionnaire that was used by the main study. According to Locke et al. (2000), this is a useful form of anticipation. It is also an excellent means by which to determine the sample size necessary to discover significant differences among experimental treatments.

#### **4.8 Ethical considerations**

Terre Blanche et al. (2006) assert that the essential purpose of research ethics is to protect the welfare of the participants and it goes beyond that into guarding against scientific misconduct and plagiarism. They further stress that research ethics should be the fundamental concern of all social science researchers in planning, designing, implementing, and reporting research with human participants. It should not only be a concern for social science researchers, but also for all researchers using human beings as participants. This is supported by Macmillan and Schumacher (2006) when they declare that educational research focuses primarily on human beings who make the researcher ethically responsible for protecting the rights and welfare of the participants of the study. Unlike medical studies, this study poses no risk to any person participating, therefore, the study proposal was approved by the NWU Higher Degree Committee. The approval letter, the protocol and a formal written request letter were submitted to UL, MREC requesting formal consent to conduct this study. To ensure that the rights of the participants were protected, the researcher obtained an ethical clearance certificate from the MREC (see Appendix E: Request to collect data and Appendix G: Ethical clearance certificate).

Although the aim of this study was to investigate the implementation of TEL at the Medunsa campus, responses were elicited from students and staff at the Medunsa campus who were using

this tool: participants were informed of the study and assured that their responses would remain confidential. Appendix A is the consent letter that the participants were exposed to before they could complete the questionnaire. Participants who completed the online questionnaire were requested to accept or decline access to it. Participants who accepted and went through the questionnaire but during the process felt they do not want to continue, could discontinue at that point and terminate the whole process. The researcher used a different approach for the group questionnaire; he furnished each participant with the consent form and went through it with them to ensure their understanding of the form. On coming to the end of the form, participants made a choice whether to participate or not by ticking on the “Yes” or “No” blocks and signing the form. The researcher and the field workers collected the forms and those who indicated that they were not interested left the room and those who were willing to participate completed the questionnaire.

#### **4.9 Triangulation**

By virtue of this study being a multiple method study, it is triangulated in design. The purpose of triangulation in this study was to provide a more comprehensive and complete picture of data by converging data analysis methods and offsetting the strengths and weaknesses of each method. Qualitative and quantitative data was collected at the same time. This was done to see if the results from each approach were the same; this also indicated the validity of the study. It is a cross-validation among data sources, data collection strategies, time periods, and theoretical schemes. The researcher compared different sources, situations and methods to see whether the same patterns were recurring (Macmillan & Schumacher, 2006).

De Vos (2001) defines triangulation as a tool that uses several different research methods, participants and instruments to test the same finding and considers this approach valuable as it establishes the validity of the research findings. It is also a means that compares different kinds of data from different sources to see whether they agree with one another. With the combination of these techniques in order to investigate the same phenomenon, the researcher obtained a better, more substantive picture of reality; a richer, more complete array of symbols and theoretical concepts; and a means of verifying many of these elements. It is believed that triangulation has the benefit of raising social scientists above the personal biases that stem from single methodologies (Berg, 1998; Frankfort-Nachmias & Nachmias, 1996; Hussy & Hussy, 1997; Walsh, 1998).

The aim of this exercise established the validity and reliability of the research findings and avoided any bias that may have occurred. Two of the four types of triangulation were used (Easterby-Smith, Thorpe & Lowe, 1991 in Hussy & Hussy, 1997:74) as follows:

- Data triangulation, whereby responses from all the respondents involved in this study per category are compared to check if the findings are the same or they differ; and
- Methodological triangulation, whereby findings from the respondents will be looked at and compared according to their methodologies (i.e. quantitative and qualitative methodologies) to test whether the findings are the same.

#### **4.10 Ensuring validity and reliability**

Mokoena (2004) argues that validity in educational research, with reference to case study, has been questioned by researchers with a positivist orientation, and that data collected by any and/or all means of data collection instruments should be examined to assess the extent to which it is likely to be valid and reliable. Although Bell (2000) proposes that the two (reliability and validity) work together by explaining that if the data is not reliable, then it simply means that it is not valid, the researcher does not agree with the argument and believes that reliable data may not necessarily be valid. The argument is based on the definitions of the two terms, reliability and validity. Reliability is the extent to which a procedure produces similar results under constant conditions on all occasions. This means that the use of the same instrument by a different researcher should yield the same results. Validity tells us whether the item measures or describes the phenomenon it is supposed to measure or describe. Having said that, the researcher believes that the instrument used to collect data can be valid but the context of the research may yield different results.

##### **4.10.1 Validity**

Validity is the degree to which scientific explanations of phenomena match reality. It refers to the truthfulness of the findings and conclusion (Macmillan & Schumacher, 2006). Terre Blanche et al. (2006) attest to the above point when they state that validity is the degree to which the research conclusions are sound. Based on Terre Blanche et al. (2006) and in order to ensure the validity of the study, the researcher considered the following: the relationship among the variables; the causal relationship between the intervention and the dependent variable; the generalisability of results; and what the nature of the constructs is.

#### **4.10.2 Reliability**

Reliability refers to the consistency of measurement, the extent to which the scores are similar over different forms of same instrument or occasion of data collection (Macmillan & Schumacher, 2006). According to Terre Blanche et al. (2006), reliability speaks to the ability to repeat the results; a reliable study gives the same results when the study is repeated. The reliability of the instruments of this study was also tested through the results from the pre-test or pilot study and the preliminary results of the main study.

#### **4.11 Trustworthiness**

The researcher gauged trustworthiness during data collection and analysis of data. The researcher selected trustworthy evidence for pattern seeking by qualitatively assessing the solicited data against unsolicited data (Macmillan, McMillan & Schumacher, 2006).

#### **4.12 Data analysis**

Data collected from the respondents was analysed qualitatively or inductively and quantitatively or deductively.

##### **4.12.1 Qualitative data analysis**

Notwithstanding the challenges of qualitative data analysis outlined by different scholars and researchers, this study had three forms of qualitative data collection instruments, namely: interviews, documents and observation. The researcher analysed data collected through these instruments qualitatively. Qualitative data analysis is an inductive process of organising data into categories and identifying patterns. The qualitative data was presented categorically; some researchers use the term to represent verbal or narrative pieces of data. This type of data is collected through focus groups, interviews, open-ended questionnaire items, and other less-structured situations (Bryman & Cramer, 1994).

Due to the mass of qualitative data that was collected, and considering some of the challenges described by Hussy and Hussy (1997), namely, reducing data in order to sharpen, sort, focus, discard and reorganise it in such a way that conclusions may be drawn and verified; and structuring the data, the researcher identified themes and patterns to assist in the analysis of data. For this process, the Constant Comparative Method was used, whereby the researcher went through the

collected data over and over again, comparing each element (i.e. phrase, sentence or paragraph) with all other elements. In addition, this method helped the researcher to select themes that capture or summarise the contents of the collected data (Thomas, 2009). Since the above method would have also helped in reducing the data, the researcher used two strategies, namely; hermeneutics, for the data collected through the interviews and content analysis, for the documents and the observations. Using hermeneutic strategies helped the researcher to look at the interaction between the understanding of the text and the interpretation of its part. This went deeper into the hidden meanings in the obvious meaning. With content analysis, this study examined the content of UL's policies on e-Learning, teaching, learning and assessment, and also the observations made by the researcher (Maree, 2007). The interpretation of data followed the Macmillan and Schumacher (2006) 4-phase model whereby the researcher takes the recorded data and then codes and categorises it into patterns or themes and concepts and finally narrates the findings. The researcher went over the analysis to check and double-check for errors and refine the analysis and interpretation. Before the researcher could engage in the inductive analysis, an interim analysis was conducted, i.e., as the data was collected the researcher analysed it in the process; the aim of this was to make data-collection decisions and to identify recurring topics. After collecting the data, the researcher wrote summaries of what he observed and notes from the interviews (Macmillan & Schumacher 2006).

#### **4.12.2 Quantitative data analysis**

Quantitative data from the questionnaires administered to students and lecturers was presented and analysed statistically. The researcher used the graphs and the frequency and percentage tables in presenting the data. The responses were categorically analysed. To analyse data, the researcher migrated data from Survey Monkey used to collect data and made a preliminary analysis for the statistical package for the social sciences (SPSS). Bryman and Cramer (1994) and Punch (2009) describe SPSS as a statistical program in the social sciences that is very widely used. SPSS is a computer software package that helps to analyse data statistically. They further indicate that the great advantage of using this package is that it enables the researcher to score and to analyse quantitative data very quickly and in many different ways. The other advantage is that this programme can read data in almost any format and version; it is a versatile tool.

The quantitative research is based on branches of statistics namely, statistics that describe, that help one understand the relationships between the variables, enabling one to deduce or infer, i.e. draw conclusions from analysed data. Therefore, this study, among other statistical analyses, cross

tabulated and used contingency tables, regression weights, to check how accurate the predictions were and analysed the variance. The study checked the interrelatedness of features and, above all, interpreted the results of the study (Punch, 2009; Thomas, 2009). The data collected through the quantitative means was analysed using statistical packages. Using both approaches allows the researcher to incorporate the strengths of each method, which provides a more comprehensive picture of what is being studied, emphasising quantitative outcomes as well as the process that influenced the outcomes (Macmillan & Schumacher, 2006).

#### **4.13 Conclusion**

This chapter has discussed in detail the methodological dimension of the study. The chapter has considered the multiple-mode approach that the study employed and how it was analysed. The chapter has also highlighted the issue of triangulation through the instruments and methodologies, notwithstanding the reliability and validity or trustworthiness of the study. The study has not only described the different instruments used to collect data, but has also debated how these instruments were used together to strengthen each other's weaknesses. The next chapter, Chapter five, discusses data analysis and presents an in-depth interpretation of data compiled from the study.

## **CHAPTER 5**

### **DATA ANALYSIS AND INTERPRETATION**

#### **5.1 Introduction**

Chapter 4 outlined the research design and methodology used in this study. This chapter describes and analyses the results of the empirical data collected in response to the main research question documented as the implementation of the TEL technique as a support tool for the learning and teaching process in HE. Having in mind the multiple-mode method approach that this study employed, as indicated in the previous chapter, this chapter also presents findings from both qualitative and quantitative research instruments. The data in this chapter is categorised into two phases of organising data, i.e. phase one discusses how data was prepared before it could be analysed. Phase two deals with the actual analysis of data. The phase is further sub-divided into two sections, quantitative and qualitative data.

#### **5.2 Preparation of data**

The data collected from students at the Medunsa campus was through dual means, i.e. through the electronic and paper-based questionnaires. The researcher made available the two forms of questionnaires and the participants in different departments had a choice to complete either of them. The School of Oral Health, the School of Medicine and the Department of Pharmacy in the School of Health Sciences, opted to complete a Survey Monkey (online) questionnaire, whereas the Department of Radiography in the School of Medicine and the rest of the departments in the School of Health Sciences opted for a paper-based questionnaire. A link to an online questionnaire was sent to respondents via email. The researcher held a meeting with each programme that had indicated that they would want to complete the paper-based questionnaire. In the meeting with the respondents, the researcher explained the consent form before distributing the questionnaire. Students who were not interested in participating in the study were excused and only those who agreed by signing the consent form were allowed to participate in the study. To reconcile the paper-based and electronic questionnaires, the researcher employed the services of data capturers to capture all the paper questionnaires into the Survey Monkey. The total number of students who participated in this study is 266. Thirty- nine of the respondents who attempted to complete an online questionnaire did not complete the actual questionnaire; they had agreed to participate but did not go through the questionnaire hence they are counted by the system as respondents. Before

the analysis of data, the researcher exported the data from the Survey Monkey to Excel and cleaned the data. In addition to the students' questionnaire, the researcher also sent fourteen questionnaires to academic staff; two of the questionnaires were opened but not completed. With regard to qualitative data, the researcher employed the services of a research assistant who transcribed the four interviews conducted and recorded on the recording device.

### **5.3 Data analysis**

The cleaned data was then given to the statistician to run the summaries on a software system for data analysis and report writing called Statistical Analysis System (SAS). The statistician also ran all relevant tests for this study. Using the summaries from the statistician, the researcher ran further tests and analyses such as pie charts and frequency tables using SPSS. The researcher made notes from both the observation checklist and document analysis schedule. The quantitative and qualitative data are analysed and interpreted separately below.

#### **5.3.1 Quantitative data**

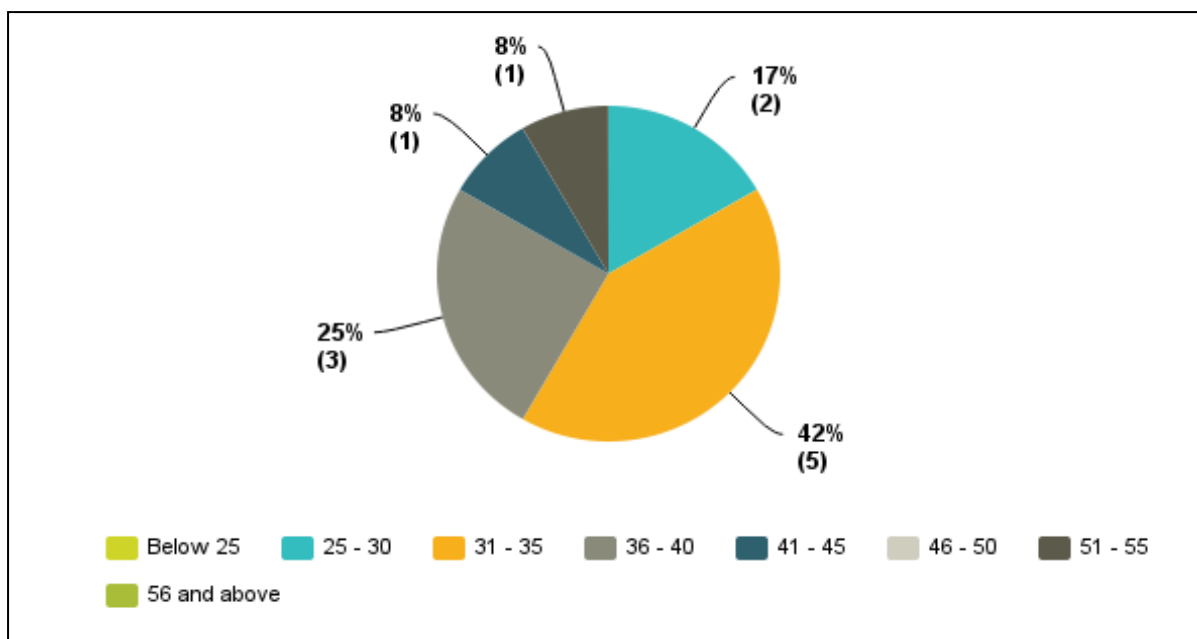
This section presents the data collected from lecturers and students at Medunsa campus, two hundred and twenty-seven response rate (227) from the students and twelve (12) from the lecturers were analysed. Data collected through the two sets of questionnaires administered to the students and the lecturers are presented and interpreted according to the following five themes: biographic and demographic data; access to TEL facilities and resources; level of literacy and interest; training and use of TEL technique; and, preferred teaching and learning mode.

##### **5.3.1.1 Questionnaire from the lecturers**

The online link of an electronic questionnaire was sent to fourteen academic staff members at the Medunsa campus of UL. All fourteen respondents opened the link and agreed to the consent form but only twelve completed the questionnaire. This section looks at the analysis and presents the results of the twelve respondents.

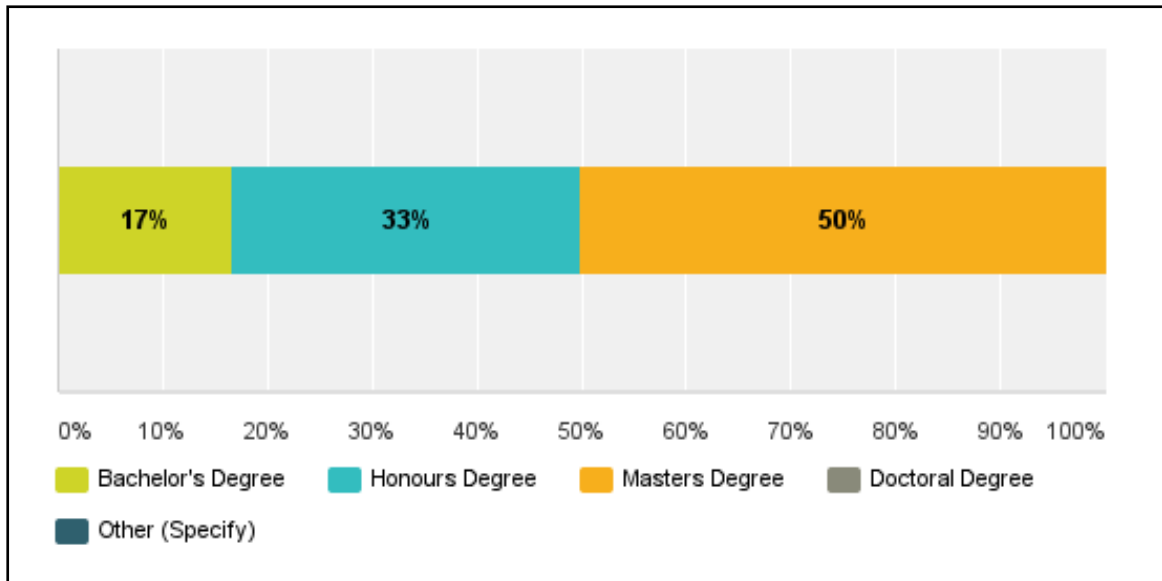
###### **5.3.1.1.1 Biographic and demographic data**

The academics were requested to respond to the biographic and demographic questions. The aim of these questions was to determine the gender, age, qualifications, nature of employment and the rank of the respondents. The questions sought to determine the relationship(s) between the stated independent variables and the implementation of TEL at the Medunsa campus of UL.



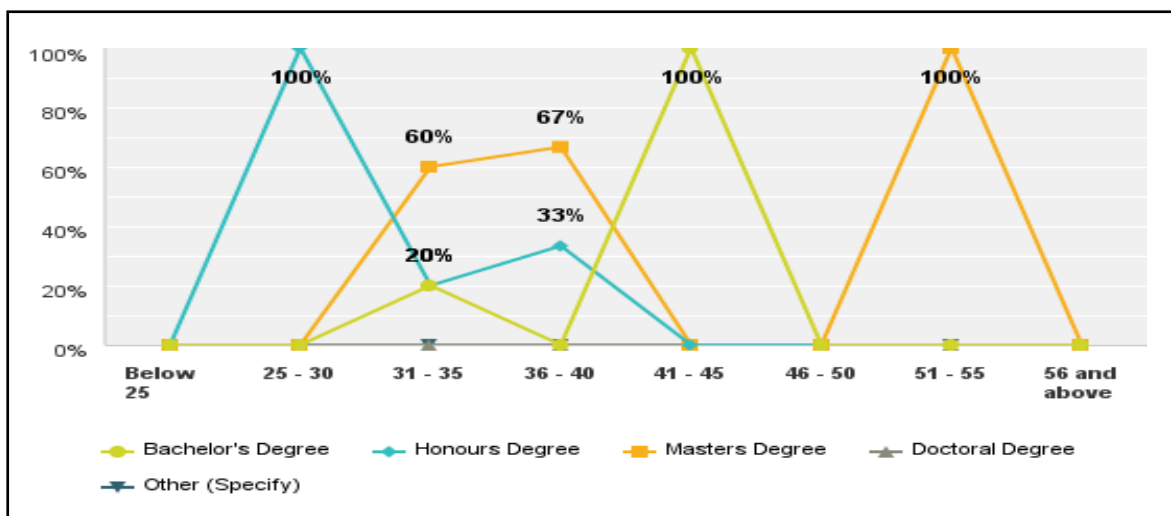
**Figure 14: Age category of lecturers**

Evidently from figure 14, the academics in majority who teach larger classes are younger academics aged between 25 and 40 years contributing 84% of the total academic population of the study. Amongst these academics, those who are aged 31–35 years are in the most majority (42%), followed by age category 36 – 40 (25%) then age category 25 – 30 (17%). The younger generation is more conversant with technology than their elders and through these younger lecturers, the use of technology to enhance learning might not be a difficult exercise to embark upon. Probably the younger lecturers may associate more easily well with the students since they find themselves between both worlds (the world of the young and the world of the old).



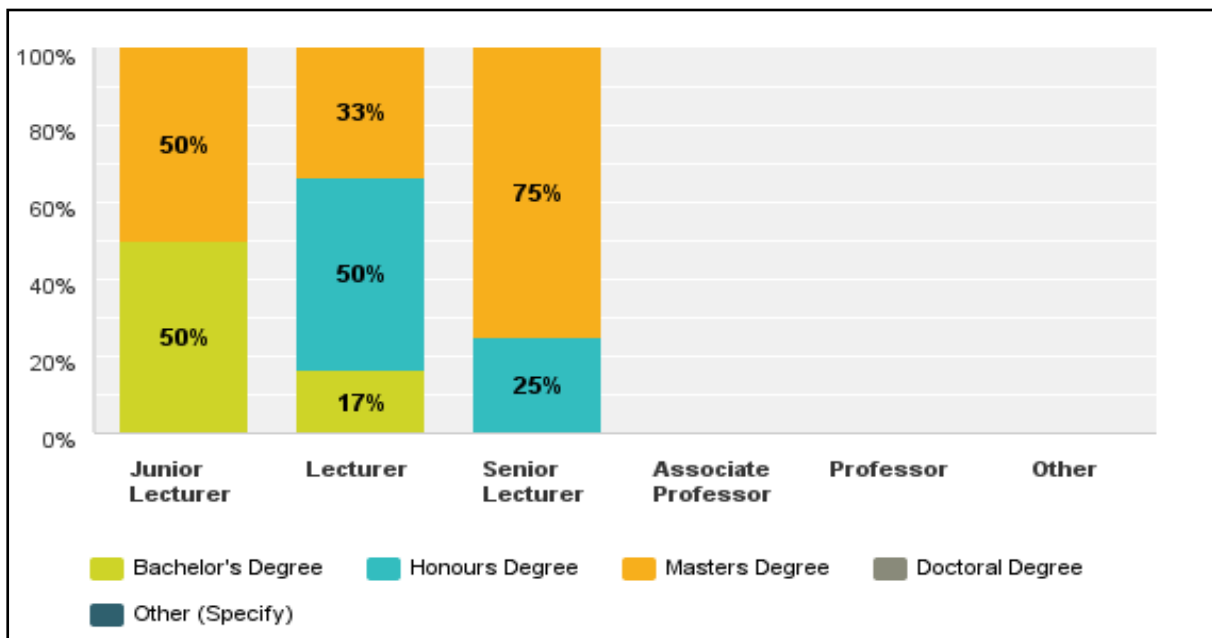
**Figure 15a : Academics' highest qualification**

Looking at figure 15a, it is evident that a significant number (50%) of academics who are teaching larger classes are in possession of a master's degree. Although there was no one from the population with doctoral degree, a very small number of the respondents (17%) indicated that they had a bachelor's degree and 33% hold an honours degree. The study depicts that 50% of academics hold a master's degree, while it is a matter of great concern that the other half hold only a junior degree with which to teach at an HEI. It is an unprecedented practice to have lecturers teaching without Master's Degree at HEI, unless they are on a special University programme that develop their own (Developing own timber). Mostly the lecturers without Master's Degree are considered as underqualified and there is a general tendency to undermine their teaching.



**Figure 15b: Qualification by age**

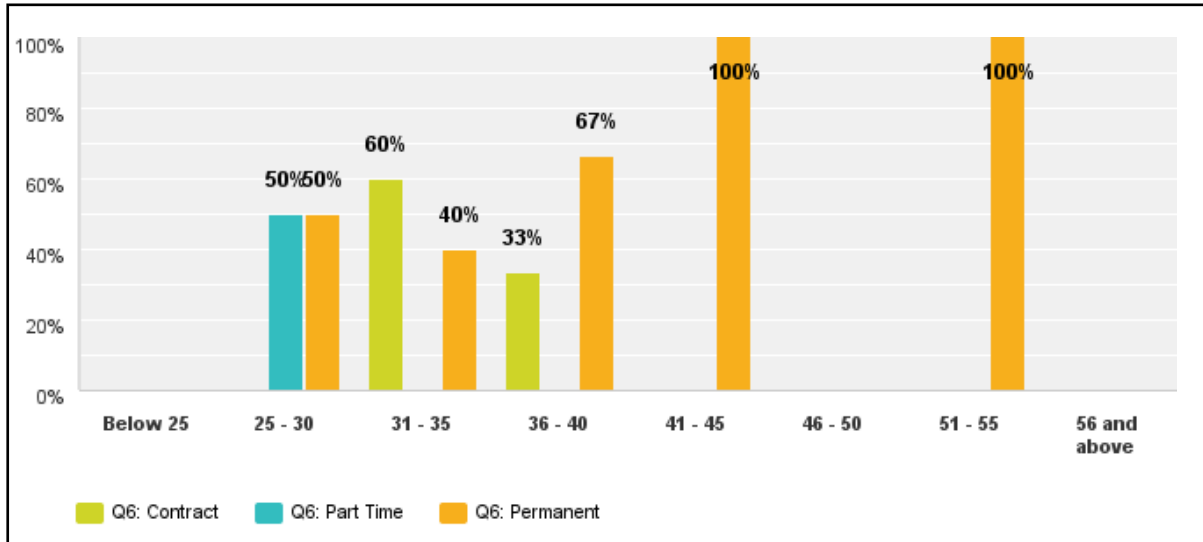
From figure 15b on qualification by age, the following were noted: staff in only two age categories hold a bachelor's degree. All academics participating in this study and who are aged between 41 and 45 indicated that they have a bachelor's degree and only 20% of academics aged between 31 and 35 have the same qualification. Academics who are aged between 25 and 30 indicate that they have an honours degree. The other age categories with honours degree are 31–35 years and 36–40 year olds, though both categories have few academics in them contributing 20% and 33% respectively. The majority of academics with a master's degree are those who are aged between 51 and 55; academics in the age categories of 41–45 and 31–35 are also in possession of a master's degree, contributing 67% and 60% respectively. According to figure 15b, there are none who hold a PhD and are 56 years and above. In agreement with figure 15a, it is evident from figure 15b that academics with a master's degree are in the majority.



**Figure 15c: Qualification by rank**

According to figure 15c, 50% of the junior lecturers have a bachelor's degree and the other 50% have a master's degree. Half (50%) of the academics who are lecturers hold an honours degree and the other half was divided between those with bachelor's (17%) and master's (33%) degrees. Twenty-five percent (25%) of the total academics who are in senior lecturership positions are honours degree holders and the larger portion of senior lecturer positions is occupied by academics with a master's degree. The bar graph depicts anomaly in practice at MEDUNSA, in a normal setting in HEIs academics with honours degree are at a junior lecturer level, Masters Candidates are at lecturer level and senior lecturers hold PhD, at some institutions the PhD should be coupled

with a few publications. It is very rare to find HEI having a lecturer with a junior degree only. MEDUNSA staff establishment pose a unique setting which brings forth a concern in terms of teaching and learning process.



**Figure 15d: Qualifications by nature of employment**

Figure 15d above, depicts the age of the participants by the nature of their employment. The figure suggests that most of the younger academics are either on contract or in part-time employment, whereas most of the older academics are in a permanent position. According to the figure above, 60% of the academics aged between 25 and 35 and 33% of those aged 36-40 designate that they are on contract. Fifty percent (50%) of the younger academics aged 25-30 are employed on a part-time basis. The contract employees in most cases lack stability, which may cause the younger lecturers to be reluctant to engage in new approaches to teaching and they may be looking for employment opportunities outside the institution.

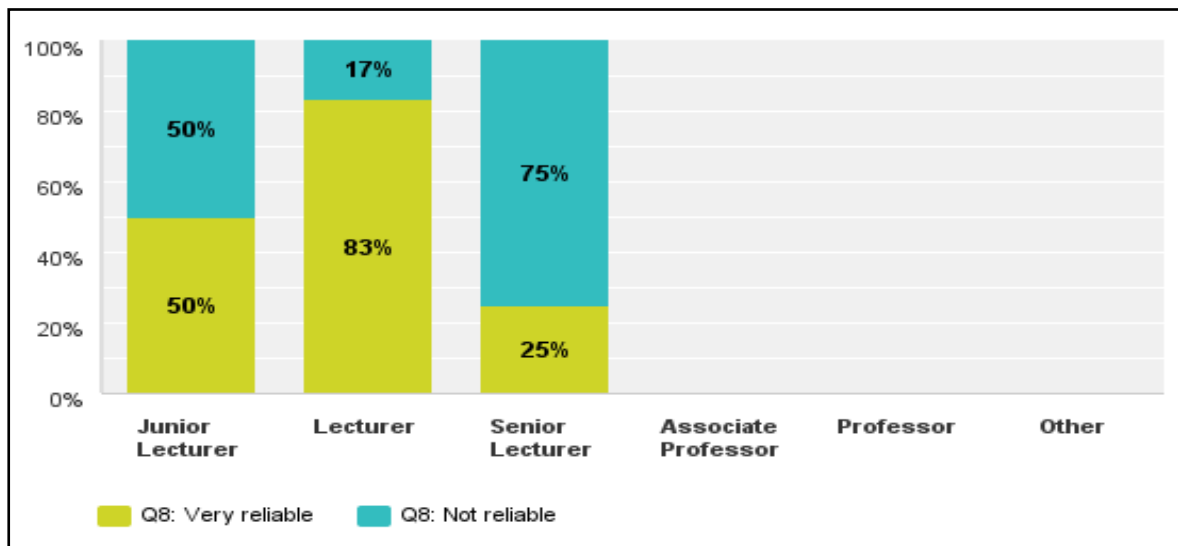
#### **5.3.1.1.2 Perception of lecturers towards TEL and access to facilities and resources**

The questions below sought to determine and analyse the perceptions and expectations of users in the implementation of TEL and also to examine the extent to which users have access to TEL facilities and resources. The section also looks at the correlations of variables.

**Table 4a: Reliability of the university's internet services**

Answer Options	F	%
Very reliable	7	58%
Not reliable	5	42%
Not sure	0	0%
<b>TOTAL</b>	<b>12</b>	<b>100%</b>

Table 4 above depicts academics' perception on the reliability of Internet services in terms of the access. Although academics indicated an overall 58% on the reliability of the Internet service, 42% argue that the Internet service is not reliable. Figures 16a to 16c below show the perception of academics regarding the reliability of the Internet against different dependent variables.



**Figure 16a: Reliability per rank**

According to figure 16a, the depiction is that at the junior level, half (50%) of the academics indicate that the Internet service is reliable and the other half that it is not reliable. This is not the case with the lecturers and senior lecturers; there is a significant difference between academics who feel that the Internet service is reliable and those who indicate that the service was not reliable. Looking at the lecturers, 83% state that the Internet was reliable and only 17% state it was not reliable. Contrary to the responses of some lecturers, senior lecturers see it differently; illustrating that 75% feel that the Internet is not reliable (accessible easily) and a lesser percentage (25%) feel that the Internet is very reliable. The variation is brought by the use of technology for different reasons at different levels. Figure 16b shows how academics at different levels use technology in support of their different views regarding the Internet service.

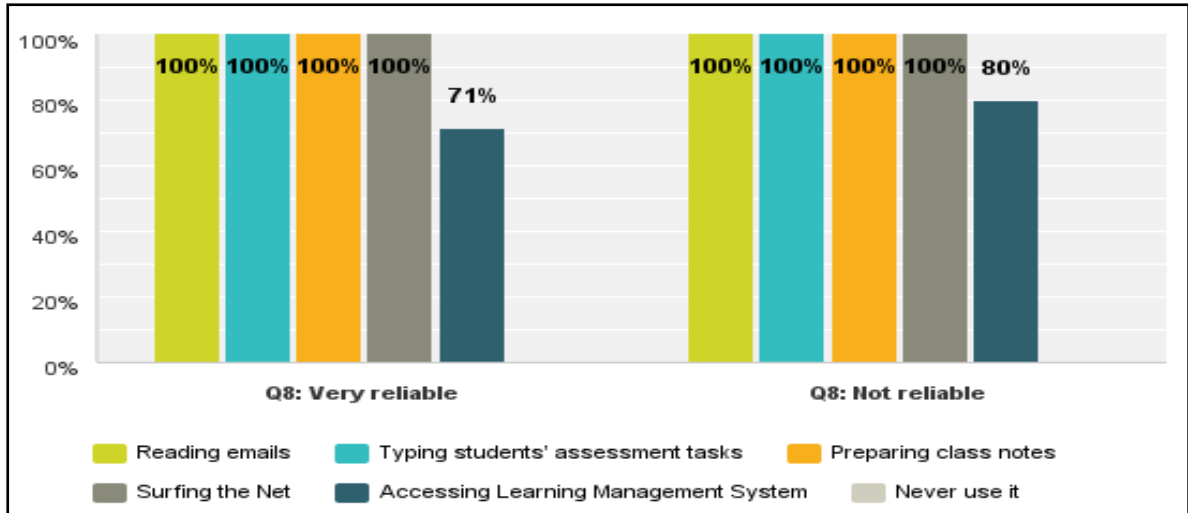


Figure 16b: Reliability of internet service per users

Figure 16b reveals a contrast between academics who feel that the Internet service at Medunsa is very reliable and those who indicate that the service is not reliable. One hundred percent (100%) of the academics, who use the technology to read emails, type the students' assessment tasks, prepare class notes and generally surf the Net, perceive the Internet to be very reliable. Similarly, academics who describe the Internet as unreliable also use the technology for the same functions. Although there is little difference between the respondents who perceive the Internet service as very reliable and those who feel that it was not reliable, 71% of those who consider that the Internet is reliable indicate that they use technology to access UL's LMS while 80% who consider the Internet unreliable use technology to access LMS.

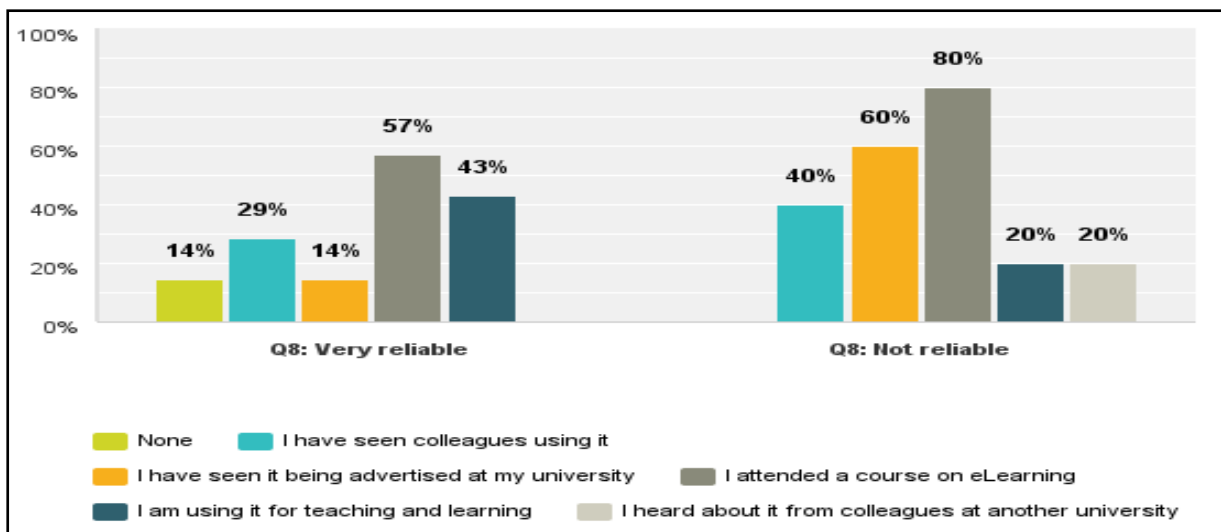
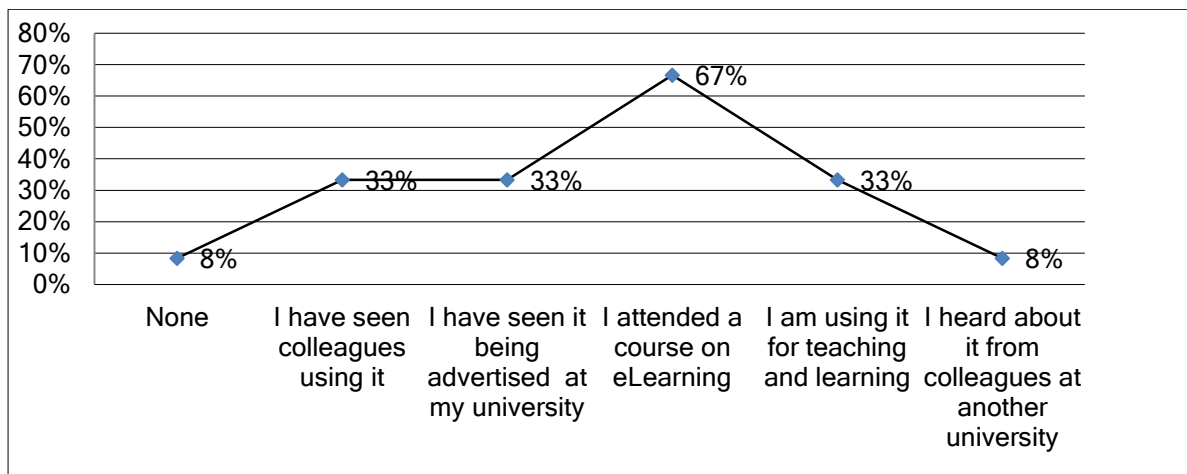


Figure 16c: Academics' TEL experiences based on reliability

Figure 16c depicts that the majority of the academics (57% of those who find the Internet reliable and 80% of those who find it unreliable) specify that they have attended a course on TEL, where they built their experiences on TEL strategies. Not only did those who found the Internet unreliable complete a course on TEL, but they 60% of them also saw it advertised at the university. Forty-three percent (43%) of the academics who claimed that the Internet was reliable, as compared to those who indicated that the Internet was not reliable (20%) used the technology to enhance their learning and teaching process. Based on figure 16c above, clearly, respondents who claim that the Internet is not reliable are not hands-on users; 20% of the respondents have heard about TEL from colleagues in other universities and 40% state that they have seen colleagues using it.



**Figure 17: Lecturers' experiences in the use of TEL**

Academics were asked to indicate their experiences with regard to TEL. Figure 17 above gives a summary of the responses of the question asked. The line graph shows that academics do have varied experiences in TEL. The figure shows only 8% of academics who indicated that they did not have experience at all and at the peak of the graph the majority of the academics (67%) are recorded to have attended a course on TEL. Although the academics claimed to be trained on TEL, only 33% of the academics are using TEL for teaching and learning. Not only did the academics use TEL, but 33% also indicate that they have seen their colleagues using TEL. The other 33% indicate that the use of TEL technique is being advertised on campus, which has encouraged the end-users to use and familiarise stakeholders with this technique. Table 4b shows the frequency of use by academics in both groups.

**Table 4b: Use of TEL per week and reliability of the Internet service**

Frequency of using e-Learning per week		
	How reliable is your university's internet service?	
Answer Options	Very reliable	Not reliable
<b>How often do you get support on eLearning on your campus?</b>		
Never	71%	40%
Once	14%	60%
Twice	0%	0%
Three	14%	0%
Four	0%	0%
Five	0%	0%
<b>How often do you visit your campus Learning Management System (LMS)?</b>		
Never	71%	60%
Once	0%	20%
Twice	14%	20%
Three	14%	0%
Four	0%	0%
Five	0%	0%
<b>How often do you collaborate online with your students?</b>		
Never	29%	0%
Once	14%	20%
Twice	29%	40%
Three	29%	0%
Four	0%	0%
Five	0%	40%
<b>How often do you post class notes online?</b>		
Never	43%	40%
Once	29%	0%
Twice	14%	40%
Three	14%	0%
Four	0%	0%
Five	0%	20%
<b>How often do you give assessment online?</b>		
Never	86%	40%
Once	14%	60%
Twice	0%	0%
Three	0%	0%
Four	0%	0%
Five	0%	0%
<b>How often do you facilitate online discussions for your students?</b>		
Never	86%	100%
Once	14%	0%
Twice	0%	0%
Three	0%	0%
Four	0%	0%
Five	0%	0%

Table 4b focuses on the frequency of using TEL in a week by academics. The table considered academics who perceived Internet at Medunsa as very reliable and those who considered it unreliable. The analysis below categorises academics who perceive the Internet at Medunsa very reliable as group 1 and those that perceive the Internet as unreliable as group 2 for the purposes of easy reference to the categories of the respondents. Six (6) questions were asked to this effect and the responses were captured as shown in table 4b above.

In answering the first question as indicated on table 4b, “How often do you get support on e-Learning on your campus?”, 71% of group 1 academics and 40% of group 2 academics indicated that they never got support in using TEL from anyone on campus. Sixty percent (60%) of group 2 academics indicated that they got support through it only once a week, whereas 14% of group 2 academics portrayed that they got support once a week and the other 14% indicate that they got help three times a week. The support they received in a week from the TEL unit may not be enough to be able to use technology to enhance their teaching.

When the academics were asked; “How often they visit the campus LMS”, the majority of academics (71%) according to table 4b, having said that the Internet was reliable in table 4a, indicated that they never visit the LMS and a higher percentage (60%) of those who found the Internet unreliable had never visited the LMS. Only a smaller percentage (28%) of academics who said the Internet was very reliable visited their LMS, though not as frequently as they should. Table 4b displays that 14% of the academics visited the LMS only twice in a week and the other 14% three times in a week. Looking at those who saw the university’s Internet as unreliable, 20% of the academics visited the LMS once a week and the other 20% indicated that they visited the LMS twice a week. There are no academics who indicated that they visited the LMS regularly, e.g. at least five times in a week.

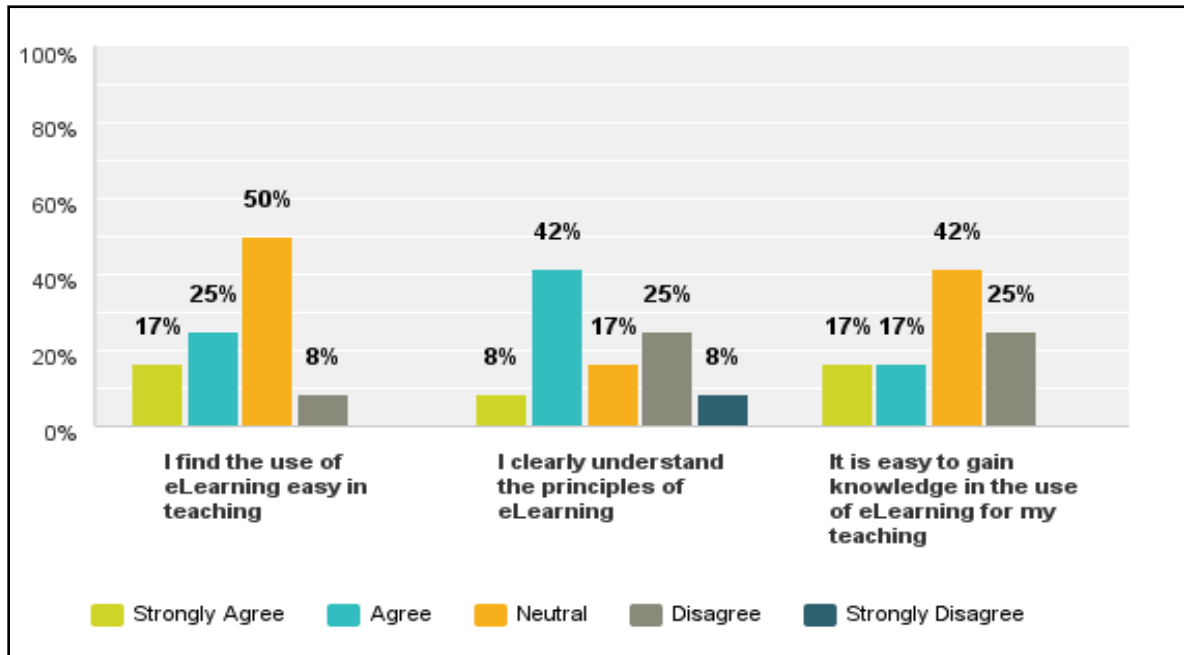
Contradictory to the frequency of visiting the LMS where the majority of academics indicated that they never visited the LMS, as indicated above, the response to the question “How often do you collaborate online with your students?” is that group 2 academics do use the LMS more frequently than they stipulated in the preceding response. Forty percent (40%) of group 2 academics indicated that they collaborated with students online five days a week and the other 40% twice a week; only 20% said that they collaborated with students once a week. All academics in group 2 collaborated with students online though some not so frequently as others unless they use TEL platforms other than the university’s LMS. The same applies to group 1 academics,

although not as frequently as group 2 academics; 29% see students online three times a week and the other 29% twice a week. Group 1 academics who see their students once a week online contribute only 14% and 29% maintain that they never use any online platforms to meet with students.

Responding to the question: “How often do you post class notes online?”, the majority of group 1 academics (43%) revealed that they never posted the class notes online for students and almost the same percentage of group 2 academics (40%) had never posted notes online. Having said that, it is also worth noting that 20% of the respondents in group 2 posted class notes online five days a week, though they found the Internet unreliable. The remaining 40% of group 2 academics posted the notes twice a week.

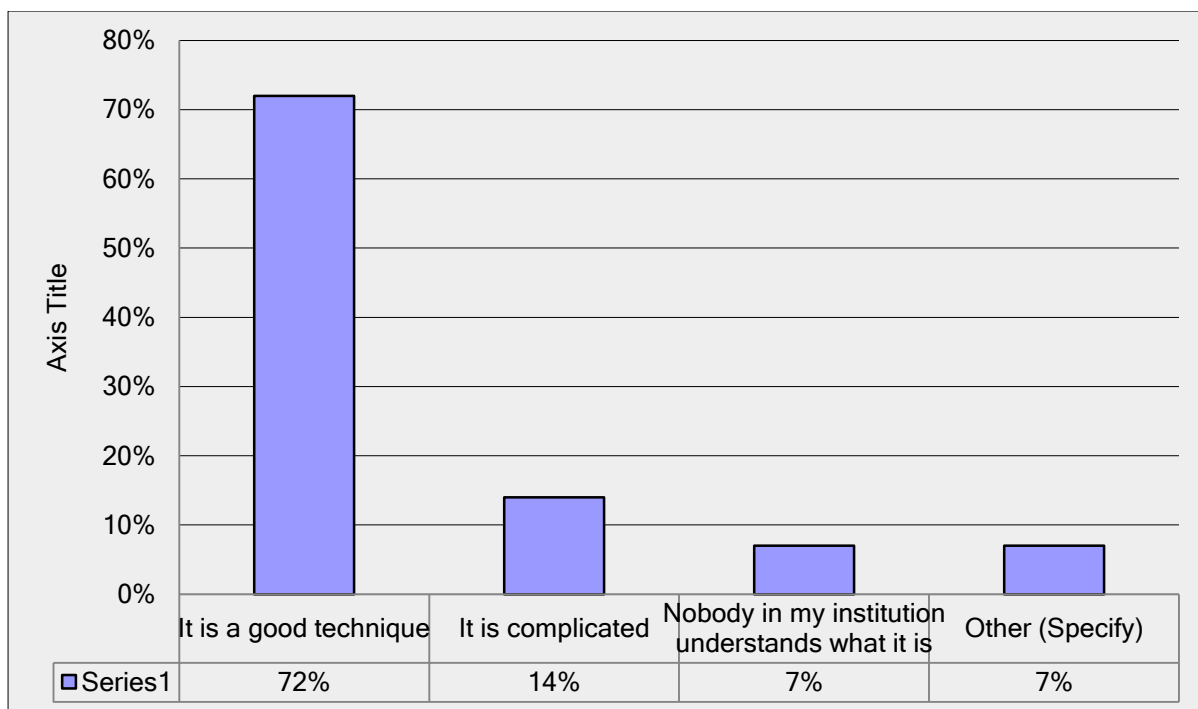
It seems that assessing students online at the Medunsa campus is not a favourite option. This is evident when group 1 respondents answered the question: “How often do you give assessment online?” Eighty-six percent (86%) of the academics never gave students an assessment task online and only 14% assessed students online. Contrary to group 1 academics, the majority of group 2 academics (60%) responded that they assessed students’ work online once a week and only 40% never assess students’ work online.

A significant majority of academics at Medunsa never used online platforms to facilitate class discussions with their students. In their responses to the question: “How often do you facilitate online discussions for your students?”, a significant percentage from both groups 1 and 2 stipulate that they never facilitate online discussions for their students, contributing 100% response rate of group 2 and 86% of group 1. An insignificant number of group 1 respondents, 14% indicated that they do facilitate online discussions to their students.



**Figure 18: Understanding the use of TEL**

In response to the five Likert scale questions that check the understanding of academics with regard to the use of TEL, figure 18 displays the result. The majority of academics in two of the three statements shown in figure 18 display either the academics' uncertainty with regard to the use of TEL or some kind of "I do not want to bind myself" attitude. In the statement: "I find the use of e-Learning easy in teaching", 50% of the respondents were neutral and 42% of the respondents in the second statement: "It is easy to gain knowledge in the use of e-Learning for my teaching" are also neutral, contributing the majority of the academics in those two statements. Conclusions that can be drawn from these responses may be as a result of academics not knowing exactly what TEL is or what benefits it brings. Forty-two percent (42%) of the academics find the use of TEL easy in their teaching, whereas an insignificant 8% do not find it easy. Regarding the gaining of knowledge in the use of TEL, 34% of the academics indicated that it is easy to gain knowledge for their teaching and 25% of the academics did not agree with the statement. With regard to the statement on understanding the principles of e-Learning, the majority of academics contributing 50% were in agreement, meaning that they do understand the principles of e-Learning and only 33% of the respondents' indicated that they did not understand the principles of e-Learning. The indecisive group in this case contributes only 17%.



**Figure 19: Opinion of academics on TEL**

Although in the preceding section, academics indicated that they have never used TEL, the majority (72%) indicate that TEL is a useful technique. The results in the table show that the majority of academics understand what TEL is; only 14% responded that TEL is complicated and 7% responded that nobody in the institution understands what TEL is.

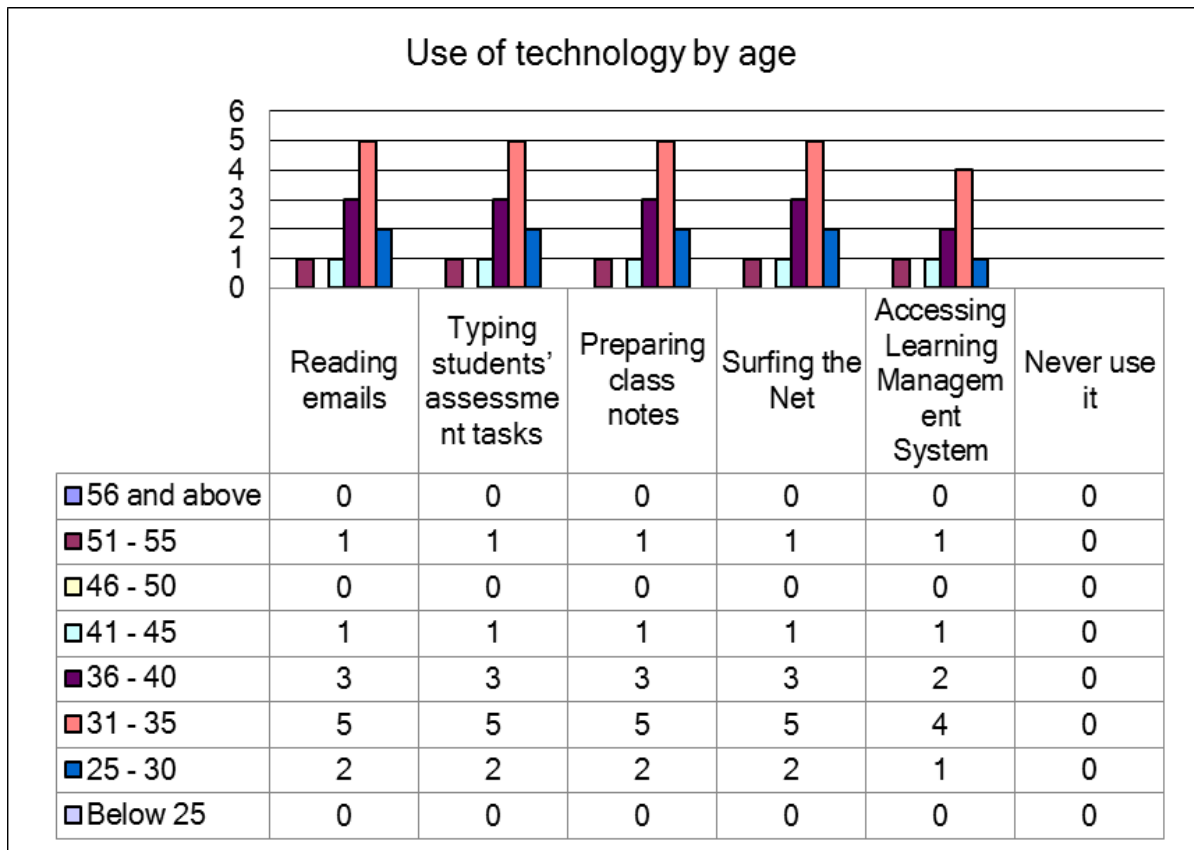
### 5.3.1.1.3 Training and use of TEL technique

Training of stakeholders in an institution is far more important than any other factor in the successful performance of these stakeholders. The subsequent section looks at the importance of training academics in the use of TEL (Wilbur, 1970). The results displayed illustrate the training received by academics to enable them to use TEL in their teaching.

**Table 5: Training by qualification and age**

Qualification	Age	At school level	At this university	When I started working	TOTAL
Bachelor's degree	31 -35	0%	50%	0%	50%
	41 – 45	50%	0%	0%	50%
	<b>Total</b>	<b>50%</b>	<b>50%</b>	<b>0%</b>	<b>100%</b>
Honours' degree	25 -30	50%	0%	0%	50%
	31 – 35	0%	0%	25%	25%
	36 – 40	25%	0%	0%	25%
	<b>Total</b>	<b>75%</b>	<b>0%</b>	<b>25%</b>	<b>100%</b>
Master's degree	31 -35	50%	0%	0%	50%
	36 -40	17%	0%	16%	33%
	51 -55	17%	0%	0%	17%
	<b>Total</b>	<b>84%</b>	<b>0%</b>	<b>16%</b>	<b>100%</b>
<b>TOTAL</b>	25 – 30	17%	0%	0%	17%
	31 – 35	25%	8%	8%	41%
	36 -40	17%	0%	9%	26%
	41 -45	8%	0%	0%	8%
	51 – 55	8%	0%	0%	8%
	<b>TOTAL</b>	<b>75%</b>	<b>8%</b>	<b>17%</b>	<b>100%</b>

Table 5 illustrates the training of academics on TEL according to age and qualification. Fifty percent (50%) of academics with a bachelor's degree aged between 41 and 45 indicated that they received their TEL training when they were still at school, whereas the academics aged between 31 and 35 received their training at university. In the honours category, the majority of academics (50%) who are aged between 25 and 30 indicated that they learnt to use TEL at school level, and 25% of each category of academics, those who were aged between 31 and 35 and 36 and 40, indicated that they were taught the use of TEL when they started working and at school level, respectively. A total of 84% of the academics with a master's degree indicated that they received training in the use of TEL while they were at school and 16% when they started working. Looking at the overall training in the use of TEL, the majority of academics from the bachelor's to master's degrees, contributing 75%, learnt to use TEL at school level and 17% in the workplace. Although the academics indicate that they attended a course on TEL, they did not learn the use of TEL at university.



**Figure 20: Use of technology by age**

Figure 20 above shows how the academics of different ages use the technology and what they use it for. The academics indicated that they are using technology for different reasons and at different rates; none of the academics pointed out that they never used technology. Interestingly, the figure portrays that the majority of the academics who are shown to be using technology more than others are academics who are aged between 31 and 35. For almost all the uses of technology indicated in the above figure except for one, academics who are aged between 31 and 35 years of age contribute 42%. It is also interesting to note that a smaller percentage (33%) of the same age category do access the university's LMS. What is also worth noting from the figure is that the majority of academics who use the available technology are in the age category of 31 to 40 years. Only 15% of the academics are aged between 25 and 30, who are expected to lead in the use of technologies. Evidently, in figure 20, an average percentage of 17% indicated that they use technology for accessing LMS. The majority of the academics, averaging about 20%, are basically using technology across four areas, namely, reading email, typing students' assessment tasks, preparing class notes and surfing the net.

### 5.3.1.1.4 Preferred teaching and learning methods

Individual academics at Medunsa have their own preferred teaching styles. In this section, this study analyses and interprets the lecturers' preferences in conjunction with the availability of TEL tools at Medunsa.

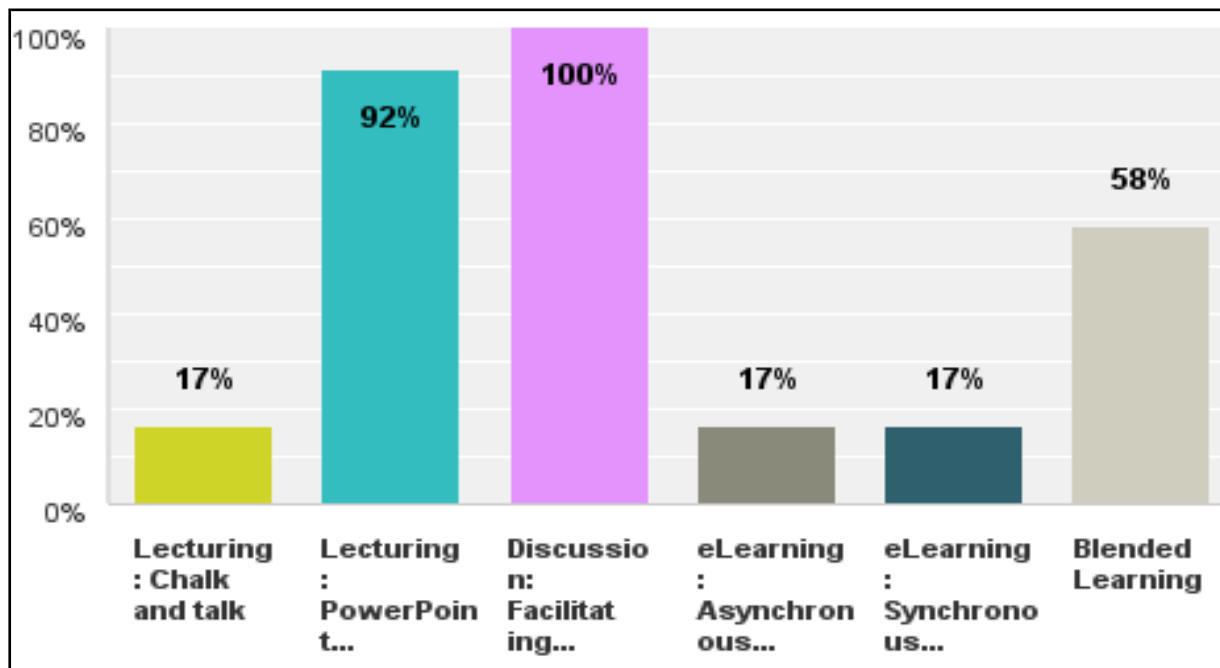
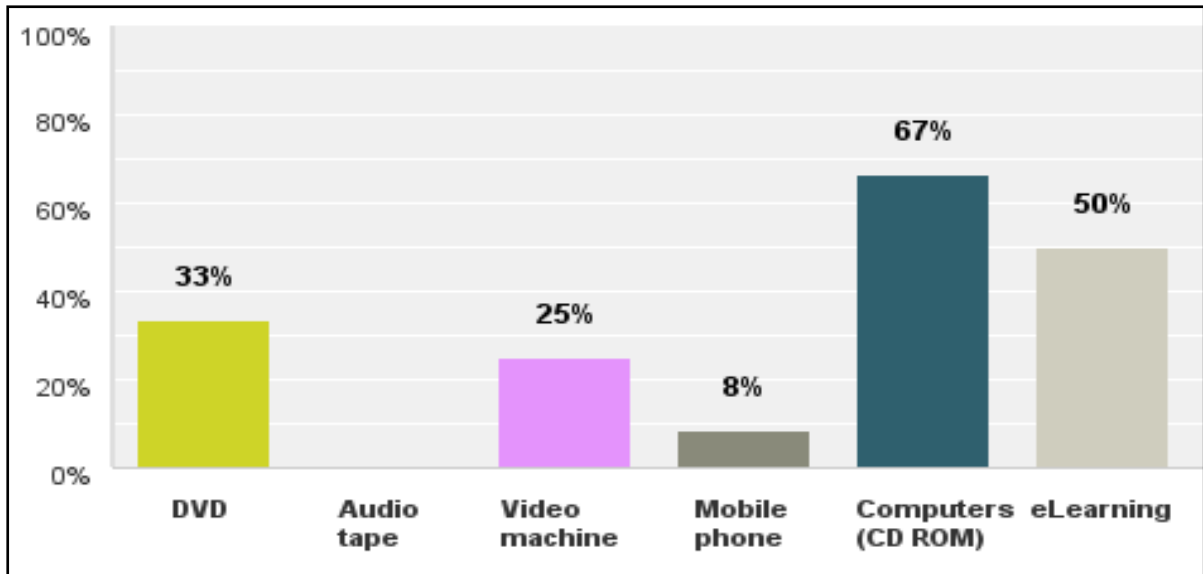


Figure 21a: Teaching methods preferred

Figures 21a above and 21b below show results from the question on the teaching methods the academics prefer and TEL facilities that they use for their teaching respectively. Academics, in the two questions, were allowed to tick as many relevant boxes as they wished. Responding to these two questions, figures 21a and b point out that although the majority of the academics (67%) indicated that they are using CDs to teach their students, 100% of the academics indicated that they prefer class discussion whereby they facilitate learning experience and 92% prefer to lecture using PowerPoint presentations. It is also interesting to note that a significant minority, contributing 17% of the academics, point out that they are using chalk-and-talk lecturing methods. It is also noteworthy, according to figure 21a above, that a number of academics, contributing an average of 31%, show that they are using some form of TEL in three formats: asynchronously, synchronously and in a blended format.



**Figure 21b: TEL facilities used in learning and teaching**

According to figure 21b depicted above, and as indicated in figure 21a in which academics indicate that they do use TEL as a preferred method of teaching, they indicate that they are using the majority of TEL components listed except for one. The most-used components, apart from CDs, are e-Learning, DVD and video machine, while the least-used component is a mobile phone contributing 8%. As shown in figure 21b above, no academics indicated that they are using audio tapes in their teaching. Figure 21b depicts that although the academics are using different components of TEL, they do not use audio tapes and the figure also depicts that mobile phones are less preferred than other devices.

Table 6: Responses from lecturers on training and resources

Answer Yes or No		
Answer Options	How reliable is your university's internet services?	
	Very reliable	Not reliable
<b>Do you have a computer in your office?</b>		
Yes	86%	100%
No	14%	0%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>
<b>Have you been trained to use e-Learning techniques?</b>		
Yes	71%	100%
No	29%	0%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>
<b>If trained, Do you think the training you received is adequate?</b>		
Yes	80%	0%
No	20%	100%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>
<b>Do you have your own course/module site?</b>		
Yes	57%	60%
No	43%	40%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>
<b>Do you get necessary support with regard to e-Learning?</b>		
Yes	57%	20%
No	43%	80%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>
<b>Do you have access to e-Learning resources and facilities at home?</b>		
Yes	57%	40%
No	43%	60%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>
<b>Do you have access to e-Learning resources and facilities work?</b>		
Yes	67%	100%
No	33%	0%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>
<b>Do you have a unit that deals with e-Learning at your institution?</b>		
Yes	71%	80%
No	29%	20%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>
<b>Are you aware of any e-Learning policy of your institution?</b>		
Yes	14%	0%
No	86%	100%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>

Table 6 above looks at nine “yes” and “no” questions asked of the lecturers. The results of the nine analysed and interpreted questions are presented in this section. The questions asked are based on the reliability of the Internet at Medunsa. The results are presented question by question.

The responses are grouped into two groups (i.e. those who perceive the Internet to be very reliable being group 1 and those who feel that the Internet is not reliable as group 2).

The first question asked of the academics was whether they have computers in their offices. Even though the majority of the academics (group 1 = 86% and group 2 = 100%) as per table 6 have computers in their offices, it is still a concern to learn that there are those who have no computers in their offices. Although the percentage of the academics may be low at 14%, this should not be happening in this era because computers are an integral part of teaching and learning. It is also of concern to note that the 14% who claim not to have computers in their offices are those who feel that the Internet at their campus is reliable.

The second question asked was if academics had been trained to use TEL technique. A vast majority (group 1 = 71% and group 2 = 100%) of the academics agreed that they had been trained to use technology to enhance their teaching. Twenty-nine percent (29%) of group 1 academics state that they are not trained to use TEL as a tool that supports teaching. This might be due to them being recently appointed or at the time they completed the questionnaire had not yet been trained. After training, a follow-up question was asked to find out from those who received training if the training was adequate. There is a significant variation between group 1 and 2 academics. 80% of group 1 academics perceived the training to be adequate, and on the other hand, 100% of group 2 academics and 20% of group 1 academics found the training to be inadequate.

In answering the fourth question that states: “Do you have your own course/module site?” the majority of academics who indicated that they do have module/course site contributing includes 60% from group 2 and 57% from group 1. Forty-three percent (43%) and 40% from group 1 and 2 respectively indicated that they do not have course/module sites. The preceding statement means that the stated percentages do not use the university’s LMS as one of the components of technology that enhances their own teaching.

Corresponding to the results in table 4b, stating that they have never received support on e-Learning on their campus, table 6 depicts that 80% of the academics from group 2 do not get the necessary support whereas only 20% said they do get support. With regard to group 1, there is an insignificant difference between the academics who said they do get support on e-Learning matters and those who indicated that they do not get support, contributing 57% and 43% respectively.

Without support on using the technologies, the academics may lose interest and not be able to fully use the technologies in their teaching.

In terms of question six and seven that looked at accessibility to e-Learning resources and facilities, the following findings are presented. In answering question six that states: “Do you have access to e-Learning resources and facilities at home?” the majority of group 2 academics (60%) indicated that they do not have access to e-Learning facilities and resources at home whereas 40% of the academics stated that they do have access at home. With reference to group 1, there is a slight difference in percentages of those with access to facilities and resources and those without. Fifty-seven percent (57%) of the academics indicated that they do have access to facilities and resources at home and 43% stated that they do not have access. On the other hand, the same question was asked in question 7, seeking to find accessibility at their work station. All academics (100%) in group 2 indicated that they have access to facilities and resource at work as in group 2 where 67% of the academics claimed the same. Only 33% of group 1 academics indicated that they do not have access to facilities and resources at work.

Responding to question eight that sought to find out if there is a unit that deals with e-Learning at Medunsa, an overwhelming majority of the academics from both group 1 and 2 (71% and 80% respectively) pointed out that there is a unit that specifically deals with e-Learning matters. A small percentage (29% and 20%) of groups 1 and 2 portrays a lack of knowledge of the TEL unit at the university.

In answering the ninth question that seeks clarity on the academics’ knowledge of the policy on e-Learning, the findings show that few of the academics (14%) stated that they are aware of the Institutional eLearning policy available at the university. A sizeable number of academics, contributing 86% and 100% of group 1 and group 2 respectively, are not aware or have knowledge of the policy. This means that most of the academics are not aware of the institutional e-Learning policy that is available for all lecturers and e-Learning end-users.

### **5.3.1.2 Questionnaire responses from students**

The researcher prepared two formats of questionnaires for students at the Medunsa campus of UL to respond to and the students were at liberty to choose if they respond to a paper-based questionnaire or an online questionnaire developed through Survey Monkey. The paper-based completed questionnaires were captured onto Survey Monkey through the assistance of data

capturers. A total of 266 questionnaires were captured onto the programme. Table 7 below depicts the percentage of respondents who agreed or disagreed to complete the questionnaire.

**Table 7: Consent**

<b>Responses</b>	<b>F</b>	<b>%</b>
Agree	265	99.6
Disagree to online questionnaire	1	0.4
<b>Total</b>	<b>266</b>	<b>100</b>

The students who disagreed to the online questionnaire did not complete the questionnaire; they exited the webpage and those who disagreed to complete the paper-based questionnaire were excused from completing it. According to table 7, it is recorded that 265 students indicated that they agreed to complete the questionnaire and only one online respondent (it excludes the paper-based respondents) declined to complete the questionnaire. Although 99.6% of the students indicated their interest in completing the questionnaire, 38 students contributing 15%, who agreed to complete the questionnaire, did not actually complete the questionnaire. Only 85% of the students completed the questionnaire. This means that the results presented in this section are based on 227 students.

#### **5.3.1.2.1 Biographical and demographic data**

The results of the biographical and demographic data are presented in this section with the aim of determining if the profile of the students (gender, age and province) has an impact on the implementation of TEL at Medunsa.

**Table 8: Students' profiles: Gender, Age and Province**

Gender	Age	Provinces										Total	
		EC	FS	GP	KZN	LP	MP	NW	NC	WC	NoSA	F	%
Female	16 – 21	0	0	28	11	54	20	6	0	0	3	122	54
	22 – 27	0	0	10	3	8	4	1	0	0	2	28	12
	28 above	0	0	0	0	0	0	0	0	0	0	0	0
Male	16 – 21	1	1	15	2	31	3	3	1	0	0	57	25
	22 – 27	0	1	4	2	6	1	0	0	0	2	16	7
	28 above	0	0	0	0	1	0	0	0	1	0	2	1
Homosexual	16 – 21	1	0	0	0	1	0	0	0	0	0	2	1
	22 – 27	0	0	0	0	0	0	0	0	0	0	0	0
	28 above	0	0	0	0	0	0	0	0	0	0	0	0
Total	F	2	2	57	18	101	28	10	1	1	7	227	100
	%	1	1	25	8	45	12	4	0.5	0.5	3		

**Keys:** **EC** = Eastern Cape; **FS** = Free State; **GP** = Gauteng; **KZN** = Kwa Zulu Natal; **LP** = Limpopo; **MP** = Mpumalanga; **NW** = North West; **NC** = Northern Cape; **WC** = Western Cape; **NoSA** = Non-South Africans

**\*NB.** The question on gender had three options; male, female and other. Two (2) of the students selected other and specified that they are homosexuals, hence table 8 above has homosexual as a category

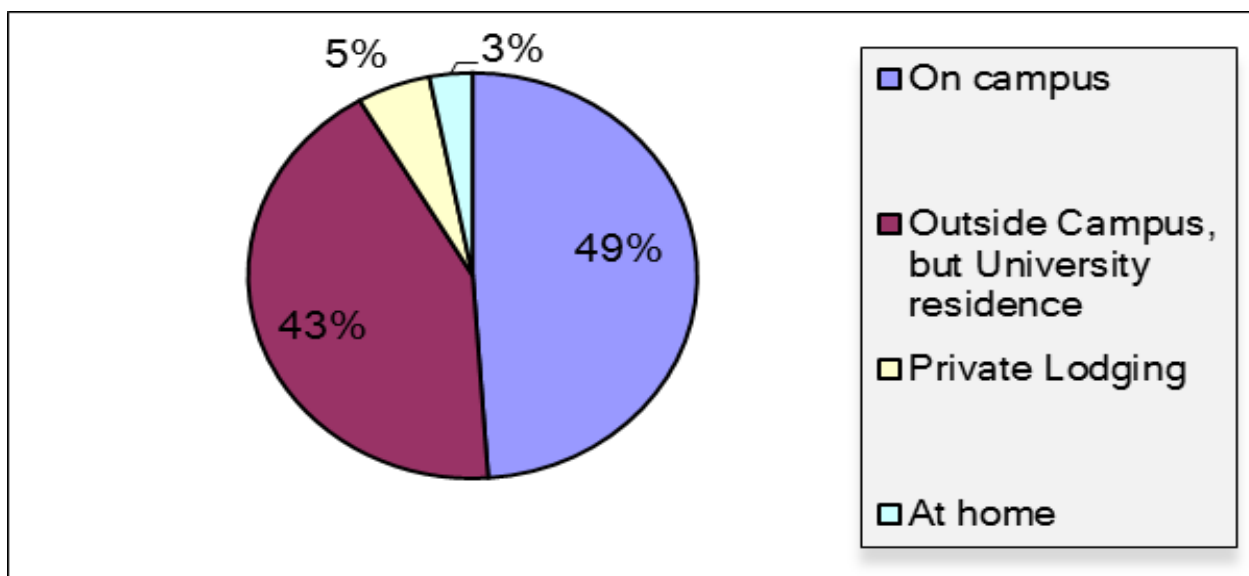
In table 8, cross tabulation depicts the biographical and demographic data of students seeking to find a relationship between gender, age and the provinces from which they come, with the aim to relate the findings of this question to the implementation of TEL.

The majority of students across all provinces, according to table 8, are female, contributing 66% (54% aged between 16 and 21, and 12% agSMAN\_22 and 27). Male students contribute 32% and homosexuals only 2%. A noteworthy majority of the respondents are from Limpopo Province, which is mainly a rural province, followed by Gauteng Province (25%), Mpumalanga Province (12%), Kwa-Zulu Natal Province (8%), and North West Province (4%). The data shows that although Medunsa is situated in Gauteng Province, most of the students are not from GP but they are from Limpopo province (LP). Interestingly, Medunsa has a higher population (3%) of foreign students than other South African provinces such as Eastern Cape and Free State (1%) and Northern Cape and Western Cape (0.5%). The majority of the students (80%) are aged between 16 and 21 and those who are aged between 22 and 27 contribute 19%, whereas 1% is a respondent who is aged above 28 years. Clearly the majority of Medunsa students are young, aged in their 20s. Evidently it is correct to conclude that, according to table 8, the majority of students at Medunsa are female, they come from Limpopo Province and 99% of the students are aged between 16 and 27.

**Table 9: Non-South African students**

Country of Origin	F	%
Namibia	1	14
Nigeria	1	14
Swaziland	4	58
Zimbabwe	1	14
<b>Total</b>	<b>7</b>	<b>100</b>

Three percent (3%) of students who are non-South Africans according to table 8, are from four countries indicated in table 9 above. Foreign students who responded to the questionnaire are from the African continent with Swaziland in the lead, at 58%. The same as the findings in table 8, showing that most of the students are from Limpopo Province, data in table 8 affirms that the majority of the students who are studying at Medunsa are from rural areas; Africa is also mostly rural.



**Figure 22: Students' residence**

According to figure 21 above, the majority (92%) of the students reside at the university residences with 49% of the students residing on campus and 43% residing at the university residences that are outside the campus. Only 8% of the students are residing either at home or are in private lodgings. The pie chart above depicts that the university's residences, be they on campus or outside campus, accommodate most of the students; not even a quarter of students are residing outside a university residence. Perhaps the low figures of students who do not reside at a university residence are due to the low enrolment of students from Gauteng Province where Medunsa is located and the North West Province which is a neighbouring province, where students can still travel from their homes.

**Table 10: Programme of study**

School	Programme of study	F	%
<b>Pre-Clin and Path</b>	BSC	79	35
<b>Oral Health</b>	Dental Science	4	2
<b>Health Care Sciences</b>	Human Nutrition and Dietetics	14	6
	Occupational Therapy	28	12
	Pharmacy	8	4
	Physiotherapy	35	15
	SLPA	15	7
<b>Medicine</b>	Radiography	25	11
	MBCbB	19	8
<b>Total</b>		<b>227</b>	<b>100</b>

The findings in Table 10 above indicate the composition of the students according to the programme and schools at which they are registered. The majority (44%) of the students are from the School of Health Care Sciences (SHCS) which comprises Human Nutrition and Dietetics, Occupational Therapy, Pharmacy, Physiotherapy and Speech, Language Pathology and Audiology (SLPA). The SHCS is followed by BSc (35%) students in the School of Pre-clinical and Pathology. The third largest group is from the School of Medicine with 19%. The smallest number of students who responded to the questionnaire is from the School of Oral Health contributing 2%.

#### 5.3.1.2.2 Access to TEL facilities and resources

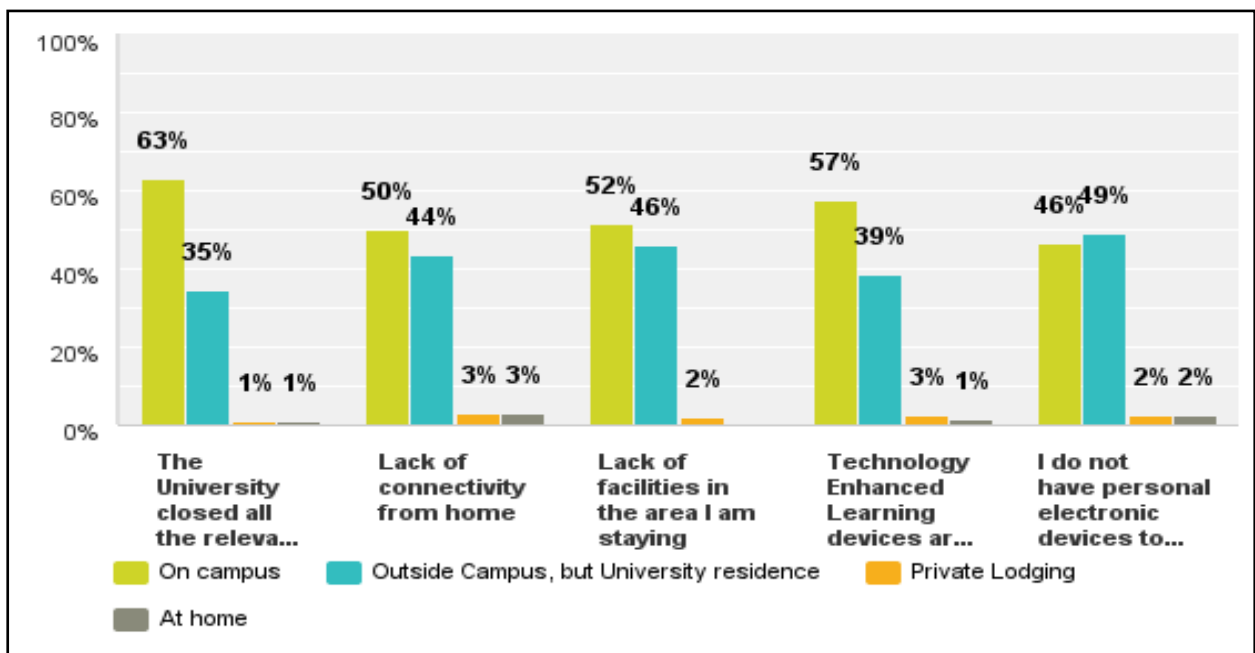
Access to TEL resources and facilities is one of the most important aspects that should be considered. If there is a lack of access or the access is inadequate, this may cause difficulties in the implementation of TEL in any given institution of learning. This section looks at whether the students do have access to these resources and facilities and how reliable is this access. If they do have access, the question of where they access the resources and facilities is asked.

**Table 11: Access to TEL facilities**

	<b>F</b>	<b>%</b>
<b>On campus</b>	160	71
<b>At home</b>	57	25
<b>Internet café</b>	103	45
<b>My smartphone</b>	140	62
<b>My electronic device as a tool to enhance learning</b>	138	60

The students were asked where they access their TEL facilities and resources. They were allowed to choose as many suitable responses as possible. The data above indicates that the majority (71%) of the students access their TEL facility on campus. Sixty-two percent (62%) indicated that they use smartphones to access TEL. In addition to smartphones, 60% indicated that they access the university's LMS through their own electronic device. Apart from their own devices and the campus, students indicated that they access TEL facilities at the Internet café (45%) and some (25%) at home. According to the table above, the conclusion that can be safely drawn is that students at Medunsa generally do have access to TEL facilities and resources in most places, to start with at the university and they can also get access at home, the Internet café, using their own e-devices which include smartphones.

Although the majority of students, according to table 11, indicated that they have access through different media, not all of the students have access to TEL resources. Figure 23 addresses the reason why some of these students do not have access to TEL resources and facilities in relation to where the students reside while they are at university. This figure responds to the two questions asked, which are: “If you do not have access to TEL facilities and resources what might be the problem?” and “While at the university, where do you stay?” In the case of the first question, respondents were allowed to mark as many problems as possible. The results are presented as follows.



**Figure 23: Reasons for no access to TEL resources**

Even though the students have access to internet facilities, figure 23 shows that the majority (63%) of the students who reside on campus state that they are unable to access the TEL resources whenever they need to, because the university has closed some of the relevant sites. The majority (50%) of the students who claim not have access to TEL facilities, indicated that there are no relevant facilities in the area where they are staying. Fifty-seven percent (57%) of those students, who reside on campus also point out that electronic devices that are needed to be used in enhancing their learning are too expensive for them to buy. Probably, this is due to their social background. Through interaction with students, the researcher noted that most of them come from a rural background with the majority being poverty stricken. Hence, 46% indicated that they do not have personal electronic devices to access TEL.

Looking at the students who are residing at home or in private lodging, in figure 23, it is learnt that insignificant, lesser percentages have access to TEL facilities that range between 1% and 3%. This may mean that most of the students who reside at home or in private lodgings have no access to TEL resources and facilities.

**Table 12: Reliability of the connection**

<b>Responses</b>	<b>F</b>	<b>%</b>
<b>Not reliable</b>	142	63
<b>Not sure</b>	44	19
<b>Very reliable</b>	41	18
<b>Total</b>	<b>227</b>	<b>100</b>

Students were asked the same question as lecturers regarding the reliability of the Internet connection. Table 12 gives a summary of the students' responses to this question. The majority (63%) of the students feel that the Internet connection is not reliable. Only 18% of the students indicated that the connection is reliable, whereas a slightly higher percentage (19%) of students is not sure if the Internet connection is reliable or not. Judging from the results of the above table, the conclusion here would be the students find the Internet connection, which is useful for online learning as a component of TEL, to be unreliable. If the Internet connection is unreliable, then it poses a serious threat to the implementation of TEL because firstly the LMS and other online tools are reliant on the connectivity.

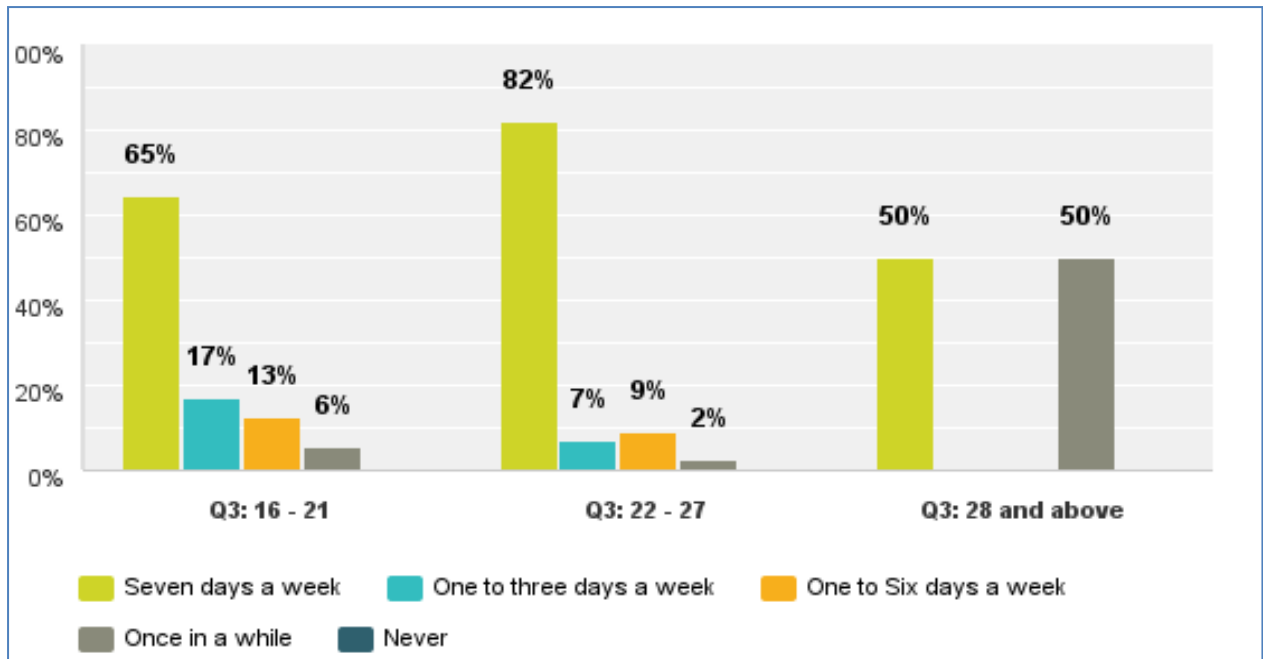
#### **5.3.1.2.3 Use of TEL technique by students**

Table 13 below displays the results on the importance of using TEL forwarded by students. Students were advised to pick all the reasons that contribute to encouraging them to use TEL. The question asked was: "e-Learning is important because it helps me to...".

**Table 13: Students' reasons for use of TEL**

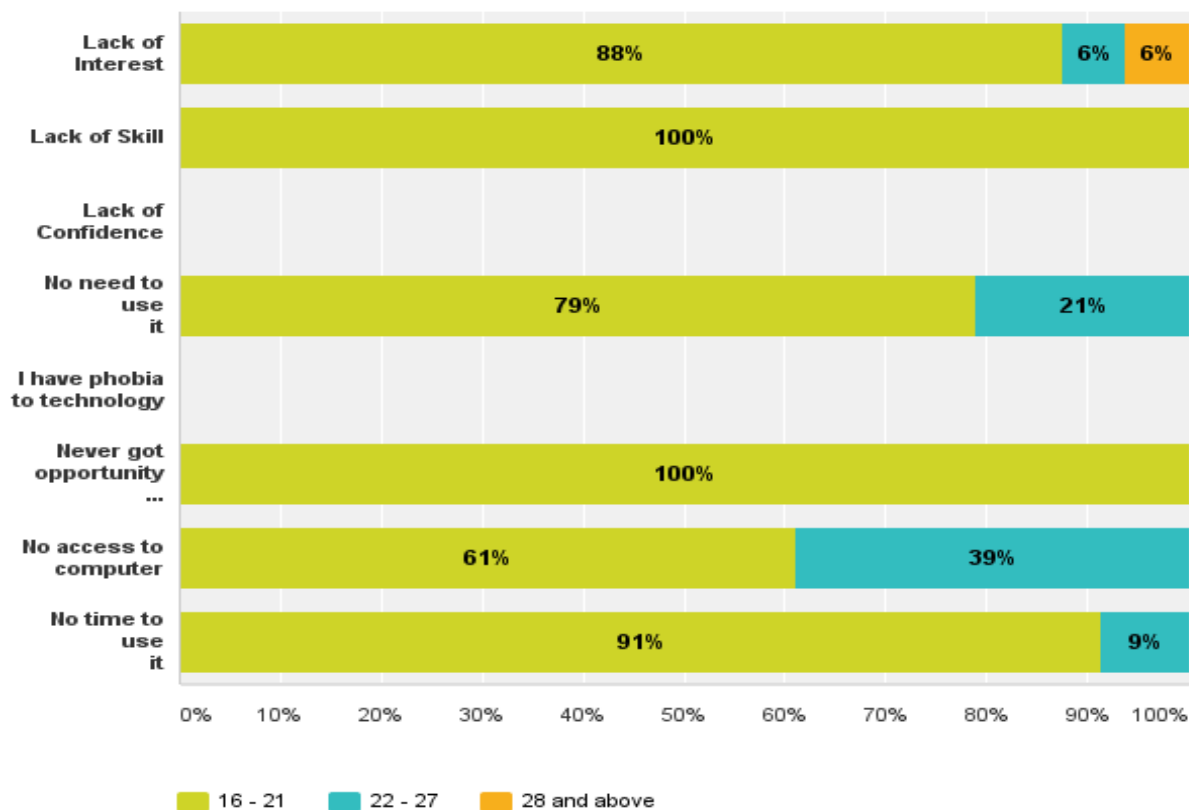
<b>Answer options</b>	<b>F</b>	<b>%</b>
<b>Learn at my own pace</b>	130	57%
<b>Learn on my own</b>	119	52%
<b>Learn at my own place</b>	112	49%
<b>Have access to learning at any time</b>	132	58%
<b>Have interaction with other learners</b>	86	38%
<b>Have access to more information</b>	138	61%
<b>Have access to my instructors at any time</b>	59	26%

The most common reason selected, is that the students have access to more information when using TEL, contributing 61%. In order of preference apart from the majority, based on the number of respondents who picked reasons for using TEL, students responded as follows: students feel they have access to learning at any time (58%); learn at their own pace (57%); learn on their own (52%); and, learn at home (49%). These four reasons were advanced by students to be the most favourable on why they use technology to enhance their learning. The reasons stated by the students mean that they perceive TEL to be advantageous and they enjoy working independently in their own time and space without the limitation of four walls. There are other reasons that are listed by the students but that did not receive favourable attention. The reasons are: the students have interaction with other learners (38%) and have access to lecturers at any time (26%). Fortunately for the students at Medunsa, TEL affords them the opportunity to learn and study at their own pace, space, time and in the comfort of their homes. The technology is also advantageous to the students because they have an opportunity to access their lecturers at any time, can go back to lecture notes and access other sites for information at any time and they can collaborate with their classmates at any time.



**Figure 24: Frequency of computer use by age**

Figure 24 above shows the frequency in the use of computers according to students' age categories. Analysing age category 16–21, the majority (65%) of the respondents indicated that they use computers seven days a week, 17% use computers one to three days in a week, 13% one to six days a week and only 6% of the respondents stated that they use computers once in a while. In the age category 22–27, the majority (82%) of the respondents claim to be using computers seven days a week and there is a huge gap between those who indicated that they use computers seven days a week and those who stipulated that they use computers one to six days a week (9%); 7% of the respondents indicated that they use computers one to three days a week and only 2% use computers once in a while. The age category 28 and above, which is the smallest population, uses computers seven days a week (50%) and the other half of the population (50%) use computers once in a while. The data in table 24 depicts that an average of 66% of the students across all age categories use computers every day of their student life, with the 22–27 year-olds in the majority. The researcher would have expected a higher percentage of users from the youngest group because they are regarded as technology natives or digital natives, as designated by Prensky (2001). Although 19% of the respondents across all age categories indicated that they use computers once in a while, there are no students who indicated that they never use computers. This means that even though there are still those students who use computers only once in a while, all students at least do use computers.



**Figure 25: Reasons for not using TEL**

Even though there are no students who indicated that they do not use computers, there are those students who have not used technology to enhance their learning, according to figure 25 above. The figure presents data regarding the relationship between the age of the students and the reason for not using TEL. The figure above shows that 88% of the students who indicated that they do not have an interest in using technology to enhance learning are aged between 16 and 21 and the remaining 12% are those who are agSMAN\_22 and above (6% agSMAN\_22–27 and the other 6% aged above 28). Interestingly, when looking at the skill of using TEL, 100% of the students who stated that they do not have skill to use technology to enhance learning are those who are aged between 16 years and 21. Seemingly, the students who are 22 and above do have skills in using technology. The figure also shows that students who find no need to use technology in enhancing learning are those who are aged between 16 and 27, with those who are agSMAN\_16 and 21 in the majority (79%) and those who are 22–27 (21%). This is an unexpected finding; normally younger people are those who would want to use technology, as supported by Prensky (2001) and Wang et al. (2009). This may be due to the fact that the majority of these young students are from a rural province, Limpopo (cf. table 8), where students have not been exposed to technology. Lack of use of TEL by academics, may be one of the contributing factor that causes

students' lack of interest in the use of TEL (cf. figure 21a & b; table 4b). The students between 16 and 21 are the only ones (100%) who indicated that they never had the opportunity to use technology to enhance learning anywhere.

None of the students indicated “technophobia” as being one of the reasons why they do not use TEL. This means that the students are not technophobic nor does this reflect a lack of confidence. The only reason students are not using technology to enhance learning if summarised would be lack of exposure to such technologies leading to lack of understanding on how the technologies work.

#### 5.3.1.2.4 Training and level of literacy and interest

In this section, the study looks at the training of students in the use of computers and other TEL approaches. It is imperative for the end-users of TEL to be trained on basic computer skills to enable them to use the TEL resources and facilities with ease. The section starts by answering the question: “Who taught you to use computers?” The question seeks to find out if the students have background knowledge of using computers or did they come to the institution without the knowledge of computers.

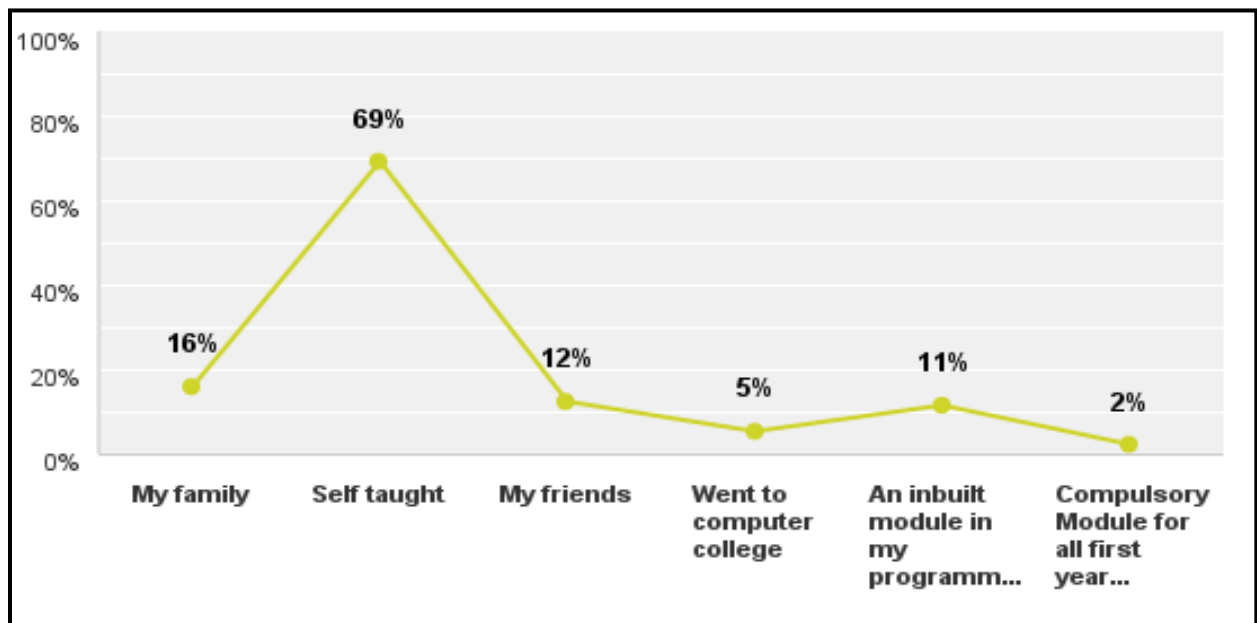
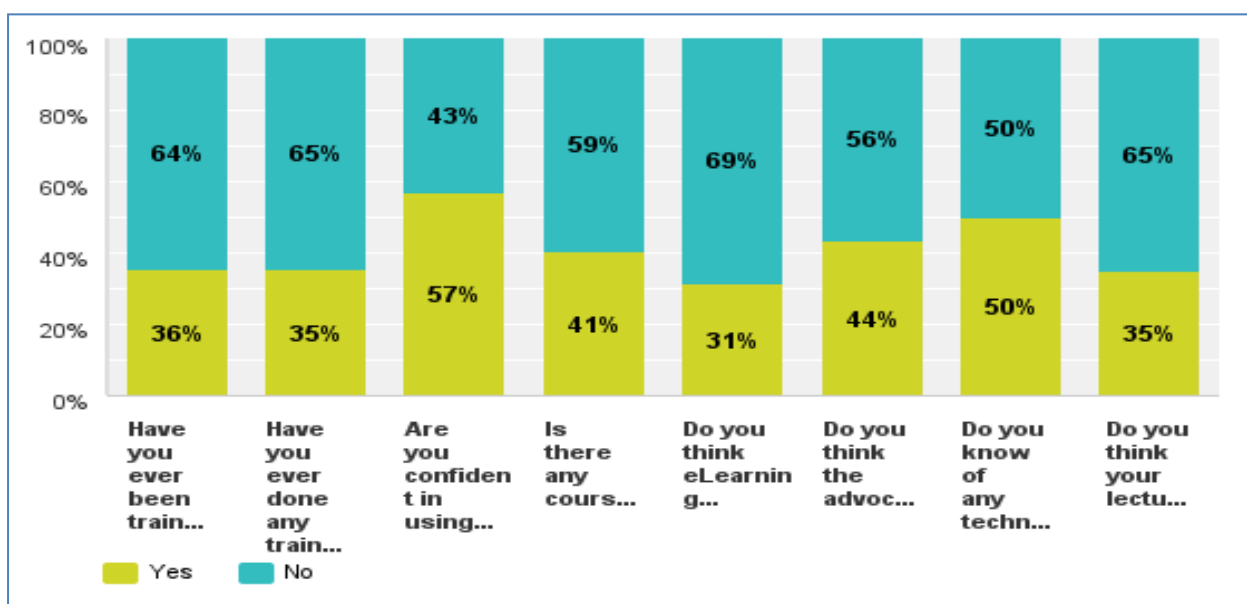


Figure 26: Training in basic computer literacy

The linear graph depicted by figure 26 above shows the background knowledge of students on using computers. Sixty-nine percent (69%) of the students taught themselves to use computers.

Probably they learnt computers by trial and error. There is a significant difference between the self-taught and other sources of training. This is depicted by the gap between students who claim that they taught themselves computers and the second largest percentage (16%) who are students who indicated that they were taught computers by their family and 12% of the respondents who said they were taught by their friends. The majority of students in this question do not have formal academic training in basic computer skills; this is evidently depicted by 18% of the students where only 2% claim that basic computer skills is a compulsory module for all first-year students, 5% stated that they went to computer college and 11% indicated that basic computer literacy is an inbuilt module in their programme of study.



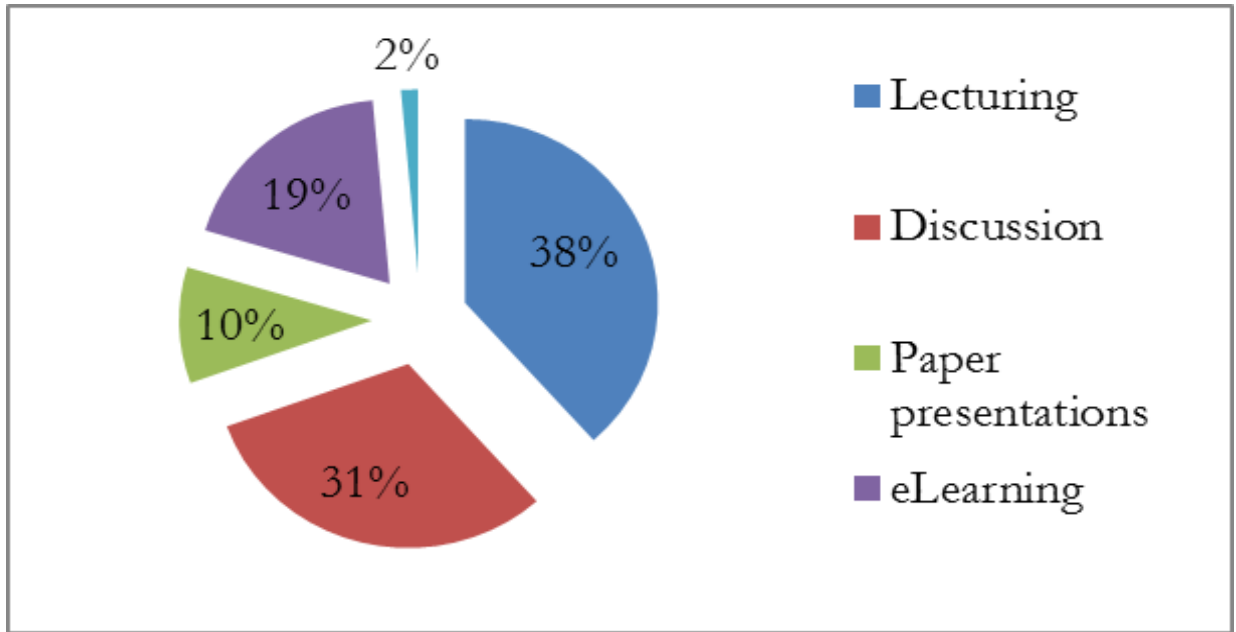
**Figure 27: Students' general responses**

Figure 27 above, depicts the “yes” and “no” results. This question has eight statements that students could agree or disagree with using the yes and no answers. Responding to the first question that sought to find out if the students have been trained on using the e-Learning technique, the majority (64%) of the students responded “no” to the question. This means that the students had never been trained in using TEL and 36% indicated that they had not been trained in the use of TEL. Finding out if the students are trained in the general use of the Internet, the results depict that 65% of the students have not been trained; only 35% claim that they are trained. Even though the majority of the students are not trained in either the use of TEL or the Internet, in general, 57% of the students indicated that they are confident in using TEL and 43% said they are not confident. Attempting to respond to the question: “Is there any course or module in your studies that is offered through e-Learning?”, only 41% of the students replied ‘yes’ and the rest

(59%) of the students said “no”. This means that the majority of modules/subjects are not offered through the e-Learning system. In answering the question: “Do you think e-Learning techniques are used effectively in your institution?”, the majority (69%) of students alleged no and only 31% replied in the affirmative. It is of concern that the majority (56%) of the students responded “no” to the question: “Do you think the advocacy of this technique is adequate?” and only 44% answered “yes”. It shows that the marketing of the use of TEL is inadequate. Figure 26 above depicts that half (50%) of the students do not know anybody on campus who could help with technical matters in terms of TEL and the other half stated that they know an assigned technician who could help. In response to the question that sought the students’ perception of their lecturers with regard to the use of TEL, the majority 65% of the respondents claim that their lecturers cannot use TEL. The results mean that the students are of the view that their lecturers are not up-to-date with the TEL technique. Studying figure 26 above, it is evident that from the students’ perspective, TEL is still a challenge.

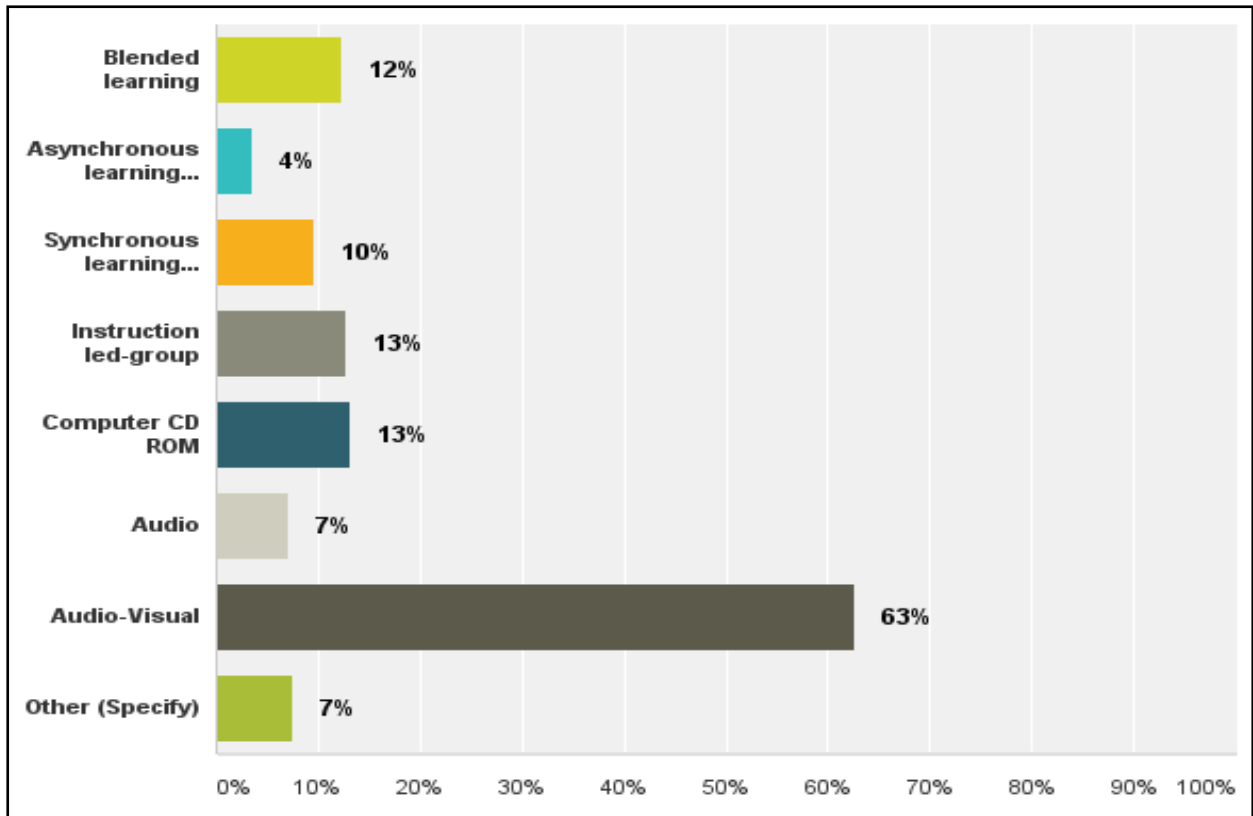
#### **5.3.1.2.5 Preferred learning and teaching mode**

Different students at a learning institution possess different learning styles, thus they prefer a particular teaching method that complements their own learning style. This section deals with the preferences of students in terms of learning and teaching; and also their preferences with regard to the use of TEL. The results of the students’ preferences are analysed and interpreted in two figures (figure 27 and figure 28), which answer the two questions that were asked of the students which are: “Which learning and teaching mode do you prefer?” and “What method of e-Learning do you prefer?” The two questions were followed up by questions that sought for motivation to clarify their choices. Students were allowed to choose as many preferences as they liked and that suited their needs.



**Figure 28: Preference of learning and teaching methods**

Regarding the students' preference of learning and teaching methods, the pie chart (figure 28) depicts the students' choices. With no significant margin, the majority of the students show that they prefer lecturing and discussions, contributing 38% and 31% respectively. Only 19% of the respondents indicated that they prefer TEL. Students who prefer a paper presentation represent 10% of the total population of the respondents while 2% indicate that they prefer other methods although they did not specify which ones. Based on the results presented on the pie chart above (Figure 28), the use of technology to enhance students' learning is not the most preferred. Students prefer the teaching methods used by lecturers before the development of technological systems which are used to enhance learning and teaching. These methods contribute an overall percentage of 79 and include lecturing, class discussions and paper presentations in this order of preference.



**Figure 29: Preference of TEL methods**

Figure 29 above, gives an account of the respondents who specified that they prefer TEL as the learning and teaching methods, with the significant majority (63%) of the respondents stating that they prefer audio-visual over other TEL components. The instructor-led group and computer CD-Rom take second place (13%) in students' preferences. Blended learning is one of the least preferred components (12%) of TEL. With regard to the online learning component, 10% of the respondents prefer synchronous learning whereas 4% stated that they prefer asynchronous learning. Seven percent (7%) of the respondents indicated that they prefer just audio as a means of lesson delivery. Clearly from the bar graph above, students are less interested in using most of the TEL components that are prominent in the 21<sup>st</sup> century. Interestingly, the students' and the lecturers' (cf. 21a & 21b) preferences differ greatly. Students prefer the audio-visual medium whereas lecturers prefer the lecture methods using PowerPoint and class discussions.

### 5.1.1 Qualitative data

This section presents and interprets data collected through the interviews, observation schedule and document analysis. One set of the interview schedule was developed and administered to all the interviewees. The purpose of having the same schedule for all interviewees was to triangulate, and confirm whether all stakeholders have the same knowledge regarding TEL. Interviews were

conducted with 5 senior managers and 1 specialist. Although the same schedule was used for all interviewees, the five interviews conducted varied in terms of time taken based on the understanding of the questions by the interviewees and the follow-up questions, seeking clarity from the interviewees. The duration of the interviews ranged between 54 minutes and 54 seconds to 01 hour, 20 minutes and 48 seconds. The actual responses of the respondents are captured verbatim in italics and the respondents are represented in this study by their official portfolio. In this study, the 5 senior managers were referred to as SMAN\_1 to SMAN\_5. After thorough study of the transcription of the recordings of the qualitative data, the analysis is presented under the following themes:

1. Biographic data;
2. Perceptions and expectations in the implementation of TEL;
3. Access and resources;
4. Factors inhibiting the implementation of TEL;
5. Strategies to implement TEL;
6. Policies and operations.

### **5.3.1.3 Interview responses**

#### **5.3.1.3.1 Biographical data**

Medunsa, as a single faculty campus of UL had an Executive Dean, one specialist, a Director (ICT) and acting Director CAE. The mentioned personnel were interviewed. Although there is one CAE Director and one Executive Dean (ED), the researcher decided to interview two of each, a focus interview with the CAE acting Directors (one at Medunsa and to a sister campus). The reason for this was that the acting CAE Director had only recently been appointed to the position in a managerial position and since the CAE departments on both campuses had been working together, the researcher considered that they would provide rich data. The Executive Dean of the Faculty of Health Sciences was interviewed before he left the employment of the university. Following his suspension, an acting ED was appointed, thus the researcher decided to interview the acting ED in addition to the first interview with the suspended ED. The data from the two interviews was used in this study. It is also worth noting that the SMAN\_5 had been appointed only four months prior to the interview and had had only four months service at Medunsa.

#### **5.3.1.3.2 Perception and expectation in the implementation of TEL**

The researcher sought to find out from the respondents if they knew and understood the concept of TEL. To get clarity on this matter, five questions were asked under sub-themes. This means

that the theme was further divided into four sub-themes, namely: understanding of TEL; quality of teaching and learning using TEL; future of TEL; and pros and cons of TEL. The responses to these questions from all the interviewees are analysed, interpreted and presented as a whole under this theme.

#### **5.3.1.3.3 Stakeholder understanding of TEL**

Generally, the six interviewees demonstrated a similar understanding of TEL. The question on the interviewee's understanding of what constitutes TEL is a crucial one and intended to clarify the common understanding of the interviewer and the interviewee. Interesting responses were made, as follows:

*TEL to me refers to the future landscape, students' notes taking times are gone, and students are learning at comfortable times, students have reference electronically (SMAN\_1).*

SMAN\_1 sees TEL as a tool for the future. This may be interpreted to mean that TEL is not relevant in this era but rather is a tool that needs to be prepared for the future. What the interviewee also mentions of utmost importance regarding TEL is that learning takes place according to the wishes of students who can find the required information electronically via the Internet and other electronic devices.

*E-Learning as I understand it in the context of this campus is seen as a facilitator of learning which is open or is available to the lecturers and the students as a convenient way to do to teaching outside the classroom. Electronic platforms can assist in facilitating learning to the extent that all teaching with knowledge transfer may not happen within the classroom yet there will be more to impart to students; they see that as additional medium (SMAN\_2).*

From the understanding of SMAN\_2, TEL is not a policy that can be enforced on the stakeholders at Medunsa, because it is open to whoever wants to use it to facilitate learning and teaching, to conveniently take teaching outside the classroom. In his understanding of TEL, he depicted TEL as an additional resource that lecturers and students can use conveniently to collaborate outside the classroom.

*TEL is where lecturers have to use technology to enhance their teaching; it can be giving assignments, it can be even sharing lecture notes with the students, it can be even giving tests to the students through the use of technology or even interaction with a student on one-on-one basis using emails, using technology when they want to ask something from the lecturer (SMAN\_3).*

Although SMAN\_3 made note of the fact that lecturers can interact one-on-one with the students using technology, her understanding of TEL is singly-focused, leans more toward using technology for teaching only, unlike the executive directors who see TEL as a tool that can benefit both students and lecturers. The understanding here leads us to conclude that TEL is more beneficial to academics than to students.

*I was introduced to TEL at the Medunsa campus where we are using Blackboard as the learning management system, to send announcements, send emails, do blogs, do class presentations and some notes that students can access wherever they are (SMAN\_4).*

This interviewee joined the university with no knowledge of TEL and clearly the interviewee was introduced to one component of TEL not the entire TEL technique. Her understanding of TEL is limited to the use of LMS as one technique and shows that that is the focus at Medunsa. The understanding, adding to that of the preceding colleague was expressed, i.e. TEL is mainly used for teaching and not much for learning. Its use is from the lecturer to the students and not a two-way process.

*TEL is the use of technology to enhance education. We need to conduct research by visiting other institutions to benchmark (specialist).*

In addition to the general understanding of TEL by the interviewees, the specialist at Medunsa feels that the university needs to benchmark with other institutions to see how they are using TEL to benefit the university community.

Notably, all the interviewees seem to have a similar understanding of the concept TEL although the definition of TEL by the majority of interviewees is mainly inclined toward online learning with specific reference to LMS. One benefit of TEL that comes through more often is learning comfortably outside the classroom.

#### 5.3.1.3.4 Learning management system (LMS)

In unison, the interviewees above indicated that they are using Bb as their LMS as an official system. Some of the interviewees claimed that there are other TEL components used as learning and teaching platforms although they are not official.

A follow-up question was asked seeking to find out why the university opted for Bb as an official LMS whereas there are open source LMSs that are free. In response to this question, the specialist did not have an answer but does not envisage any problem if the university used open sources as an LMS.

#### 5.3.1.3.5 Other TEL component used

The EDs, the SMAN\_5 and the specialist made mention that the Department of Public Health under the School of Health Care Science is using a different TEL component (Amber.net) to enhance learning and teaching, this being the only department using a different official TEL component from the rest of the university community. This shows that there are two systems at the university concurrently running without communicating with each other. This is clearly shown in SMAN\_5's comments on the issue:

*We have the Department of Public Health using an online training which is using a system called amber net, which is a very good and effective system and it has been running for a long period of time. Now how do you synergise the two and making it one, even if you have got the multifaceted kind of system you are using? These are some of the things I say it talks to your readiness... that cannot be done by ICT but it can be done by the ED (SMAN\_5).*

The online platform the SMAN\_5 is referring to, used by the Department of Public Health, is a component of TEL and is licensed to the department. In addition to the afore-mentioned tool used by the Department of Public Health, SMAN\_1 also mentioned an online programme developed and used by the Department of Anatomy. According to the respondent, the programme has been developed by a member of academic staff in the department and is a tool that is used specifically for assessing students' learning. The data above depicts that apart from Bb as the official LMS, there are two other online systems that are used by the university, though these are departmental systems.

According to the Director, even though he feels it is not his prerogative, but rather that of the ED, it would be good sense to regroup all TEL components and house them under one umbrella based on the experiences of the Department of Public Health in their use of technology for learning and teaching and to equip the university community accordingly.

#### **5.3.1.3.6 Use of social networks to enhance learning**

When the interviewees were asked which other TEL components they use to enhance learning and teaching at Medunsa, they indicated Bb as the only official component of TEL. They also indicated that all the SNs that other lecturers use to communicate with their students regarding the modules, are now unavailable for both staff and students between 07h00 and 17h00 hours. SMAN\_1 was asked why the management and Senate had decided to close the SN sites during the day and his response was as follows:

*The management and Senate decided to close the SNs because they slow down the bandwidth on campus and affect the research and other valuable work done by the academics. Students go to the library to access SNs and chat with friends for most of the day (SMAN\_1).*

This was echoed by SMAN\_2:

*Unfortunately the broadband of the university's Internet is such that it is not able to carry Facebook or Skype or any other media because that has been a bone of contention. Many lecturers have complained to management that for them even for themselves they need this because these days they exchange documents via Skype; they are able to give students assignments and are able to have group discussion on Bb, but the university says the broadband is too low that it affects the core or even the email when students get onto this (SMAN\_2).*

The concern of the management, according to the two EDs, is that the resources are misused by the students though there is much use for the SN. The abuse of the SN disadvantages other important work that needs to be done by academics, for example, research. What comes out more as the main problem is that the broadband is low and it prevents academics from doing academic work while students are on other sites. Not only students are affected by this closure of the SN site, but also academics cannot use the sites to post students' notes, make announcements and facilitate group sessions. The concern of other respondents is that sometimes the SN closure continues well beyond 17h30. This was explicitly said by a respondent:

*It is difficult to access Facebook here at work during the day even at lunch time. They say they open at 17h00 but it is not so. One time I was working late and I waited until after 17h00 but they did not open it, so I am not sure when do they open it; so I doubt if they do open it (SMAN\_3).*

Clearly the university does not open the site on time as promised. The respondent also indicated that she approached the ICT to ask as to what time they open the sites and she was told that by 17h00, there are still many students on campus and the system cannot handle the numbers. The respondents also raised the fact that due to the closure of SN, they now use their own laptops and data bundles to access the SN sites to interact with students.

*The university closes some sites which are used by some lecturers and students to enhance their learning and teaching during the peak hour and open it after 17h00, however there are still some lecturers who use such sites to enhance their learning and teaching though it is not official to use it, especially after hours (SMAN\_4)*

The interviewee above claimed that the university decided to close all social networking sites, including Facebook, which was much used by some lecturers and students for their learning and teaching processes, and other sites during the day and they are opened in the evening when everyone else has gone home. Even though the SN is closed during the day, some lecturers and students still use sites such as Facebook to communicate with their students using private devices and even stay after work to access the site when the university opens it. The CAE Director made it categorically clear that although the university blocks its system to access SN, students still access it by phone. The university should consider opening it during the lunch break and also for lecturers to communicate with their students who, however, are frequently on the network.

*The impact I just feel that if for instance most of the students are on Facebook and we cannot go where they are, we miss out on any learning opportunity we can come out from that experience. We rather open it during lunch because even if we closed the SN students can access it through their cellular phones (SMAN\_4).*

One vital issue that the above respondent highlighted is that the students are always on SN, and regardless of the closure of the sites by the university, they use their personal devices to access the

SNs. It is therefore important for the lecturers to find them in their own environment and use their environment as learning experience. In addition to this notion, SMAN\_4 suggested that it would be a good idea to open the SN sites unlimitedly for academic staff as it will help them in their teaching and research. In addition to this notion, SMAN\_4 cited an incident to emphasise the importance of the SN. She shared her workshop experience, as follows:

*I remember when we were in an induction workshop, one lecturer asked the institutional SMAN\_5 to say you closed the SN sites and yet they help us in our teaching, for example, YouTube and Facebook. The answer was that if you really feel you want to use it come to our offices and we will open yours alone (SMAN\_3).*

The answer the institutional SMAN\_5 gave to the inductees at that particular workshop was also echoed by SMAN\_1 in his interview when he was asked what should a lecturer who uses SN to teach do if the sites are closed and the lecturer needs to teach. The answer from the SMAN\_1 was that the lecturer should write a strong motivation which should be tabled before the university management who would open it reluctantly. However, the SMAN\_5 at Medunsa has another opinion:

*I am of the personal opinion that we need to resource anyone with any tools that will make your life easier. If Facebook is going to be adding value, these things though they started as social media where people were just throwing ideas but you can see now it has built up, it has grown toward providing efficiency around the business model. Therefore I am saying: Why not? But we need to resource it, protect it so that it doesn't open up toward manipulation by any other person... SN is e-Learning (SMAN\_5).*

The SMAN\_5 suggests that the SN was closed for use on campus due to misinformation. He believes that although the SN was initially meant for social purposes, it is now used by most academics and students as a learning and teaching platform. Acknowledging that SN can be abused by users, he further suggested that there should be good security around the SN to curb the abuse of the platform. The ED and the Senate needed an ICT expert to advise on the use of SN for learning and teaching before they decided to close it. Adding to the viewpoint of the SMAN\_5, the specialist also shared the same sentiments, namely that the university should have consulted the ICT for advice before closing the sites. In short, the specialist stated:

*It is a bad move for the university to decide to close social media without even consulting with the stakeholders (specialist).*

When the university management decided to close the SN sites, they did not consult the users, but simply informed users that the sites would not be available for use during peak hours. The SMAN\_5, aware of the value of SNs in learning and teaching, is planning to reopen the sites which were closed.

### **5.3.1.3.7 Usefulness of TEL technique**

The respondents see the usefulness of TEL in teaching and learning, although the main concern is the skills of academics in using TEL and their general capacity:

*I can say they are quite useful if they are being utilised, but I doubt the staff members, some of them, to what extent they are familiar with the use of this technology. If you find one who cannot read his or her emails regularly, how do we expect such people to use social networks? (SMAN\_3)*

The interviewee above regards social networks as useful though she doubts the capability of academics. The respondent claimed that some academics cannot even use technology to read personal or global emails for their information; for such staff TEL is complicated. However, the second CAE Director stressed the importance of the use of SN for learning and teaching:

*Let me make an example of Twitter; Twitter I can follow people with the same interest as I. Let's say I am interested in Social Psychology ... and whatever they post I will follow and that will add to my knowledge. Social networks are not only about communication but meeting people. In a way I can say I can follow people who have been there in the system, who know how things work in the field and can advise though informally. It can be a mentoring of some sort done even if people are not aware that they are mentoring you. On Facebook we can create educational groups; most of our young people are always on Facebook (SMAN\_4).*

SMAN\_4 perceives SN as a tool that is not useful for socialisation only but also for the learning and teaching process, beneficial to both students and lecturers. SN, such as Twitter, is useful in following experts in the field from whom one can learn and with Facebook, lecturers or even students can create groups that could enhance student learning. Students could collaborate with

other students and interact with the lecturer at the same time. The user can also get some informal mentoring from experts who contribute to these SNs. The SMAN\_4 went on to state:

*Many-a-time you may find that Bb is not available when you really, really, really need it and students are reluctant to use Bb. It is not all students who are using Bb...if Bb was user-friendly for all, where students can interact within it, but unfortunately you cannot get experts on a subject there in Bb you need to get them somewhere else. Twitter and Facebook are all over the world to get information; it is open rather than only relying on what literature has. Bb-mobi has limitations because it only works in Blackberry which is expensive and some students are from a poor background and they cannot afford it (SMAN\_4).*

The availability and reliability of Bb has become a great concern at Medunsa which affected the usability by the students as depicted by the respondent above. The university has also introduced Bb-mobi for easy access whereby the LMS can be accessed through smartphones. However, the respondents alluded to the fact that the only smartphone that works well with the Bb-mobi is Blackberry which is expensive for the students at Medunsa, given the fact that the majority of the students are from Limpopo (cf. table 8) which is a rural province where people are impoverished. Therefore, the majority of students may not be able to afford Blackberry. Due to these challenges, students, according to the interviewee above, are reluctant to use Bb and they collaborate among themselves through other platforms which are easily accessible to them. Nevertheless, SMAN\_2 emphasised the accessibility of TEL on students' cellular phones. He also acknowledged that they have not maximised the capability of the mobile phone for TEL. Having highlighted these challenges, SMAN\_2 states:

*...but it had value in the sense that real time students are able to access t materials because lecturers post those materials on Bb. It's particularly useful where you have clinical training where people spend an extended time in clinics, for they are able to return to the Bb if they miss a class. For example, they are in a group and they missed their blog posting and therefore also had to their blog posting tan then they can access the Bb or they are outside in a community to do their clinical posting, it is easy to return and still access their material on Bb, so in that way it does adds some value to give students access to real time material... the challenge is to make it more reliably and consistently available and accessible because it may be available but not accessible and that is the purpose of e-Learning if you cannot have it accessible it's a problem (SMAN\_2).*

SMAN\_2 stresses the importance of availability and accessibility of TEL consistently for use by the stakeholders. This respondent also highlighted the importance of TEL, especially to health sciences. He stated that this tool is important in the sense that if students miss lectures due to their clinical training, they are able to access the classes they missed and the material used on TEL. TEL closes the physical gap that the university might have between students and lecturers.

#### **5.3.1.3.8 Future of TEL at Medunsa**

Medunsa officially began to use technology to enhance learning in 2011. The university in its implementation of TEL focused on one component of TEL, namely, LMS (Bb). Nevertheless, although TEL is quite recent at Medunsa, some respondents are positive that TEL has a future there. The SMAN\_5 raised some concerns through questions when asked about the future of TEL at Medunsa:

*I might not agree with the method used, however, there is the other question I wanted to probably ask to answer your question. Is the institution ready for e-Learning? If the institution is ready, do we have the capacity that will facilitate and run with e-Learning? At the moment in my four months of employment I have seen the university losing people that would be instrumental in seeing the implementation thereof (SMAN\_5).*

Having queried the readiness of the institution in implementing TEL, the SMAN\_5 also highlighted that the major pointer to the success of the implementation of TEL at Medunsa is that academics, through the ED and teaching and learning, stipulate what they want to achieve in terms of TEL. The ICT would be able to progress if what they want to achieve is documented. What also came out clearly from the interview with the SMAN\_5 is that qualified human resources should be in place; readiness is not only based on infrastructure but also on human capacity. To accomplish the desired TEL status, the SMAN\_5 declared his intentions, as follows:

*God willing in the coming 5 years, this university at the click of a button you should be able to get whatever information you need, but not just to get the information but at a speed at which you receive the information. Put in smart boards, projectors that you can control using a smartphone and that allows you to record your lessons (SMAN\_5).*

Effective and efficient TEL needs good resources and facilities. The SMAN\_5 commits to providing technology that is faster and highly computerised; at the click of a button the campus community

should receive the information it needs. This means that people will not be limited to their own corners to access information. In terms of connectivity, the SMAN\_5 further stated that by 2015 the ICT would have equipped the entire campus with indoor and outdoor WIFI which could be accessed by the Medunsa community and available for everyone in the vicinity; hopefully it would be password protected. Automatically the network would switch off the users' bundle and activate the Medunsa connectivity. Students would be able to see which lecturer is on the Net and could communicate with the lecturer if necessary. The coming developments are not the SMAN\_5's thoughts only; SMAN\_2 also indicated the following:

*There is a plan to change all of these challenges; the current thinking is by January all of this will be available. The new server is being installed and much broader bigger bandwidth for Internet is now pretty much available. There is already a procurement of all of these and is set to be switched on... so we need as part of our plan change management which starts in January. We need to begin to change perspectives on teaching and learning and where teaching and learning happens and it is not just that is a classroom, it is not just a chair site, we can have where the students at least on the cell phone that is able to login on Bb. For example...we say this is not avoidable, we have to have this as part of it, so it should be about not if, is about how we do it, not if we do it. We will definitely do it, it's part of our strategy, the goal of delivering high quality teaching and learning... so those are the kind of things for me that are important in moving forward (SMAN\_2).*

SMAN\_2 confirms what the SMAN\_5 has said, that the university is in the process of dealing with the challenges encountered that hamper the successful implementation of TEL at Medunsa. The university is also planning to run workshops that will help in changing the perception of the lecturers in terms of teaching and learning. The lecturers will be made aware that teaching does not occur in walled classrooms only, but electronic platforms can also be used. The Dean envisages a technological future for Medunsa that would allow students to access the LMS and other TEL facilities through their cellular phones, which would allow students to access the material at any time without the limitations of classroom walls. According to the Dean, it was evident that he will ensure that TEL is implemented fully at Medunsa regardless of the challenges that may arise. The above respondent also emphasised the importance of TEL as a tool closely related to future success:

*Definitely like I told you, to the extent that this institution relies on training on and off campus you would definitely need to have something like this. When students are four weeks sitting in*

*Rustenburg, they should still be able to log on and access study materials, that maybe they had class three weeks ago they should be able to log on and pull out supplementary material, they should be able to communicate by email and the lecturer say you know what I have just loaded this material on, so you can also access it doesn't matter where you are sitting. So strategically I do not see any other way to run what we plan without having an electronic platform as part of teaching and learning and that's why we want to build residences. The residence that we are going to be putting up in Rustenburg should also have Internet to make sure that students have access (SMAN\_2).*

Further emphasising the importance of TEL, this respondent indicated that TEL is a necessity, especially because Medunsa students are situated in different provinces of South Africa. Importantly, lecturers should have access to them. Communication between lecturers and students should not be interrupted by distance hence, residences that will be built at different learning sites will have Internet connectivity. However, other respondents felt that they still needed to familiarise themselves with this new technology before they could venture into using other components of TEL. There is hope that the employment of younger academics familiar with technology will increase the use of TEL in its complete form, as expressed by the following respondent:

*I think the future is there for Bb, you know the new lecturers are the ones who are more interested in experimenting, so the more new younger ones are appointed I think the more it will be used. Because if you look at the older ones, they are more rigid and resist change (SMAN\_3).*

The SMAN\_3 and SMAN\_4 echoed what was said by SMAN\_1 and the specialist that the university would buy laptops for students which would be kept at the e-Learning centre managed by the specialist. The SMAN\_3 and SMAN\_4 are of the opinion that the purchase of laptops would help to enhance the future of TEL at Medunsa. They foresee students whose lecturers do not use technology to enhance learning and teaching, pushing their lecturers to use TEL, especially if other lecturers are using it. In addition to the highlighted future plans for Medunsa, SMAN\_2 also mentioned that he would encourage students to take Massive Open Online Courses (MOOC) and be credited for those courses:

*And around the world they are talking about Massive Open Online Courses and we may encourage our students to join some of these classes as part of credits and we will identify and begin to create those courses ourselves and put them on our website and the global world can access it. That is what will make our university move... the structure would be the one that would be*

*saying, ok, how is this course? You would look at the description of the course and the quality thereof based on the content... it could be formative learning for the purposes of the next teaching component because we are going to do this in the next three weeks. In the meantime, as a supplementary leg, you get on to this in your own time (SMAN\_2).*

The respondent above envisages a university that may make use of relevant MOOCs which the students can take and that bear credits toward a student's programme of study. The idea of the SMAN\_2 with regard to the MOOCs is that if a lecturer identifies a MOOC that addresses a portion of a module that s/he feels is not his/her strength, the university may want students to take the MOOC; those who complete the module would be awarded the relevant certificate. The lecturer concerned would then credit the student with the competency certificate. According to the respondent above, MOOCs can also be used as an additional resource to enhance learning and teaching at Medunsa. The lecturers can encourage students to take a certain MOOC as pre-class preparation to enhance the understanding of the next class or a revision of what they have done in the previous class or level of study. Not only would students take other institutions' MOOCs but Medunsa is also intending to develop its own MOOCs to contribute to the global society to fulfil the mandate of globalising education. This will happen when TEL is successfully implemented at Medunsa.

#### **5.3.1.3.9 Perception and attitude of students and academics towards TEL**

Even though the future of TEL at Medunsa is promising, the SMAN\_3 and SMAN\_4 claim that when evaluating teaching and learning, students frequently indicate that lecturers are not using much technology to enhance learning, even the official LMS. The students' rating when coming to the use of technology by lecturers is always very low; possibly these evaluations are for the academics mentioned by the interviewee above, namely those of the older generation:

*In a student's evaluation there is a section on the use of TEL, most departments' students are always giving a very low on this part, showing that most of the lecturers are not using technology to enhance learning and teaching (SMAN\_3).*

According to the respondent above, students' evaluation conducted by the CAE on learning and teaching displays that most academics are not using technology to enhance learning and teaching. This may be due either to lack of interest or ignorance, though the EDP students at Medunsa present a different case as lecturers are forced to use TEL, in particular Bb. The students'

perception of lecturers in terms of the use of TEL is confirmed by the viewpoint of SMAN\_2 who states:

*Well I must be honest about that, I don't get a sense that they are passionate about this; people are still very traditional in their approach to teaching and learning, you know be in class that's benefit in it, you miss class you miss it and I tried to make people understand that there is no point in punishing the student that misses a class, if the student can access the material online it shouldn't be a problem... the students on their part as well, you know I have heard things like, they don't have laptops because when I engage colleagues they say no that thing won't work, guys here they don't have laptops, the students don't have laptops so what's the point doing this (SMAN\_2).*

The lack of interest on the part of lecturers in using TEL as depicted by the results from the SMAN\_3 and SMAN\_2, which he expresses as lack of passion in using TEL, is because the lecturers still prefer the traditional way of teaching. They believe that students need to attend class rather than to access the learning material through some kind of system. The lecturers' attitude does not encourage the use of TEL at Medunsa; to them TEL can work if each student has a laptop. SMAN\_2 was asked as a follow-up question if he thinks lack of interest in Medunsa academics is because of their age or their orientation. The Dean responded by saying:

*I must say that there is a mix of what I will call unhealthy and interesting and an emerging mix of young and old. Yes, the traditional, those who will tell you they have spent 30 years teaching; they have prepared their notes so nothing can replace those things, more resistant to getting, yes they have got every reason, you know like it's not available, it's always down, students cannot access it but I believe that if they were more open there would have been much more effort even from management to get going. So it has to do with the tradition and therefore the orientation of all lecturers in terms of their perspective so they still stick to their traditional classroom, physical contact kind of ideology and that's why I said it will take change management, intervention by professionals to flip the minds. I am not sure how this is going to happen. The much younger ones want to see it happen and on that basis I believe we do have that opportunity to make it happen (SMAN\_2).*

According to the respondent above, there is a serious digital divide between young and older staff in terms of the understanding and perception of TEL. The older lecturers do not want to use

technology to enhance their teaching because of its challenges, according to this respondent. They believe that the traditional methods they have been using are sufficient and have never failed them; they do not trust TEL platforms. The respondent also mentioned that lecturers do not make an effort to understand what TEL is. The resistance of the academics is something that is also observed by the specialist when stating:

*...not everyone is using e-Learning, due to resistance to change their mindset, some are still using transparencies (specialist).*

The response of the specialist shows that it is difficult “to teach old dogs new tricks”; the lecturers still believe in their old methods of teaching and are hesitant to move with the times. With regard to younger lecturers, they are eager to implement and they are the reason that the Dean is hopeful that TEL will be successfully implemented at Medunsa. The other important pointer that the Dean raised is that for years, older lecturers consider that they have been able to teach well, although in many cases this teaching is not aligned closely enough to the philosophy of the university. The Dean disagrees with the assumption that professionals can teach what they know. They need to learn and acquire a pedagogical approach to be able to use all the media available for knowledge transfer. The university’s teaching philosophy encapsulates the notion of using technology to enhance learning and teaching but the lecturers are not in harmony with their own philosophy.

The use of technology to enhance learning, especially Bb, is made compulsory for the EDPs, hence these students seem to be enjoying TEL and prefer it over the F2F method:

*Students are receiving TEL quite well. They enjoy communicating using Facebook as a means of communication for announcements and they also prefer Bb, especially when publishing the results rather than receiving them face-to-face (SMAN\_4).*

It is a different case with students. The response above illustrates the point that students have wholeheartedly accepted the use of technology to enhance learning and teaching. Students enjoy communicating and collaborating with fellow students on Facebook and they prefer their results to be posted on Bb for ease of reference. The students prefer technology over F2F contact. With the utmost certainty, the specialist argued that TEL will be implemented fully and successfully at Medunsa even though there are some who are negative about using technology for learning. He stated:

*Some due to other reasons feel that e-Learning does not work while others are happy about it. Some are positive and others are slowly adapting to change, but e-Learning is marching on (specialist).*

The tone of the specialist was vigorous and positive, conveying the idea that TEL implementation at Medunsa will be a success regardless of what some may think or feel. The specialist intends to embark on a vigorous campaign on the merits of TEL and hold road shows.

#### *5.3.2.1(j) Advantages and disadvantages of TEL at Medunsa*

When the interviewees were asked the advantages and disadvantages of TEL at Medunsa in particular, the respondents indicated that:

*Advantages I see are that students can access information from their lecturer at any time, any day 24/7 and also for the lecturers it doesn't take much of his time to organise them, if he wants to make an announcement he has to call everybody, he just does so. With the disadvantage, I've got two; the level of competence of staff and lecturers may affect the use of TEL and the other one, some may have competence but they do not have devices to access, so even if the information is put there they cannot access it (SMAN\_3).*

Evident advantages to this technique are noted by SMAN\_3 who indicated that with TEL, the students have access to the lecturers' information, including class notes and other material relevant to their learning, at any time. According to the respondents above, TEL can save lecturers' time; the lecturers can reach all students simultaneously. Competence and lack of resources were strongly stressed; the respondents indicated that many, especially older staff, are not competent yet those competent young lecturers do not have the resources to use TEL. With much vigour, the specialist also cited the advantages of TEL:

*e-Learning is advantageous mostly to the learning because of on-going contact, access to materials anywhere and anytime. It contributes to learning process without meeting face-to-face (specialist).*

The specialist feels that TEL is more beneficial to students than any other system. Students can access their learning materials and they also have access to their peers and lecturers at times convenient to them. Students learn at their own space, not necessarily meeting F2F with any of

their peers or the lecturer. On that note, SMAN\_2 made the following statement in relation to the advantages of using TEL:

*There is no way that the Department of Public Health, for example, will have 100 students doing MPH in a classroom with the number of the lecturers they have and there is no way SMU can expand its students to 10 000 in 2024 or 7500 in 2019 if we don't have that.*

SMAN\_1, in the response above, means that TEL will be helpful to the institution to increase student enrolment in accordance with the recommendations of the Department of Higher Education. In addition, the Department of Public Health would also be aided by this platform to reach their geographically dispersed population comprising very large classes, with a minimum of academic staff. The respondent also cited another example where TEL is of advantage to its users. The Department of Surgery has installed a system whereby a camera transfers images of the surgery performed in theatre to the seminar where a professor is training registrars. The theatre itself can accommodate only two registrars but with this technology, a whole group of registrars can view the procedure at the same time and discuss it as a group with the professor. The Dean also emphasised that there is no breach of ethics in the transmission of these images because the patient would have given prior written permission for their use in this way. Having listed all the advantages by the respondents, the specialist spoke against a sole TEL platform and instead advocated for a BL mode as he highlighted one disadvantage:

*Students who are mostly doing chemical experiments practically have to be there, they cannot do these practicals online. The solution to this problem is that the learning mode at Medunsa should be blended, we can't have pure online mode of learning (specialist).*

Although there are manifold advantages for the implementation of TEL at Medunsa, the specialist has pointed out the most vital part of university learning, namely practical work. Students are required to practise the theory they have learnt and in this instance, online methodology could not achieve this. The student in a laboratory should be fully attentive to the practical experiment and not to a computer screen.

#### **5.3.1.3.10 Access to facilities and resources**

The questions relating to access sought to find out from respondents the following: if they are trained to use TEL; the TEL components used at Medunsa; if TEL resources are available for use;

and lastly, if there are modules that are offered through TEL; whether they have access to those modules.

Although Medunsa students have access to some TEL resources and facilities, they are limited to those that the university deems necessary. It appears that students are not keen to use these. Students have access only to Bb which is sometimes not available to users:

*At this stage because of the limitations, the challenge around capacity, even the Bb is limited by that. There is general limited capacity to deliver an electronic media and it is not uncommon that Bb is not accessible sometimes when it is down (SMAN\_2).*

The Dean acknowledges that at times the Bb is not functional or it is out of service, not only because the Net is frequently down due to maintenance, but also because the university lacks capacity to run a project of such magnitude. Other TEL sites are barred from students hence they cannot access them. Connectivity is important for the successful implementation of TEL, especially with regard to online learning. At least, the university is paying attention to adequate connectivity around campus as it is embarking on equipping all office buildings, lecture halls and student residences with WIFI, where the users will be able to access the Internet. This was confirmed by the SMAN\_5:

*...most places on campus have WIFI. Hopefully, because I have spoken to the interim council which has approved the ICT budget, we should have by next year WIFI into all university buildings and we want to have indoor and outdoor WIFI. When the student is seated in the cafeteria, he must be able to connect his device and be able to work (SMAN\_5).*

Resources and facilities are adequate at Medunsa given the student enrolment; the campus has sixteen computer laboratories which, according to the specialist, are equipped with  $\pm 600$  computers and a state of art e-Learning centre. The university has equipped student residences, with the exception of off-campus residences, with WIFI for use by all intended users that are password protected. SMAN\_2 affirmed this statement by the SMAN\_5:

*What I know is each hostel has a WIFI and each building also has a WIFI. Don't ask me how efficient but it is there... but otherwise if you are anywhere else you cannot get it... far from the building I am not aware of any hotspots (SMAN\_2).*

The university is now embarking on making the entire campus WIFI friendly, so that students can access Internet anywhere on campus. One respondent notes the following on the availability of resources and facilities:

*The university has what they call the state-of-the-art e-Learning lab, though our definition of state of the art differs. It is equipped with VDI machines and has WIFI, any place has got WIFI...we have got about 16 labs... in my opinion there are no academics to run successfully with e-Learning, hence I have said it has not yet been implemented (SMAN\_5).*

This simply means that Medunsa has got facilities to implement TEL although, according to the SMAN\_5, they are not state-of-the-art facilities but standard facilities to enable the desired work to continue. In terms of human resources, Medunsa has a challenge since there is only one specialist, trained as a Bb specialist who is not an expert in learning and teaching but an ICT staff member. The other person who had been charged by SMAN\_1 to assist the current specialist has left the employment of the university. Consequently, the entire project has collapsed, although the SMAN\_5 has indicated that the current acting ED is resuscitating the project through the office of the Director, Practice of Medicine (POME).

With regard to the question on availability of modules on TEL platforms and the access thereof, the specialist has indicated that there are some modules which are linked on the university's LMS (Bb) whereby the module lecturer and students enrolled for the module are linked. The specialist has stated that because security for the modules online is tight, not everybody can have access to the module concurrently:

*There's never been a case where students had access into a course for which they were not registered. With regard to lecturers, there's no lecturer who can get access into any course they are not teaching unless they've been given permission to do so. So at the end of the day the content is well preserved and protected. Whatever you are putting there you are sure only people who have access into that course will access it... the system allows me to generate a report that tells me who logged in, at what time and for how long, so we can track and trace the users (specialist).*

The response above means that the specialist has full control over what is happening at a module site. He is the only member of staff who may add and withdraw a user from the

system. He is also responsible for the smooth operation of Bb on campus. Apart from these technical duties, he is also responsible for the training of both lecturers and students at Medunsa. He is the only staff member with system administration rights. What the specialist emphasises here is that the system is secure and that no unauthorised person can access any learning site.

#### **5.3.1.3.11 Training of users and skills they possess**

According to the CAE Directors, although the university through the ICT and other structures offers TEL training, this training is mainly meant for academic staff and not for students. As a result, a CAE Director explains:

*The ICT department is trying, because we see the advert every now and then inviting staff to attend training, but from my understanding and the continuous stream of advertisements for staff to come I think it shows that attendance is very low, so I can say that some staff are not responding to invitations for training. For students I am not sure (SMAN\_3).*

Although, according to the respondent above, the ICT department advertises and provides training on the use of TEL, most lecturers seem to ignore such important training sessions. It seems there is no one who is presenting similar workshops for students. As a result, students are expected to use TEL without being trained. The respondent indicated that she is not sure about student training, implying she has never seen an advertisement inviting the student community to training on the use of TEL:

*Most of the staff are attending Bb training organised by the specialist... and even in our induction to encourage academics to use TEL we also invite ICT people to come to give a crash course. For example, in July we had the second phase of the induction programme where we concentrated on Bb and lecturers were trained on Bb skills so that when they start they can upload their material onto the system as early as possible. Even though the lecturers at postgraduate level are reluctant to use TEL, at the undergraduate level lecturers do participate in training (SMAN\_4).*

SMAN\_4 also emphasised the fact that lecturers are trained in the use of TEL, stating that the CAE has introduced a session on the use of Bb to facilitate learning and teaching at Medunsa, facilitated by the specialist. This introductory course during induction helps arouse the interest of newly-appointed academics in the use of TEL. What was apparent on this topic regarding the

matter of academics' basic computer skills needed for the use of TEL, is the issue of attitude toward the use of technology that hinders academics from training in basic computer skills:

*Even if they are training on Bb, unfortunately, there is no basic computer literacy skills training, before it was there but we don't have it any more, they have cut it off (SMAN\_4).*

What SMAN\_4 here suggests is that the training of all TEL users on basic computer skills once offered to all academics and subsequently discarded, is of great importance. This training would help lecturers who lack these skills to have a basic knowledge of computer literacy, to enable them to use TEL facilities effectively. SMAN\_4 continues to pin the non-use of TEL resources and facilities onto the attitude of lecturers toward TEL:

*... their attitude, I remember some lecturers used to say I don't have time to mark the students' work, how will I have time again to upload things on Bb, I don't have that kind of time. So I think for some of them it is a matter of attitude, they know and some don't know because the basic computer skills training that used to assist is no longer available (SMAN\_4).*

From the response above, it could be assumed that the attitude of lecturers toward TEL may have arisen because of their lack of computer skills; in such a case, use of TEL is overwhelming for the lecturer. A lecturer's marking load, about which there are complaints, could also be relieved by the use of TEL, if they are trained to assess using the system and to programme the system appropriately. If lecturers display this kind of attitude, it may hamper the successful implementation of TEL because if the primary users are not interested in a system, the programme could be a failure. SMAN\_3 took the discussion further:

*Yes, because some of the lecturers can't read their own emails, they call the students to write, read for them or secretaries. Usually some just resist change, especially those who are older in the system, some of them not all. They just have a belief that how they were doing things some 15 years ago can still work right now. So when one has an attitude one won't make an effort to try (SMAN\_3).*

It was disturbing to find out in this age and era there are academics that cannot read or open emails to an extent of requesting students or secretaries to read emails for them. It is also a common

factor that people resist change regardless of how beneficial it is; this is one attitude that delays the process. The respondent continued:

*I think the university should put in place some measures, ensure that everyone is computer literate. Everyone uses technology and also on its part, like where we are talking about Facebook being closed because there are too many students, the university knows how many students it has. Why then don't they order servers which are sufficient for such numbers? How are other universities doing it, because in other universities it is open throughout. It is up to you to choose what you want to use those SN, but here there are limits. They should go and learn, see how they do it and also try to do it (SMAN\_3).*

The interviewee suggested that the university should reintroduce the basic computer literacy course for users who are computer literate, to empower them to use TEL facilities with ease. The respondent also suggested that the university should also embark on some kind of benchmarking, to see how other institutions are managing the use of technology to enhance learning and teaching and how they keep open all other SN sites that can be used for teaching without causing the bandwidth speed to slow down. The university should also devise means to power-up the bandwidth to cater for all students and lecturers.

According to the respondents (SMAN\_3 and SMAN\_4), the situation at Medunsa is that the ICT department provides training on TEL matters, particularly Bb for the staff. CAE concerns itself with the training in the use of other technologies to enhance teaching for the lecturers. They offer training on using PowerPoint to present lessons and Excel to compute students' marks. CAE employs the facilitation services of an expert in the field. In terms of support, Bb users are supported only with technical issues, such as uploading the material and the use of Bb in general. There is a lack of academic support for the lecturer in terms of developing online course content, assessment and procedures lecturers could use to teach through TEL. ICT staff members are not conversant with pedagogical aspects. Since not much was mentioned on the training of students, the SMAN\_2 was asked if there was training specifically for students with regard to TEL and basic computer literacy. His response was as follows:

*I imagine the CAE would also be the support structure for students. I think the first years might be doing this through the computer literacy course, you know the first year they do SIM. I think at that stage they could also be exposed to Bb.*

According to the response above, it seems that there is no structured training on TEL platforms for students. The SMAN\_2 considers that CAE's computer literacy course covers the TEL platform training, specifically Bb. According to the interviewee, if the training of TEL platforms is not covered under this computer literacy course, CAE should include that training. The interview with the specialist confirmed that students are also trained in the use of TEL, although the respondents did not go into detail on training for students. With regard to the training of students in the use of TEL, the specialist noted:

*All first years are trained and all have access; students are empowered with skills although it is not compulsory for them. To support the students throughout the year, we have student assistants who help us attend to the students and these assistants help us during training of the students (specialist).*

Based on the response above, the students are not given value-added training. It is not clear on what aspect they are trained or the level of expertise of the student assistants who are supposed to offer assistance to students when required. The respondent mentioned that he trains students at the lecturer's request, for example, if the lecturer is using TEL techniques and requests the specialist to help familiarise students with the use of Bb. In contrast to the response he gave with regard to students, he provided a detailed description of training for academics:

*I train the lecturers to design and use customising, setting up tests and making announcements, interacting with students. This training is on-going...I also give support to individual lecturers; after training I meet the lecturers one-on-one, I keep in touch to make sure of the backup. If the lecturer meets with challenges s/he can log a call with me and I attend to his/her query (specialist).*

Drawing a conclusion on the above, it appears that even though the specialist indicated that they do train students on the use of TEL, considerably more attention is paid to academics. The increased support given to academics, according to the response above, is mainly technical. The specialist shows how the system works but does not help lecturers with the methodology of teaching by means of the system.

#### **5.3.1.3.12 Factors inhibiting implementation of TEL**

The following discussion seeks to identify the challenges and successes that the Medunsa campus has faced in the implementation of TEL. The interviewees listed what they thought posed challenges in the implementation of TEL and also shared their success with regard to the implementation.

The respondents listed the challenges in the implementation of TEL at Medunsa, as follows:

- ✓ The bandwidth is too small to cater for the university community, hence SN sites are closed.
- ✓ Most students are from rural areas, therefore they lack competence and do not own technological devices.
- ✓ TEL is not clearly defined but regarded as an ad hoc kind of practice.
- ✓ There is no clearly-defined policy for users.
- ✓ An e-Learning project may be built around a particular person not the university.
- ✓ E-Learning platforms and capacity to manage the resources are limited.
- ✓ There is a need to make people believe that they can contribute to the successful implementation of TEL.

#### **5.3.1.3.13 Strategies to implement TEL**

Although the SMAN\_5 has stated that they are not the core business of the university but a support structure, he did discuss in depth the strategy that the ICT would like to employ in the implementation of TEL at Medunsa. The SMAN\_5 feels that academics, through the relevant department, should be the driving force behind this, to be supported by ICT with the required resources. Academics should have a written plan of what they wish to do in terms of TEL and know exactly how they would want it to be managed.

SMAN\_2 also considered that academics should be the driving force behind TEL but for them to do this the university needs to create an environment where there is demand for TEL. For example, he considered that in a group of hundred, about 20% would want to use TEL but the rest would feel that they could do without it. Therefore, the environment does not demand TEL at Medunsa. According to the SMAN\_2, support is needed from the other 80% for the process to succeed. This would be achieved by what the Council for the Centre for Health Science Education at Medunsa would like to do through the establishment of the Centre for Health Science Education. The centre's mandate is to professionalise health education, in recognition of the fact that not all professionals are good educators. The SMAN\_2 proposed that in order to

institutionalise the idea, the centre would offer short courses, with part of the course being devoted to TEL. After training, the university would then address the issue of infrastructure to support students and staff.

#### **5.3.1.3.14 Policies and operation**

TEL at Medunsa is the responsibility of ICT, unlike the situation pertaining at other institutions, for example, Fort Hare, University of Pretoria, North-West University and the University of Cape Town, where it is the responsibility of an Academic Development Unit (ADU), with ICT supporting users with technical assistance. The development of TEL material, assessment and all other curriculum issues are the responsibility of the ADU. There is a module on the use of TEL offered by ADU which lecturers are obliged to complete. The SMAN\_3 and SMAN\_4 argue that because ICT personnel are not experts in the field of teaching and learning, TEL would be better managed if it is the responsibility of CAE with technical support from ICT. The SMAN\_3 and SMAN\_4 believe that at Medunsa, TEL has been placed under the SMAN\_5 because it is a new development for the institution. Respondents noted the following:

*I think because it is new and people don't understand it much... and also the interpretation of concepts for here when they hear the word technology they only think ICT, not looking into what exactly that is (SMAN\_3).*

According to SMAN\_3 above, the Medunsa community has confused TEL with general technology or the use of computers, hence when they hear any word related to technology, they attribute it to ICT. This is also observed by the SMAN\_5 who states:

*When people talk of the e-Learning concept, they think of computers, the state-of-the-art lab. For me, e-Learning is not an electronic lab that can do all these things. If that's what your conclusion of e-Learning is, then it means since we have got about 16 labs then we have implemented e-Learning. But it's way bigger than that, hence I am saying we should also understand the concept, how the concept is sold out there (SMAN\_5).*

The SMAN\_5 considers that people at the institution believe that if they have state-of-the-art computer laboratories with high-speed connectivity, they have successfully implemented TEL. On a different note, the SMAN\_5 sees their role as support of the core business of the university:

*We are expecting the core business, which is the academics, to say to us: These are our strategic objectives, that we think if we do this it will assist us to achieve... then the core business ask us and say, how are you going to support us?, Now instead of us coming with our own vision we come with the strategy to support... then we say let's look at issues of infrastructure, where do you want to position these online centres all over the show...to make sure that the infrastructure is ready. Do remember that the ICT is the support to the business and not really the core business. At this stage I haven't heard academics saying: This is what we want to do. Therefore it becomes difficult for me to say this is what we are going to do not knowing that it's going to meet their requirements or it's just going to be shooting in the dark (SMAN\_5).*

The SMAN\_5s emphasised that they are simply supporting the core business of the university by planning and providing for the necessary ICT infrastructure and resources. He also raised a concern that since the start of his employment at the university, academics had not led the process. The core business should give the direction that the university needs to take and the ICT offer support by supplying the relevant equipment. Explicitly, the Director further states:

*e-Learning is more on learning and training and ICT does not do that. What ICT would say is how do you facilitate that, then put kiosks in hospitals, post offices with the aim of extending e-Learning. I am saying it is best suited under academics, but there is a very thin line between ICT and them. They know what they want to do but they do not have the means to do that, that's where ICT should come in. So you need a very strong partnership between the two, hence I am saying the way we answer is the "how" part of it (SMAN\_5).*

According to the interviewee above, TEL should be housed under the ADU in collaboration with ICT. He categorically stated that ICT does not deal with teaching and learning matters but can help with the technology that can help in facilitating the learning and teaching process, hence he suggested that there should be a strong partnership between the ADU and ICT.

With regard to policy, although the specialist and SMAN\_1 indicated that there is a policy on e-Learning somewhere in the university system, it has not been finalised. Moreover, the SMAN\_3 and SMAN\_4 who are responsible for the academic development of staff and students have not seen it, nor has the policy been made available for public perusal. Although the SMAN\_5 in his response to this question felt that policy is not an issue, he touches on policy matters when he states:

*You know there is one guy who says where there is no vision people perish... If among other vehicles they think e-Learning can help them achieve their vision they need to say so clearly in their objectives and once they have said that clearly they will say how do we resource these particular objectives so that we are able to achieve... so now we do not know where we are standing (SMAN\_5).*

It seems the SMAN\_5 has no knowledge of the policy that some colleagues claim to be aware of. Although throughout the interview, he talked about policy, he clearly indicated that policy is not his concern. The institution should decide whether they want to use technology to enhance learning and teaching and also consider how the programme would be resourced on formulating the policy. However, SMAN\_2 indicated that the matter of policy around TEL starts with the Health Professional Council of South Africa (HPCSA):

*I know there are discussions at the Health Professional Council about this, particularly how do you use SM as part of teaching and learning and the ethics of it for health professionals. So it is at discussion level. I don't think they have articulated a policy on it as such and one of the staff shared this at the executive meeting of the faculty... I don't think as a country we have embraced TEL to the extent that it should be so it is catching a lot of academics by surprise... I think with CHE itself, I am not aware of any policy in particular about e-Learning. You know CHE's mandate includes quality assurance and standards of teaching and learning as a custodian (SMAN\_2).*

The respondent above painted a scenario that in teaching and learning circles, there is no policy around the issue of using technology for learning. The respondent started by highlighting the discussions under way at the HPCSA and made it clear that he is not aware of such a policy from the Council of Higher Education (CHE) as a quality assurer for higher education in South Africa. The Dean also alluded to the fact that currently, there is a general and open interaction on the part of the CHE's quality enhancement project where the discussion is on the support that universities are giving toward students' success. In these interactions, the CHE has not prescribed any methodology in particular but has given the universities a framework within which to develop sound practices and report on them. In the next phase, the CHE will be reviewing submissions from universities and develop policy. He also alluded to the fact that even though there is no policy from the CHE or the HPCSA, TEL is recognised in HE. To conclude the discussion, the researcher closes with the words of the SMAN\_5:

*At the moment, currently, my observation, I might be wrong – remember I am not working on this from day to day, e-Learning has not yet taken off. The reason why it has not taken off is because it was the vision of a particular person, and that vision of a particular person and having resourced it with a few people who have left the entity, and that particular person is also not at the fore and running the whole thing (SMAN\_5).*

The interviewee in this case was not referring to a single component of TEL when he said e-Learning has not yet taken off; he was referring to TEL in totality. The respondent is aware that there is Amber.net and Bb running on campus; these are merely components of TEL. He attributed failure to implement TEL at Medunsa to the fact that this project had been given to individuals to manage, who had later left the employment of the university, taking with them all their ideas. The SMAN\_1 who had steered the project had also resigned. The implementation of TEL, according to the SMAN\_5, is being resuscitated through the office of the SMAN\_2. This project has been made the responsibility of an individual. The interviewee also raised his concerns at building a TEL project around an individual and not the university. When the individual leaves, the person leaves with the ideas, but if it is the university's concept, whoever is charged with the responsibility to execute will know that s/he is executing the university's mandate.

#### **5.3.1.4 Observation responses**

The researcher dedicated time observing how TEL is implemented. The researcher used structured non-participatory observation as an additional tool to collect data for the purposes of triangulation. A formal predetermined observation schedule was used for observation. The schedule drawn was adapted from Maree (2007) (see appendix D). The observation schedule has three sections: checklist section where the researcher as an observer ticks the yes and no responses; descriptive observation section whereby the observer records a description of what is observed; and open-ended section where the observer gives general comments on what he has observed. The researcher decided not to take any active role other than the one of being an observer in order to avoid bias. The analysis and interpretation of the data from this instrument was carried out using some of the themes identified in the preceding sections.

##### **5.3.1.4.1 Access to facilities and resources**

Access to resources and facilities by users is crucial for the successful implementation of TEL in any given institution. For Medunsa to successfully implement TEL, it needs to

open access for its community. In terms of facilities and resources, the researcher made the following observations:

- Lecturers' offices are furnished with computers.
- The Internet is available for the use of lecturers at any time of any day, except when they are offline.
- Although the campus has Internet connection, it is not yet well-resourced with facilities that would assist in enhancing learning through technology.
- The sixteen (16) computer laboratories that carry  $\pm 600$  computers are also connected to the Internet. Several computers are out of order and laboratories are not open all day. Some are open when booked for a class and some when the university opens its doors.
- Some university buildings, including on-campus residences, are equipped with WIFI.
- All SNs are closed during the day.

The observations above clarify that all lecturers, except for those in one department whose HoD has decided not to provide a computer for each lecturer, have computers and Internet access. Academics have access to Internet 24/7 and this is advantageous to lecturers who want to use TEL for their teaching. Even though the university closes its doors at five in the evening and opens them the next morning at six, students do have access to the Internet after these hours because residences are equipped with WIFI, although this benefits only those students who have devices linked to the Internet, for example, laptops, tablets and smartphones. Students without such devices have to wait until laboratories reopen the following day. Bearing in mind that the majority of students come from rural settlements and that most of them do not have these devices, it is a disadvantage for them if SNs are closed during the day and laboratories where SNs are available are closed at night.

#### **5.3.1.4.2 Training of users and skills they possess**

Training is an integral part of TEL. The university community may have access to Internet and other TEL resources but they may not necessarily be trained to use the resources. The researcher made the following observations with regard to training and skills:

- The specialist at Medunsa is a certified Bb instructor, who has undergone training in the use of Bb with the Bb supplier.

- Most lecturers do have basic computer skills but do not use technology enhanced learning tools.
- Students have basic computer skills and can surf the Net. In their first year, CAE offers a computer literacy course.
- Training on the use of TEL facilities is not compulsory. However, during the CAE induction programme, the specialist gives new academic staff a short course on the use of TEL, focusing on Bb.
- All students receive basic computer literacy as a module offered by the CAE. However, not all are trained on the use of TEL. The Bb training offered by the specialist is not compulsory.

The majority of academics have been in the employ of the university for many years. These academics are accustomed to traditional classroom teaching and the introduction of technology may require them to be trained in its use. Fortunately, the university invested in training the specialist on the use of technology to enhance learning, including specific training on the management of Bb. During the induction programme, facilitated by the CAE, the specialist introduced new members of staff to TEL, in particular Bb, and both old and new staff who are interested in using Bb booked for intensive training. Students' training is provided when the interested lecturer books on their behalf; they then receive a single training session. All students receive basic computer training in their first year. With regard to academics, training may be more intense because the majority have no basic computer literacy.

#### **5.3.1.4.3 TEL support for users**

Because the TEL concept is new at Medunsa, users need support even after training to ensure successful implementation. In addition, the majority of students are from a rural area and see technology components for the first time. Lecturers need support as they too encounter this tool for the first time in their careers. In terms of the support users receive from the university with regard to TEL, the following were observed:

- There is a discrepancy between the support given to students and staff regarding the use of TEL; academics who use TEL receive support from the specialist throughout the year but students do not enjoy that kind of support.
- This discrepancy occurs because e-Learning is under the care of different departments, such as ICT, Public Health and Anatomy. These departments run

the e-Learning differently and it seems that there is no communication between the three department, hence the TEL is not harmonised.

- Bb users, unlike other departmental components, seem to be enjoying a high level of technical support, possibly because the custodian is placed under ICT and the other staff member who assisted the specialist was employed in the Dean's office.

The observations above denote that lecturers are given more attention than students in terms of support. Students who use TEL do not receive support throughout the year as lecturers do; this may be because of their lack of basic computer skills. The researcher has observed that apart from the official TEL component (Bb), there are other online technologies used by departments, for example, the Department of Anatomy, which has developed its own assessment programme, and the Department of Public Health, which is using its own online programme. The two programmes mentioned do not get as much ICT support as the Bb. The specialist mainly supports users with the technical skills for TEL, but in the researcher's view there is still a void in relation to supporting users academically.

#### **5.3.1.4.4 Use of the TEL technique**

The institution may be equipped with world-class, state-of-the-art facilities and resources but if users do not find them useful, the implementation of TEL could be compromised. In terms of the use of these technologies, the researcher observed the following:

- Even though Medunsa is not over-equipped with technological resources to enhance learning and teaching, the Medunsa community is not maximally exploiting the available resources.
- Although some lecturers and students have been using resources for academic purposes, the majority of users accessed these resources for social purposes, hence the closure of SN sites.
- Computer laboratories are used during computer literacy classes or training offered by the CAE and specialist. Periodically, a user may write online multiple choice questions (MCQ) tests. Most frequently, laboratories are used by students typing their assignments for submission.

According to the data given above, observations reveal that at Medunsa, resources and facilities to enhance learning using technology are available, but members of the Medunsa

community do not use such technologies to their advantage. Most of the university community, including students and academics, abuse the resources, for example, students used much of the bandwidth to access Facebook for social purposes which slows the speed of the Internet thereby affecting researchers who wanted to use the Internet to search for sources. Not only are students guilty of this practice, but also some academics in their offices have used Facebook for their social pleasure.

#### **5.3.1.4.5 Policies on the use of TEL**

An institution may have superb resources, facilities and human capacity to implement a project but without rules for guidance, the project might fail. The success of the implementation of e-Learning lies also in the policies in place to guide the institution on what to do in terms of using technology to enhance learning. Regarding the policy issues on TEL, the following were observed:

- There is a draft policy on e-Learning, which is unknown to users except for the specialist and the former Dean of the faculty.
- There is no clear articulation of blending the learning using technology.

The draft policy available was drafted by the e-Learning Director who was employed at the institutional office in September 2011. The draft policy has remained a draft since then; it has not yet been circulated to the university community for inputs. Only a few people who are in the management of TEL are conversant with the draft policy. TEL at Medunsa and the community at large are not aware of this draft policy, hence the university cannot hold them responsible for not using TEL and opted for it not to be compulsory. The contents of the policy will be discussed in the subsequent section of the study, document analysis.

#### **5.3.1.5 Document analysis responses**

The researcher analysed documents that were deemed relevant for the study. A structured schedule for document analysis was developed, seeking to gather data on who developed the document, if the document was in use, the context and the intended audience, the purpose of the document, and lastly, the significance of the document (see appendix E). Three policies were identified as documents to be analysed, with the aim of seeking their impact on the implementation of TEL at Medunsa. The UL policies identified include: ICT policies and procedures; ICT e-Learning policies and procedures; and, the teaching and learning policy.

#### 5.3.1.5.1 ICT policies and procedures

The ICT Policies and Procedure document was developed on 14 September 2007 by the ICT Department of the University of Limpopo at Turfloop campus. The policy was intended for UL students (Turfloop and Medunsa campuses), staff and any other person who might use or attempt to use or is connected to, by any means, the institution's computing network.

The purpose of the policy is not clearly articulated. The stated purpose is the purpose of the existence of the ICT Department at UL. It is stated as follows:

*Information and Communication Technology resources are provided at the University of Limpopo in support of the university's mission, and are considered strategic resources in providing higher education both on and off campus.*

The above purpose denotes that the main purpose of ICT is nothing else but to support the mission of UL, which is to be:

*A world-class African university, which responds to education, research and community needs of our society through partnerships and knowledge generation, continuing the tradition of empowerment.*

ICT resources are geared toward realising this stated mission and making the university a world-class university even in terms of ICT. The purpose again speaks of providing education to both on- and off-campus students; this refers to the use of technology for learning and teaching or reaching both on-campus and equally off-campus students through technology. The policy continues:

*All members of the university community are required to use these resources in accordance with the policies described in this document, and in the spirit of the mission statement and administrative rules concerning their use.*

This portion of the document speaks to its purpose, although not flagged so. The above statement means that the document serves as guidance on how to use ICT resources to achieve the mission of the university. The document as a whole does not specifically concern itself with the use of technology to enhance learning and teaching but considers the use of ICT resources and facilities

in general. In an attempt to see how much the ICT policy caters for the use of technology in learning and teaching, the researcher looked at the accessibility and the appropriate use as well as the support that the ICT department gives to users.

With regard to accessibility and the appropriate use of ICT resources, the university provides each lecturer with a computer and a telephone line. Although the policy allows the user to use both for private as well as official purposes, the same policy emphasises that they should be used responsibly and not be misused or abused, although users are supposed to pay for private calls. To logon to the computer, the user is provided with a password and for the telephone line, makes use of pin codes provided. Having highlighted the devices given to academics, it is observed that the telephones provided are not equipped with a tool to make a conference call if the lecturer would like to connect with more than one student at a time to discuss the subject matter. Clearly the phones are not envisaged to be used to enhance learning and teaching at UL. Although the university decided to close some SN sites, it has opened the Internet for all staff to use. The university, through the ICT department, is also open to purchasing any software required for the purposes of learning and teaching.

In terms of support, the institution employed helpdesk consultants to assist with the computer software and hardware support. In addition to the consultants, the university, through the ICT department, encourages other departments to request the services of a “PC expert” when necessary. Support is offered exclusively for computing-related queries; however, the support provided is mainly technical. PC experts in the departments are more useful in terms of assisting their colleagues because they look at both technical and subject matter support. The UL ICT department identified four levels of support and listed them as full support; the ICT department supports the users comprehensively for all licensed software and hardware. The second level of support is high-level support whereby the support is geared toward users who are using specialised computer packages. This means that if a department decides on particular software that they deem fit for the enhancement of learning and teaching, the university would be able to support it. Low-level support is the third support level; on this level the university is able to support users with software and hardware not provided by the university, though the support would be minimal. The fourth and last level is computer micro-lab support, whereby the ICT employs and stations laboratory assistants in the laboratories at a specified time. Looking at these four levels discussed above, it is noted that UL supports ICT users whether they use private or official software and devices, although for private software and devices, the support is offered if it is possible.

### 5.3.1.5.2 Teaching and learning policy

The teaching and learning (T&L) policy of UL does not show when it was developed, who developed it and whether or not it is an approved policy.

The purpose of this policy is to:

...describe the University's teaching and learning ethos. It articulates the University's commitment to creating appropriate, meaningful learning opportunities and experiences for a diverse student body, in relation to programme type and National Qualifications Framework level of programmes.

The stated purpose declares that the teaching and learning policy aims at describing the teaching and learning philosophy of the university and creating meaningful learning opportunity and experiences. Though it is not clearly articulated, judging from the contents of this policy, it is meant for academics and students at UL, including the Medunsa campus. One of the matters T&L policy intends to highlight is the articulation of T&L philosophy, which is not clearly captured in the document. The principles and aspirations section (Section 3 of the policy) touches much on what could be considered as the T&L philosophy of the institution. The policy by itself does not outline how the use of TEL would operate in practice but in what we can read as philosophy, there is a mention of the use of TEL. In the subsequent paragraph, the researcher will discuss some of the points expressed in the philosophy relating to the use of TEL.

The policy mentions that the

University strives to provide for the academic and professional learning needs of a diverse student body through the creation of learning opportunities using different modes of access and delivery. These modes include face-to-face contact between learning facilitators and students, information and communication technology, library services, and experiential learning. The different modes are complementary to one another and used in a way that is appropriate to the student and module/course/programme profile, as well as module/course/programme outcomes.

The above quotation from the policy means that UL allows for multimode learning delivery. Academics may use F2F contact or technology to enhance learning and teaching. According to the teaching and learning policy, the identified teaching modes must complement each other. The policy further enforces independent learning and that students should be encouraged to self-study

whereby the lecturers or facilitators of learning reduce supervision and guidance from year one of the study to postgraduate studies. The policy points out four strategies that UL must follow in order to realise the independent learning, of which two are as follows:

Development of learning environments that are conducive to and encourage students to develop intellectual independence and ensure that students are equipped with the necessary skills to be intellectually independent.

What the policy denotes about the two strategies above is that one way of encouraging independence in learning is to develop an enabling environment conducive to learning for the students. TEL could be introduced to them and that would allow them to work independently. Of importance is the second strategy in which the university equips students with skills and knowledge to use technology to enhance their own learning. Skills learnt will allow students to work independently with little or no supervision from the lecturer. The above discussion is also supported by the policy statement on page 8:

The university encourages the use of ICT and the library as a means to facilitate student access to and engagement in meaningful learning experiences.

Although there is little on TEL in the ICT policy, one of the things proposed as being instrumental in facilitation and engagement in meaningful learning is the use of ICT. There are several ways in which this could be achieved in order to perpetuate good practices in learning and teaching. These ways include that ICT be used for collaboration between students. The other way is blending of teaching modes whereby learning and teaching may be facilitated through ICT and other modes such as F2F. ICT could also be used to assess students' learning and lecturers could make use of available software to prepare assessment tools to assess it. Lastly, ICT could be used to search for the relevant information and literature for students' learning and research work.

The last section (section 9) of the policy implies that each faculty should develop its own faculty teaching and learning policy, which must be aligned to that of the university. The Faculty of Health Sciences at the Medunsa campus does not have its own policy, with the result that Medunsa relies heavily on the general university policy. It is worth noting that the teaching and learning policy does not outline the institutional teaching philosophy on which individual lecturers should base their own.

### 5.3.1.5.3 ICT e-Learning policies and procedures

The ICT e-Learning policy is the main policy document that is interrogated more than the other two linked policies because the study is about TEL and the policy should be guiding and advising on how TEL should be used at Medunsa.

The ICT e-Learning Policies and Procedures document was developed by the e-Learning Director in September 2011. The document is still in draft status because it has not yet been adopted and is unknown to most of the Medunsa community. The document is intended for students and lecturers of the university, but its purpose is not clearly articulated. In one sentence this policy states the purpose, as follows: “This document outlines UL’s e-Learning policy.”

What the researcher appreciates about this policy is the way in which it defines e-Learning not as single-focused, by referring to online learning only. Though the study is on TEL, the university’s interpretation of e-Learning is broadly stated as follows:

E-Learning comprises all forms of electronically supported learning and teaching. The information and communication systems, whether networked or not, serve as specific media to implement the learning process. The term will still most likely be utilised to reference out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and the curriculum.

This definition clearly encapsulates e-Learning to refer to every item of electronic media that could be used to enhance learning and teaching. Although the policy touches on the use of technology to enhance learning and teaching, the policy does not define TEL. What is defined in the policy is educational technology which implies that the university does consider the use of TEL in general. It is worth noting the six points listed by UL with regard to TEL, as follows:

- UL encourages and is committed to enabling the innovative and effective use of ICTs for teaching and learning in UL courses and programmes.
- UL believes that the use of ICTs for teaching and learning must be driven by sound pedagogical principles and the needs of the institution’s students and staff, facilitated by technological advances.
- UL supports an integrative approach to the use of ICTs.
- UL is committed to the provision of an appropriate ICT infrastructure and technical support to enable effective implementation of the intentions expressed in this document.

- UL expects priorities regarding educational technology which includes e-Learning to be determined at faculty level.
- UL recognises and wishes to exploit the synergies between teaching and learning and research with regard to ICTs. UL is also committed to on-going research in the emerging field of educational technology.

It is evident from these six points that UL's use of TEL is based mainly on computerised technology to facilitate learning and teaching. The policy caters for the training of students on basic computer skills in their first year to enable them to use computerised technologies for their learning; this is a support measure that the university proposes for its students. The policy is not clear on how staff would be supported in terms of the use of TEL; it mentions that they play a role in terms of coordinating training and providing expertise as well as the allocation of the training responsibility to the faculties. Although there is a mention of educational technology in the policy, it has little on TEL in general; it is specific to one component of TEL, namely, online learning. The policy's focus is mainly on the university's LMS and its use.

#### **5.4 Conclusion**

This chapter outlined a step-by-step analysis of the data, which was categorised into two approaches; quantitative and qualitative. The quantitative category has addressed frequency and percentages, the statistics portion of the study; the qualitative has addressed the knowledge and perceptions of the respondents. The qualitative category is subdivided into three clusters: interviews, observations and document analysis. The purpose of this chapter was to interpret and present how respondents, infrastructure, resources and documentation have contributed to the implementation of TEL at Medunsa. The two approaches, the quantitative and the qualitative, have been used to triangulate and confirm the results of another approach that needs to be noted and highlighted. The next chapter deals with the findings, recommendations and conclusion in relation to the research questions of the study.

# CHAPTER 6

## SUMMARY, CONCLUSION AND RECOMMENDATIONS

### 6.1 Introduction

Chapter 5 of this study has attempted to answer the research questions posed in chapter 1. Chapter 6 provides a summary of the key findings of the study. The data presented in chapter 5 are also discussed in the conclusion drawn from the findings against the background of the theories discussed in chapter 2. Chapter 6 provides detailed and pivotal contributions that the study has made to the broader body of knowledge on the implementation of TEL as a support tool for the learning and teaching process in HE. The chapter starts by outlining the key findings according to the research questions posed in chapter 1, conclusions of the study and recommendations. This chapter takes a reflective perspective on how these questions are answered or are not answered by the study; if they are not answered, and if this is the case, possible reasons are identified.

### 6.2 Summary of key findings

The investigation into the implementation of TEL as a support tool for the learning and teaching process at the Medunsa campus was undertaken as a result of the high rate at which other HEIs are using technology to enhance learning and teaching. To achieve this aim of the study, a multiple-mode investigation was carried out by eliciting responses from 266 students and 12 academics through the questionnaire. Furthermore, interviews were held with a specialist, an SMAN\_5, two CAE Directors and two EDs. In addition to the questionnaire and interviews, the researcher observed how e-Learning was implemented at Medunsa and analysed documents (relevant policies). Data gathered through all these instruments were grouped into themes, which were informed by the specific objectives that underpinned the study. To answer the four research questions that guided this study, the summary of key findings is discussed based on the themes identified.

#### 6.2.1 Users' access to technology enhanced learning facilities and resources

The purpose of this theme was to examine the extent to which users have access to TEL facilities and resources. The study revealed that there are facilities and resources for successful implementation of TEL at the Medunsa campus. The availability of resources and facilities, such as computers, does not appear to pose a problem (cf. table 11). The institution had also made

Internet access available to both students and lecturers 24/7. It was discovered that the university had established an e-Learning centre where all e-Learning activities could be carried out. Although all these facilities and resources were in place, there are challenges experienced which are discussed in subsequent paragraphs.

Although Sife et.al (2007) purport that the implementation of e-learning platform in Tanzanian universities is still very low despite of the opportunities that are provided, Ndume, Tilya & Twaakyondo, (2008) state that as in Tanzania, it seems Africa is moving in the right direction. The findings show that the institution has enough computers connected to the Internet (cf. table 11) in relation to a comparatively low student enrolment. Not only do students have access to these facilities (cf. table 6), but lecturers also have computers in their offices that are connected to the Internet. However, there is one department whose HoD decided that his staff members did not need a computer each. The staff members in that department share one computer with the departmental secretary.

The study also revealed that the university is embarking on equipping all office buildings, lecture halls and student residences with WIFI, where users would be able to access the Internet. At the time of the study, not all buildings had been equipped with WIFI but the majority of them, including the onsite student residences, did have WIFI. It seems that WIFI in the residences is not sufficiently powerful as it does slow down, especially when the majority of students surf the Net in the evening. In addition, no information was available regarding the off-campus residences in terms of connectivity, except for the ED's mentioning that the new residences to be erected at a learning site in Rustenburg would be equipped with WIFI.

Findings showed that the institution, in addition to the computer laboratories, had developed an e-Learning centre, through which Roffe (2004) suggests that TEL can be delivered and managed effectively. E-Learning centres are established to assist students who do not have access to TEL resources outside a campus and/or do not have personal devices that can be used for connectivity. Although the Medunsa e-Learning centre has no desktop computers, the centre is equipped with Internet access and other relevant systems for the use of students in their own time, at their own pace and in a comfortable environment (Roffe, 2004). With regards to computers, this institution intends to have notebooks on loan for use in the centre. Findings also showed that the end-users, who were using available technologies, did that in three formats: asynchronously, synchronously and a blended format (cf. figure 21a).

When one considers TEL at Medunsa, all that comes to mind is LMS, in particular Bb. A number of modules have been uploaded onto the university's LMS whereby the module lecturer and students enrolled for the particular module are linked. This study showed that online access to the modules was given only to the lecturers and the students registered for the module; no other person was able to access the module unless permission was granted by the specialist or the module lecturer. Bb has a trace-and-track system which generates a report for the system managers showing them who accessed the site and details of the activity; this system confirms Bb's security. The specialist and relevant lecturers have full control of activities on a module site. Even though students have access to Bb, it appears that they are not keen to use it. Findings revealed that, apart from Bb, the other most preferred TEL component by both students and academics is Facebook, an SN prohibited during teaching hours. Adding to the challenges that may have caused lack of interest in using TEL components, Bb has not been available for users on frequent occasions. Some lecturers disclosed (cf. tables 4a and 4b) that they never visited the university's LMS (Bb) and a few of those who do use it, appear to do so irregularly.

Although there are computers in lecturers' offices, interviews with the interviewees indicate that lecturers lack basic computer skills, cannot open their emails and ask students or departmental secretaries to assist them. The students have access to 16 computer laboratories with a total of about 600 computers, even though a number of these computers were out-of-order at the time of the investigation. Consequently, the challenge remains, namely, no laboratories at the university are operational 24 hours a day. All laboratories close at 17h00 on weekdays and are closed over weekends. However, some students (figure 24) have indicated that they do use computers seven days a week. Students in this category are those who have been at the university for over a year and who may own a notebook, hence, they are able to use a computer even when laboratories are closed.

Access is crucial, hence Brown and Czerniewicz (2007:744) have made a conclusion based on their study that "the better the access the higher the frequency of use". These authors further clarify their point by stating that "those students with inadequate access to a range of resources make very infrequent use of ICT for learning, while those with adequate or good access make frequent use" (Brown & Czerniewicz, 2007:745).

### 6.2.2 Skilled technology enhanced learning users

With regards to skilled human resources, the study established that there is only one specialist who has been trained as a Bb specialist but who is not an expert in learning and teaching. This is contrary to the proposals of the ICT e-Learning policy stating that “the use of ICTs for teaching and learning must be driven by sound pedagogical principles and the needs of the institution’s students and staff, and be facilitated by technological advances” (ICT e-Learning Policies and Procedures, 2011). The other staff member who had an interest in technology and who had been requested to assist the specialist has resigned. The study also showed that the university is resuscitating the TEL project through the office of the Director, Practice of Medicine (POME), who is neither an ICT specialist nor a teaching and learning specialist.

Figure 26 shows that most students are self-taught in terms of computer use, which explains why Prensky (2001:1) named them “digital natives” because they have grown up with this new technology and spent their lives surrounded by and using computers, video games, digital music players, video cams, cell phones, and all the other devices of the digital age. This author further states the following:

Our students today are all “native speakers” of the digital language of computers, video games and the Internet.

This explains why younger lecturers (cf. table 5) claim that they had knowledge of basic computer literacy before joining this institution. The findings suggest that a number of students and lecturers have come to this university with basic computer skills.

Medunsa, through CAE services offers compulsory basic computer literacy training to all first-year students, exempting those who are able to prove that they have acquired computer literacy elsewhere. However, even though these users may possess basic computer literacy, it does not necessarily mean that they are able to use specialised TEL tools such as Bb, hence the university, through the services of the specialist, trains them on the use of Bb. Although results from the interviews indicate that lecturers and students have been trained in the use of TEL, student responses (cf. figure 27) showed the opposite. This response by students negates the findings from the qualitative data that showed that all first-year students are trained and all have access. In addition, students are empowered with skills although attendance of the course is not compulsory. The conclusion that the researcher has drawn is that not all students are trained on the use of TEL. Unlike basic computer literacy, training on TEL is not compulsory, therefore students have a

choice on whether to be trained or not and were trained on the use of TEL only on a lecturer's request. In this situation, the specialist arranges a special training session for the specific group of students.

Training in the use of TEL, which goes beyond technical knowledge of computers, is very important for both students and lecturers. Keengwe, Onchwari, Wachira (2008:86) emphasise the importance of training users in the use of technology:

...it is for teachers to go beyond technical competence to provide students with pedagogical uses and critically analyze their effective use in various contexts.

Once the facilitators of learning are trained in the skill and have transferred it to students, the latter are then able to construct their own meaning, as argued by Keengwe et al. (2008) who suggest that through technology, students learn when they construct knowledge by thinking in a meaningful way. These findings relate to those of Ndume et al. (2008), who argue that if users lack the skills to access TEL, they might feel embarrassed and avoid using it, thereby causing e-Learning initiatives to fail. It appears likely that students on their own are not able to succeed; they need the assistance of significant others, as stated by Huitt (2009). The assistance of significant others leads students to the ZPD that, according to Ravenscroft (2001), represents the place where the disorganised spontaneous conceptions of students meet the systematic and logical reasoning of significant others.

### **6.2.3 Perceptions and attitudes of users towards implementation of technology enhanced learning**

For TEL to be implemented successfully, Oye et al. (2012) argue that positive perceptions and attitudes are crucial. The users' positive or negative perspectives and attitudes have a powerful influence on implementation. Under this theme, the findings on several perspectives and attitudes of TEL academic stakeholders at the Medunsa campus of UL are discussed. The findings revealed the difference in understanding of TEL concepts among stakeholders. The study, through the qualitative data collected, showed that the campus management have a similar understanding of what TEL is. Academics also demonstrate a different knowledge of TEL (cf. figure 14c). On the other hand, students portray a lack of knowledge regarding TEL. They confine their definition of TEL to online learning because of Bb. The findings with regard to the perceptions and expectations of users are that TEL is not a policy that could be enforced on users at Medunsa. TEL is perceived as an additional and convenient resource that lecturers and the students can use to collaborate outside the classroom. If the understanding of TEL amongst stakeholders differs,

it is clear that they perceive it in different ways. It is important for stakeholders to understand TEL because a lack of understanding gives rise to poor perceptions of e-Learning (Ndume et al., 2008).

As is the case in Tanzania (Ndume et al., 2008) and in Lybia (Rhema & Miliszewska, 2011), Medunsa has taken the same stance in recognising the use of TEL in HILs as a valuable initiative (cf. figures 19 and 26). The lecturers' perceptions with regard to connectivity differed greatly from those of the students (cf. tables 4 and 12). Lecturers find the Internet service reliable; on the contrary, students find it unreliable. Those academics who feel that the Internet service is very reliable use the technology to read emails, type students' assessment tasks and prepare class notes (cf. figure 14b.) Similarly, students who describe the Internet as unreliable also use the technology for the same functions. The reliability of the Internet is dependent on the strength of the country's bandwidth, which exerts pressure on network service providers who eventually impose a data cap (monthly data limit on subscribers). The data cap comes as a result of the growing number of Internet subscribers per network. South Africa as a developing country is one on those countries (Chetty et al., 2012). In all probability, the unreliability of the Internet at Medunsa results from this capping and the weak bandwidth of the country.

The findings depicted that implementation of TEL was inadequate. Findings from the interviews have revealed that the university should benchmark with other institutions to see how they are using TEL to benefit the university community. However, findings from the lecturers showed that TEL was a valuable technique (cf. figure 16), though a small number of students consider that TEL is complicated and that no one in the institution understands what it is. These misconceptions about TEL make implementation difficult. Training might be instrumental in dealing with these misconceptions and is a very important enabler of e-Learning implementation (Odunaike, Olugbara & Ojo, 2013). These researchers propose a lack of adequate training as one reason that slows down the implementation of e-Learning. Students are the key stakeholders in the implementation of TEL; if they do not know what it is, a challenge is posed in its implementation. Roffe (2004) states that the success of TEL implementation, apart from the resources, relies on the engagement of students in all the processes of implementation and on obtaining feedback from them on how well it works. If students are not familiar with TEL, it will be difficult for them to participate in its implementation. In addition, some lecturers show uncertainty in using TEL, making them indecisive with regard to its use (cf. figure 15) but students find the use of technology very interesting. There are several benefits that students point out in

using TEL: access to more information when using TEL; learn at any time and at their own pace; learn on their own and in their own place of residence; interaction with other learners; and, have access to lecturers at any time. To summarise all the benefits listed by the participants, the ED stated that TEL closes the physical gap that the university might have between students and lecturers.

Although Oye et al. (2012) emphasise the importance of LMS as enabler to HEIs to upload courses online, this limited use of LMS, for example, using the system for student administration, provides access to study materials; conduct assessment; and provide interaction and feedback. Yet, it seems to have achieved very little or no progress for the implementation of e-Learning (Odunaike, et al., 2013). CAE Directors and the EDs revealed that the availability and reliability of Bb is of great concern but its usability by students was compromised. The intervention by the university, for students to access LMS through the Blackboard-mobi using their smartphones, is expensive. Findings also showed that students are reluctant to use Bb and they collaborate among themselves through other platforms which are easily accessible to them. Even though lecturers have shown less interest in using mobile phones to access the TEL (cf. table 21b and table 11), students are using their mobiles to access the LMS. These students using mobiles have joined many other South Africans who have already contributed to the phenomenal growth of the mobile sector whereby numbers of people are taking advantage of the information era by gaining access to content and services (Chipangura, Biljon & Botha, 2012). The students' results negate the point raised earlier stating that the use of mobile phones is expensive for them. Parr (2013) argues that smartphones are affordable as compared to computers, but they do have basic capabilities similar to those of computers.

The findings showed that lecturers were of the opinion that TEL can be a useful tool in the learning and teaching process at their institution. The use of SNs is perceived by lecturers as valuable while, on the contrary, students doubt the capability of academics. It is the opinion of students that some academics cannot use technology, including reading emails. SNs are also perceived as tools that are useful not only for socialisation, but also for the learning and teaching process; they are beneficial to both students and lecturers. The results show that some social media, such as Twitter, could be useful in following experts in a particular field and learning from them. With regard to Facebook, lecturers or even students could create groups to enhance student learning, whereby students could collaborate and interact with a lecturer simultaneously. The user could also experience informal mentoring from the experts who contribute to these SNs.

Findings showed that most lecturers had no support in using TEL from anyone on their campus (cf. table 4b). This is supported by the students (cf. figure 26) who indicated that they had no knowledge of a unit that manages TEL nor do they know of an official who helps users with technical challenges. The few lecturers who receive support in a week from the TEL unit consider it inadequate. With regard to training, the majority of the academics who find the connectivity reliable also find the training adequate, whereas 20% feel that the training is inadequate. On the other hand, 100% of the academics who feel that the connectivity is unreliable perceive the training as inadequate. The qualitative data also depict that although the lecturers are offered TEL training, it is difficult to use for most of them because they do not have basic computer skills. The insufficiency of the training of the lecturers in the use of TEL is also insinuated by the students, according to figure 26, indicating that the lecturers are not conversant with the use of TEL techniques. Not only do the students feel that their lecturers are not conversant with the use of TEL, but there is an insignificant difference between responses of the students declaring their confidence. Fifty-seven percent (57%) of the respondents indicate that they are confident in using TEL and 43% state they are not confident. The above shows once more that the perception of stakeholders in terms of training differs (cf. table 6). Perhaps lack of knowledge of the TEL unit and lack of adequate training, depicted in figure 26, is due to a lack of sustained marketing for TEL. The only advocacy that is visible is an invitation to TEL training which the respondents consider to be poorly attended (cf. figure 14c).

It is pivotal for all stakeholders at the university to be fully involved in the implementation process of TEL and be aware of existing ICT facilities and services and their importance in relation to their specific tasks to address the attitude problem. The reason why stakeholders frequently display a negative attitude is because they have a limited knowledge of technology (Sife et al., 2007). The negative attitude that the qualitative data have revealed may be created by the understanding of TEL by academics and students. Although the majority of lecturers showed uncertainty with regard to the use of TEL, they also understand the principles of e-Learning. On the other hand, lecturers are of the opinion that TEL is a useful technique (cf. figure 16). However, it is surprising to note that lecturers prefer F2F class discussions over TEL methodologies, including blended methodology. This is not the case at Medunsa only; in the study conducted by Eburn (2003), students rated the use of TEL as least useful and indicated that they preferred traditional study materials over soft or online study material. This attitude that informed their F2F preference may

be a result of one of the challenges listed by Allan et al. (2012) noting that academics need to be supported to move from an instructional to a constructive use of TEL.

There is a need to support academics and guide them through areas of discovery. This scaffolding process will help them to reach a more powerful level of understanding of TEL. If academics are scaffolded to the ZPD by knowledgeable others, they will be able to help their students reach their potential levels of development (Eggen & Kaukacha, 2013; Ravenscroft, 2001). Academics have explicitly indicated that they prefer CDs and DVDs as a methodology they might use from the TEL family, above all other TEL components (figures 21a and 21b). The negative attitude toward the use of TEL might also result from a lack of knowledge and awareness on the academics' side regarding the availability of a policy on TEL. Table 6 depicts a vast difference in responses between those who are aware of the policy and those who are not aware of it. Eighty-six percent (86%) of the lecturers indicate that they are not aware of the policy on the use of TEL. It is possible that a lack of knowledge results in academics not being passionate about TEL as perceived by other stakeholders, for example, campus management and students. Findings also showed one of the reasons why academics are not using TEL is resistance to change; academics prefer their accustomed way of teaching and feel that it is the best. In order to change the attitude of stakeholders, Sife et al. (2007) suggest that awareness programmes be organised, such as a visit to a similar institution where success has occurred and that short training sessions be conducted.

#### **6.2.4 Factors that affect the implementation of technology enhanced learning**

This theme aimed at exploring factors that affect the implementation of TEL. There are many factors that affect implementation of TEL at HILs that are also applicable to the Medunsa campus. The findings of this study with regard to the factors that affect implementation of TEL are discussed according to a number of broad categories outlined by Warburton (2009), namely, technical support; identity and cultural influences; collaboration; and policy.

##### **6.2.4.1 Technical support**

Sife et al. (2007) and Ndime et al. (2008) perceive technical support as an important part of the implementation and integration of ICT into an education system because lecturers and students require some basic problem-solving skills to overcome technical problems. In terms of hardware, software, bandwidth, including connectivity, and the skill to use all these, the study has revealed that there are resources and facilities at the institution. It seems that although the majority of academics declare that they have PCs in their offices, it is a matter of concern that there are some

academics without computers (table 6), although they are trivial in number. It is not expected of HILs to have members of staff, among others academics, who do not have basic facilities to implement the core business of an HIL, which is learning and teaching. It should be standard for every lecturer to have a computer for support in the learning and teaching process. Findings further revealed that the majority of students (cf. table 8) lack TEL facilities and resources at home and therefore rely strongly on the university's resources and facilities. Findings also showed disparity among users with regard to connectivity, whereby academics consider the Internet to be reliable and students feel the opposite (table 4a and table 12). The study also revealed that there is a unit dealing with TEL matters of which the university community is not aware. This is relevant to the support users have from the institution. The findings show that technical support for users is inadequate, possibly the reason why users are not keen to use TEL. The majority of users indicate that they are not aware of the existence of a support unit available for them. This situation is similar to that at the Lybia University where users in their reflections were not sure if technical support was available and could deal with their challenges (Rhema & Miliszewska, 2011).

#### **6.2.4.2 Identity and cultural influences**

McInerney, Hinkley and Dowson (1998) propose that academic achievements are influenced by a complex array of motivational determinants, including cultural orientation. Cultural influences include the type of settlement the respondents come from, the community of certain age groups, their level of education and attitude to the social use of technology. The age of users and their level of education are also determinants of the culture of a group. According to table 8, the study finds that the majority of students (45%) are from Limpopo Province, which is composed mainly of rural areas and for this reason is classified as a rural province. Three percent (3%) of the student population are foreign students from other African countries such as Namibia, Nigeria, Swaziland and Zimbabwe. The same table also shows that the majority of students (66%) at the Medunsa campus are female. Not only the above elements of culture would affect the implementation of TEL, but also where the students reside while at university, would play a pivotal role in the implementation of TEL.

As stated by Ndime et al. (2008), "people's behaviour towards an object is a function of intention", people engage in an activity if they see their predecessors succeeding in it. This relates to the ZPD where the student looks at the knowledgeable other whose intention is to give direction and if this knowledgeable other fails, the student will not be willing to undertake the activity. Findings revealed that the majority of academics are young, and aged between 25 and 40. Although the

lecturers find TEL to be useful (figure 16), they do not use it to enhance the teaching and learning process. This does not encourage students either to use technology to enhance their learning. Although students have access to the technology seven days a week (figure 23), they do not use it for learning purposes, thereby following the paths of their knowledgeable others. It is common knowledge that younger people, who are referred to as digital natives, should be knowledgeable in technology, but this is not the case in this study. Findings revealed that students aged between 16 and 21 (cf. figure 24) have no prior knowledge in the use of technology, although in Tanzania such students without prior knowledge coped easily in using TEL (Ndume et.al, 2008).

#### **6.2.4.3 Collaboration**

Academics and students can collaborate with each other as peers and significant others. The importance of the collaboration is to create a dialogue that helps the collaborating parties to build up a common basis for thinking together and reveal the incoherence in people's thoughts. By so doing, the collaborating parties are able to reach a higher level of consciousness and creativity. They are able remain in touch with thoughts and feelings (Huang et al., 1998). According to Njenga (2011), this dialogue or communication is vital in the collaboration within professional networks and should encourage the use of this interpersonal communication within homophilous groups. In this study, collaboration was explored in relation to whether there is effective collaboration between the major stakeholders for academic purposes and if there is, how frequently it occurs.

In terms of the lecturers, findings revealed that the lecturers who considered that connectivity was not reliable do use the LMS more frequently than others to keep in touch with students. Lecturers indicate that they use LMS to collaborate with students five days a week (cf. table 4b) though some responded that they use technology mostly for emails, typing, preparing notes, maybe due to the reason that it is much easier to use emails for communication, as was the case in Tanzania (Ndume et al., 2008). The same table further exhibits that although the academics indicated that they do collaborate with their students, an insignificant number of respondents who perceive connectivity to be reliable indicate that they facilitate online discussions with the students. The remainder of academics never facilitate online discussions with students. It is also found that there are no TEL components at the institution that encourage collaboration, except for a tool that is used only by the Department of Public Health (Amber.net technology). The qualitative data showed that most lecturers use Facebook to collaborate with their students, but because the university management decided to close the site, there is no other tool that academics and students use for the purposes of learning and teaching.

#### **6.2.4.4 Policy issues**

Concurring with the statement by Czeriewicz and Brown (2009) that the practices of any user do not occur in a vacuum, this researcher considers that there should be a policy stating the institution's goals, values and resources and governing practice. Findings showed that there is a draft policy on TEL titled "ICT e-Learning policies and procedures". This policy has been in draft format since 2011 but the university community is not aware of its existence. The policy does not give sufficient guidance on matters pertaining to TEL and its procedures, which poses challenges in the implementation of e-Learning. This view is also expressed by Ndume et al. (2008:48) who consider that "lack of vision and framework in implementing e-Learning lead to failure of these e-Learning projects". There are indications that the policy outlines explicitly the six positions UL takes regarding TEL that speaks to computerised technologies but does not touch on other forms of TEL. Findings also showed no links between the TEL policy and other policies of importance, such as the teaching and learning policy and the ICT policy, except that the TEL policy seems to be a subset of ICT policy.

### **6.3 Recommendations**

Various conclusions arrived at in this investigation on TEL as a support tool for the learning and teaching process in higher education show that there are many problems that still need to be addressed. This section deals with the recommendations emanating from the results and findings of the study.

#### **6.3.1 Recommendation 1: Strategy for successful TEL implementation**

Before any institution can implement TEL, there must be a sound strategy for implementation based on the institution's resources and competencies. There are pointers to be considered when developing an implementation strategy which Sife et al. (2007: 63) outline, as follows:

- (i) ICT infrastructure already in place; (ii) ICT skill levels in the institution; (iii) number of staff and students in each department and projected growth; (iv) academic management process: curriculum development, assessment methods and administration; (v) cost-effectiveness analysis (including hidden costs) and the choice of proper technologies for the needs of the institution; and (vi) staff development in new technologies.

The university should ensure that it has competent support personnel with skills, knowledge and experience on the use of TEL. In addition, the institution itself should possess competence such as processes, management systems, a learning culture, as well as an accumulation of skills and experience of employees. These elements would result in assets that would remain part of the institution even if employees leave it (Aamer & Saleem, 2014). Such a strategy would ensure that the situation that has arisen at Medunsa whereby skilled personnel left the employment of the institution leading to the collapse of the whole TEL initiative, according to the findings previously discussed, would not occur again.

### **6.3.2 Recommendation 2: Evaluating resources and capacity**

Ndime et al. (2008) argue that it is important to analyse the availability of, and access to, resources and capacity before implementing the TEL programme. This analysis helps to know where to start when implementing TEL and gives an indication of what is available and what skills are needed. At Medunsa, the implementation of e-Learning is not yet successful. The findings reveal that there is a lack of adequate skills on the part of users and management in using TEL for teaching and learning. This institution might have some of the resources but there are limitations, for example, the closure of SNs during the day and total lack of access to computer laboratories after hours.

### **6.3.3 Recommendation 3: Training of staff on the use of TEL**

Resistance to change results from a lack of training; the facilitators of learning shun the use of e-Learning as one of their methods of teaching. In the case under discussion, academics have become resistant to change and avoid using technology to teach because of a lack of training. It is imperative for facilitators of learning to train on the use of TEL because it provides the capacity, skills and knowledge that drive e-Learning as an instructional offering (Odunaike et al., 2013). Sife et al., (2007) propose that in addition to the improvement of lecturers' skills, training and workshops are needed to get academics involved in the process of implementing TEL at HILs. These authors further state that staff training should be continuous with regular updates on the development of new technologies. The university should train both new and existing staff in relevant TEL methodologies and pedagogies as part of initial training and continuous professional development. Different forms of training should be in place for different groups of academic staff. All staff members who join the university should attend a certification course on the use of TEL, even though they might have been using TEL at their previous place of employment. The reason for training everyone is that there are various LMSs in the market that universities are

customising. Those who are already in the university system and who have not been trained to use TEL should be given an opportunity for in-service training. Those who have been trained should attend a seminar for the purpose of re-skilling and retooling, and for introducing them to new trends in technology. Because of the difficulties lecturers may encounter during training, those who have never been trained in basic computer literacy should begin there as part of the total course package. Training should not be focused only on lecturers. Warlick and Dewey (2014) advocate that institutions provide training to students as well, especially first-year students, to adequately prepare them for TEL. Students should take a compulsory basic computer literacy module with TEL as component.

#### **6.3.4 Recommendation 4: Employment and training of additional TEL-skilled support staff**

The university should employ skilled support staff who will give support to academics on the use of TEL or invest in current staff by training them. Support staff should be able to support academics on both technical and academic matters. A unit dealing with TEL should be established. The findings in this study revealed that the support service for academics is spread among several service points: ICT for technical support; CAE for facilitation strategies; and content from the curriculum specialist who has now left the employment of the university. It is therefore important for the university to establish a TEL support unit that will assist the academics in totality, a “one-stop-shop” for the use of TEL.

#### **6.3.5 Recommendation 5: Integration of other TEL components into LMS**

For a fully-functioning TEL, the university should open all social networking sites that were used by (\*cross check sense) for collaboration, so that students are able to use them for social learning purposes and integration with the institutional LMS. Bb is not the sole TEL component. All other TEL components that are based within a specific department, such as Amber.net and the one at the Human Anatomy department should be incorporated with the LMS so that it can be managed from the same unit. Integrating other TEL components with LMS would allow end-users to collaborate and share information with ease.

#### **6.3.6 Recommendation 6: Provision of resources for TEL**

Although the university has  $\pm 600$  computers, this total of machines does not cater for the current population of students. As a result, some stakeholders cannot make use of university facilities. For successful implementation of TEL, the university should consider providing a notebook or tablet to every student who enrolls with the university and charging a minimum for this tool in the student

fees, as is the practice with fees for textbooks and study manuals. The other option would be for the university to negotiate with a computer supplier on the same basis as the purchase of computers for university personnel. Students could buy directly from the supplier/s at a discounted price.

### **6.3.7 Recommendation 7: TEL policy development**

The university should revise the draft policy, involving all stakeholders and finalise it. The policy should be clear on the role and use of TEL and show how it links to other important policies such as those for teaching and learning and ICT. Under the auspices of the TEL unit, the university should present seminars and workshops, educating all relevant stakeholders on the policy. Information on the policy should be presented during the training to be conducted for all new staff members.

### **6.3.8 Recommendation 8: Strengthening of Medunsa broad bandwidth to increase connectivity speed**

The reliability of the Internet is dependent on the strength of the country's bandwidth, which exerts pressure on network service providers who eventually impose a data cap (monthly data limit on subscribers). The unreliability of Internet services at Medunsa may be the result of this capping and the weak bandwidth of the country. There is a need to address the bandwidth to increase Internet speed at Medunsa.

## **6.4 Conclusion**

Undoubtedly, TEL provides a unique opportunity for HILs, not only in South Africa but also across the world. The literature study shows that the HE landscape is changing significantly as a result of technological innovation and change in societal needs. The open access policy advocated by the Department of Higher Education states that the right to learn, as enshrined in the South African Bill of Rights, has the potential to expand and globalise South African higher education, which would positively change the student profile. The learning and teaching responsibility has been taken away from the hands of the significant others to the hands of the students. Learning has become more learner-centred in approach with students taking charge of their own learning. In their preparation, lecturers should take into cognisance the learning abilities and styles of the students and still ensure that learning has substance.

In conformity with other HILs, Medunsa has embraced the use of technology to enhance learning. It has partially implemented the use of technology to enhance learning, with a focus on computerised technologies. Institutionally, the university is using Bb and one of the departments (Public Health) uses Amber.net as their LMS with the two technologies being managed separately. Yet although Medunsa has adopted TEL technologies to improve learning and teaching processes, the intended users have shown a lack of interest in using these technologies. Though the campus has Internet connection, it is not yet well-resourced with facilities that would assist in enhancing learning through various learning and teaching technologies, with the exception of the newly-erected e-Learning centre. The researcher has concluded that the campus is not well-resourced based on his understanding of TEL and of how other scholars define TEL. Medunsa has selectively used one component of TEL, i.e. LMS, which is not the sole component.

It appears that the strategic plan for the implementation of TEL has not been adequately formulated. Before implementation of the technology, several matters required serious consideration, for example, pedagogical, technical and cost issues. It is possible that inadequate attention was paid to these issues at a crucial stage of development. Although the university has resources in place, such as the state-of-the-art e-Learning centre, WIFI and the provision of computers for students, attitudes have played an influential role in the level of success of the implementation process. The lack of a clear and unequivocal TEL policy may have given rise to these questionable and antipathetic attitudes. The fact that many stakeholders are ignorant of the very existence of such a policy highlights fatal flaws in administration. Policy underpins processes and procedures, giving them both direction and credibility.

Following the findings and discussions above, the study suggests a successful strategy for TEL implementation for Medunsa campus. The importance of having a strategy to implement TEL cannot be overemphasised. Emphasising the importance of strategy, Aamer and Saleem (2014:23) explain the following:

In the past, there was less focus on e-Learning strategy and more on e-Learning implementation without a realization that unless there was a successful strategy to launch and sustain e-Learning initiatives, the exercise would never yield required results in universities.

Figure 30 depicts a strategy built from a combination of Young's (2007) five main elements, Khan's (2001) e-Learning framework and Hanfland's (2007) transition phase. This suggested strategy is

interconnected and provides the knowledge, skills, tools, and support required to implement TEL effectively. The strategy is explained in table 14 beneath the strategy.

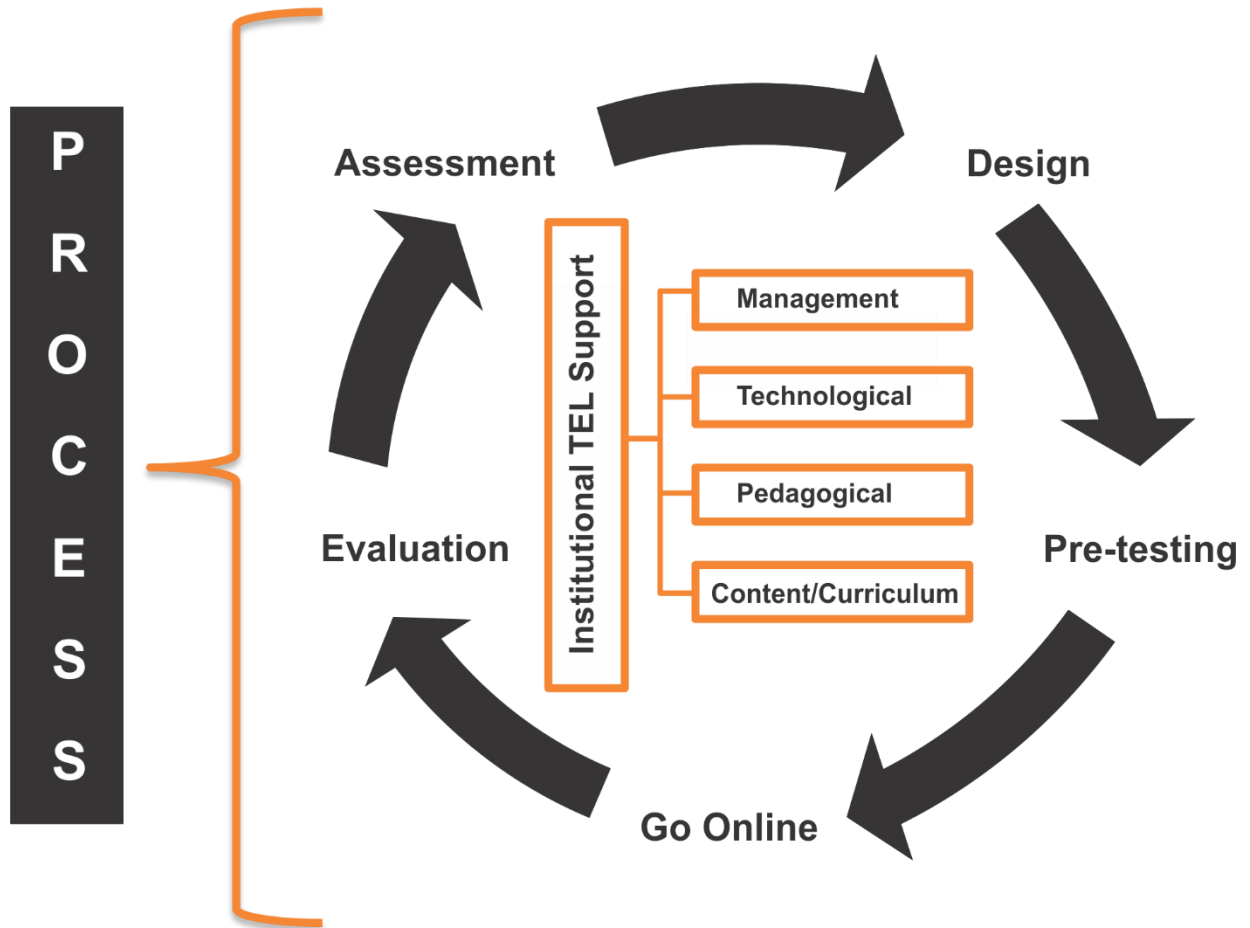


Figure 30: Proposed integrated TEL strategy for Medunsa campus

**Table 14: Explanation of proposed integrated TEL strategy**

<b>Dimensions of TEL</b>	<b>Descriptions</b>
Institutional Support	Institution chooses the appropriate mode of TEL. The institution provides support concerning administrative affairs, academic affairs and student services related to TEL, including development of policy on TEL.
Management	The management of TEL refers to the maintenance of the learning environment and distribution of information.
Technological	The technological dimension of TEL examines issues of technology infrastructure in TEL environments. This includes infrastructure planning, hardware, software connectivity and broad bandwidth.
Pedagogical	The pedagogical dimension of TEL refers to teaching and learning. This dimension addresses issues concerning teaching and learning methodologies.
Content	The content dimension of TEL refers to content analysis, audience analysis, goal analysis, medium analysis, design approach, organisation.
Assessment	Assessment refers to analysing the university community needs and assessing the technological, content, change management and organisational development requirements.
Design	Design refers to the overall look and feel of TEL programmes. It encompasses designing the page and site, technology strategy, content strategy, change management plan and the organisational development plan.
Pre-testing the system	Pre-testing of the system refers to checking if the system works well and it is not complicated for the users before it goes online.
Go Online	It refers to opening the system for access through the Net. The system can be accessed by anyone, at any time, and anywhere.
Evaluation	The evaluation for TEL includes both assessment of students and evaluation of the instruction, learning environment, technology functionality, content effectiveness and measured return on investment

By means of qualitative and quantitative data-collection instruments, this empirical investigation has attempted to answer the question: “To what extent has the University of Limpopo, Medunsa campus, implemented the TEL technique as a support tool for learning and teaching processes?” The study has contributed to the broader body of knowledge by providing an understanding of how TEL is implemented as a support tool for the learning and teaching process in higher education. The research should enable the university leadership and management, policymakers

and TEL advocates to focus on ways to improve the university's strategic plan on the implementation of TEL at this institution.

TEL support is central to all university structures, particularly in enhancing learning and teaching through technology. Central to it is the support needed to implement TEL. The first step is to establish the unit whose responsibility it would be to support the university on TEL matters. The areas of support displayed in the centre of the strategy require a unit that will support the university community on TEL matters both technically and academically. The table below, adapted from Khan (2009) with infusion of Young's (2007) elements and those of Hanfland (2007), presents a description of the strategy (figure 28). The institutional TEL support team should also ensure that the policy on TEL is developed and implemented.

## **6.5 Further research**

This study has contributed to the broader body of knowledge, providing a clear strategy that Medunsa can use to successfully implement TEL. The strategy was carefully constructed after considering the availability of resources and the competence level of users in using TEL platforms. This was achieved by focusing on answering the research questions asked in chapter 1 (cf. page 9). From this study, discontinuities have been found which may give birth to further research in the broad area of TEL in higher education. Further research to be conducted could focus on areas such as the use of TEL in health science education, the use of social media in teaching and learning and evaluation of this proposed integrated strategy to implement e-Learning at Medunsa.

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## APPENDICES

### APPENDIX A

#### ONLINE INFORMED CONSENT FOR PARTICIPANTS

**Title of the Study:** Technology Enhanced Learning as a Support tool for the Health Sciences Learning and Teaching Process: A Case Study

**Researcher:** Geoffrey Pinagase Tshephe

**Contact Details:** [mojefino.springbock@gmail.com](mailto:mojefino.springbock@gmail.com)

079 697 7701

You are invited to participate in a research study conducted at the University of Limpopo, Medunsa Campus. The study is about the implementation and the use of online learning technique as a tool that is used to enhance learning at the Institutions of Higher learning. This study is focusing on Medunsa as a case and look at all aspects of online learning, referred to as Technology Enhanced Learning (TEL). The University's Research Committee, Medunsa Research and Ethics Committee (MREC) has given me permission to conduct this study. You will be asked to complete an online survey about, how do we use electronic media to enhance learning at the Universities. This questionnaire will take approximately 10 minutes of your time. If you have any questions before you complete this survey, please email me at the email address provided, [mojefino.springbock@gmail.com](mailto:mojefino.springbock@gmail.com).

All the survey responses will be completely confidential. Responses will be sent to a link at SurveyMonkey.com where data will be stored in a password protected electronic format. Survey Monkey does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. You may withdraw your consent and discontinue participation in this survey at any time. Your refusal to participate will not result in any penalty and there are no foreseeable risks involved in participating in this.

The results of the study will be used for scholarly purposes only, for example, for my PhD

studies, presented in educational settings (professional conferences) and might be published in a professional journal. The results will also be available to the University and any participant who may wish to see them.

By clicking “Agree” below you acknowledge that you have read and understood this document. You also acknowledge that:

- You are a registered student at the University of Limpopo, Medunsa Campus
- Your participation in this survey is voluntary
- You have given consent to be a subject of this research

*NB: If you do not click on the “submit” button at the end of the survey, your answers and participation will not be recorded. Please select your choice below. You may print a copy of this consent form for your records.*

Next

## APPENDIX B

### ONLINE QUESTIONNAIRE FOR ACADEMIC STAFF

**This questionnaire aims to investigate the use of Technology Enhanced Learning (TEL) as a support tool for the Health Sciences Learning and Teaching process: A case study**

#### INSTRUCTIONS:

λ You are kindly requested to fill in this questionnaire as accurate and honest as you can.

λ This information will be kept in strict confidence

λ Click on the appropriate box to indicate your choice

λ Kindly click on submit button at the end of the survey to send it back to me

\*2. What is your gender?

Other (please specify)

\*3. Which category below includes your age?

\*4. Your Highest Qualifications

Other (please specify)

\*5. Your Rank

Other (please specify)

\*6. Your Nature of Employment

Other (please specify)

\*7. Which School or Support Unit do you belong to?

Support Unit (please specify)

\*8. How reliable is your university's internet services?

9. If your internet services are not reliable, what might be the reasons?



\*10. When first did you use a computer?

\*11. What do you use the computer for? (You may mark more than one response)

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Reading emails         | <input type="checkbox"/> Surfing the Net                      |
| <input type="checkbox"/> Typing students' assessment tasks | <input type="checkbox"/> Accessing Learning Management System |
| <input type="checkbox"/> Preparing class notes             | <input type="checkbox"/> Never use it                         |

12. If you are NOT using computers, what are the reasons for not using them?

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Lack of Interest   | <input type="checkbox"/> No need to use it               | <input type="checkbox"/> No access to computer |
| <input type="checkbox"/> Lack of Skill      | <input type="checkbox"/> I have phobia to technology     | <input type="checkbox"/> No time to use it     |
| <input type="checkbox"/> Lack of Confidence | <input type="checkbox"/> Never got opportunity to use it |  |

\*13. How often do you receive information about eLearning?

\*14. What kind of experiences have you had with eLearning? (You may choose as many as apply)

- |   |   |
|---|---|
| <input type="checkbox"/> None   | <input type="checkbox"/> I attended a course on eLearning                       |
| <input type="checkbox"/> I have seen colleagues using it                  | <input type="checkbox"/> I am using it for teaching and learning                |
| <input type="checkbox"/> I have seen it being advertised at my university | <input type="checkbox"/> I heard about it from colleagues at another university |

\*15. Answer Yes or No

	Yes	No
Do you have a computer in your office?	<input type="radio"/>	<input type="radio"/>
Have you been trained to use eLearning techniques?	<input type="radio"/>	<input type="radio"/>
If trained, Do you think the training you received is adequate?	<input type="radio"/>	<input type="radio"/>
Do you have your own course/module site?	<input type="radio"/>	<input type="radio"/>
Do you get necessary support with regard to eLearning?	<input type="radio"/>	<input type="radio"/>
Do you have access to eLearning resources and facilities at home?	<input type="radio"/>	<input type="radio"/>
Do you have access to eLearning resources and facilities work?	<input type="radio"/>	<input type="radio"/>
Do you have a unit that deals with eLearning at your institution??	<input type="radio"/>	<input type="radio"/>

	Yes	No
Are you aware of any eLearning policy of your institution?	<input type="radio"/>	<input type="radio"/>

\*16. Frequency of using eLearning per week

	Never	Once	twice	Three	Four	Five
How often do you get support on eLearning on your campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you visit your campus Learning Management System (LMS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you collaborate online with your students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you post class notes online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you give assessment online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you facilitate online discussions for your students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*17. These are the five likert scale question, kindly check in an appropriate box from strongly disagree to strongly agree

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I find the use of eLearning easy in teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I clearly understand the principles of eLearning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy to gain knowledge in the use of eLearning for my teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*18. Which of the following eLearning facilities have you used for your learning and teaching processes?

<input type="checkbox"/> DVD	<input type="checkbox"/> Mobile phone	<input type="checkbox"/> Other (Specify)
<input type="checkbox"/> Audio tape	<input type="checkbox"/> Computers (CD ROM)	
<input type="checkbox"/> Video machine	<input type="checkbox"/> eLearning	
Other (please specify) <input style="width: 300px; height: 20px;" type="text"/>		

\*19. Which method of teaching do you prefer?

<input type="checkbox"/> Lecturing: Chalk and talk	<input type="checkbox"/> eLearning: Synchronous (Online at the same time)
<input type="checkbox"/> Lecturing: PowerPoint presentation	<input type="checkbox"/> Blended Learning

Discussion: Facilitating learning  Other (Specify)

eLearning: Asynchronous (offline)

Other (please specify)

\*20. Give motivation for your choice in 19 above

\*21. What is your opinion on the use of eLearning?

It is a good technique

It is going to fail

It is confusing

Nobody in my institution understand what it is

It is complicated

Never heard of that technique

Not relevant for this university

Other (Specify)

Other (please specify)

\*22. Clarify your answer in 21 above

Next

Thank you for participating in this survey, I value your responses.

Prev Done

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## APPENDIX C

### ONLINE QUESTIONNAIRE FOR STUDENTS

This questionnaire aims to investigate the use of Technology Enhanced Learning (TEL) as a support tool for the Health Sciences Learning and Teaching process: A case study

#### INSTRUCTIONS:

You are kindly requested to fill in this questionnaire as accurate and honest as you can.

- This information will be kept in strict confidence
- Click on the appropriate box to indicate your choice
- Kindly click on submit button at the end of the survey to send it back to me

1. What is your gender?

Other (please specify)

2. Which category below includes your age?

3. Which Province do you come from?

4. If you are from outside South Africa, which Country do you come from?

5. While at the University, where are you staying?

6. What is your programme of study?

7. Where do you access your Technology Enhanced Learning facilities and resources? (you may click on as many boxes as you can)

- |   |  |
|---|--|
| <input type="checkbox"/> on campus            | <input type="checkbox"/> using my smartphone |
| <input type="checkbox"/> at home              | <input type="checkbox"/> using my tablet     |
| <input type="checkbox"/> at the internet café | <input type="checkbox"/> other (specify)     |

Other (please specify)

8. If you do not have access to Technology Enhanced Learning facilities and resources what might be the problem?

- The University closed all the relevant internet sites
- Lack of connectivity from home
- Lack of facilities in the area I am staying
- Technology Enhanced Learning devices are too expensive
- Lack of necessary skills to use the Technology
- I do not have personal electronic devices to use

9. How reliable is your university's internet services?

10. If your internet services are not reliable, what might be the reasons?

11. Who taught you to use computers?

- Self taught
- My friends
- Went to computer college
- An inbuilt module in my programme of study
- Compulsory Module for all first year students at my Institution
- I cannot use it

12. How frequently do you use computer?

- ? Seven days a week
- One to three days a week
- One to Six days a week
- Once in a while
- Never

13. If you are NOT using TEL, what are the reasons for not using them?

- Lack of Interest
- Lack of Skill
- Lack of Confidence
- No need to use it
- I have phobia to technology
- Never got opportunity to use it
- No access to computer
- No time to use it

14. These are the three Likert scale question, kindly check in an appropriate box

	Agree	Neutral	Disagree
I can use technology to enhance my learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am aware of the computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Agree	Neutral	Disagree
laboratories in my university			
I have access to the computer laboratories in my university	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not know what is meant by Technology Enhanced Learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have surfed the Net before	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is interesting to work online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do access the internet through my electronic device	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can access Social Networks using my electronic device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy accessing the Net on my electronic device	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not have interest in the use of technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Answer Yes or No

	Yes	No
Have you ever been trained on using eLearning techniques?	<input type="radio"/>	<input type="radio"/>
Have you ever done any training on internet applications?	<input checked="" type="radio"/>	<input type="radio"/>
Are you confident in using the eLearning techniques?	<input type="radio"/>	<input type="radio"/>
Is there any course or module	<input checked="" type="radio"/>	<input type="radio"/>

	Yes	No
in your studies that is offered through eLearning?		
Do you think eLearning techniques are used effectively in your institution?	<input type="radio"/>	<input type="radio"/>
Do you think the advocacy of this technique is adequate?	<input type="checkbox"/>	<input type="checkbox"/>
Do you know of any technical person who can help you with the technique in your campus	<input type="radio"/>	<input type="radio"/>
Do you think your lecturer is conversant with the technique?	<input type="checkbox"/>	<input type="checkbox"/>

16. ELearning is important because it helps me to (You may tick more than one answer)

- |   |   |
|---|---|
| <input type="checkbox"/> Learn at my own pace               | <input type="checkbox"/> Have interaction with other students     |
| <input type="checkbox"/> Learn on my own                    | <input type="checkbox"/> Have access to more information          |
| <input type="checkbox"/> Learn at my own place              | <input type="checkbox"/> Have access to my instructors at anytime |
| <input type="checkbox"/> Have access to learning at anytime | <input type="checkbox"/> Other (Specify)                          |

Other (please specify)

17. In your own opinion, what is eLearning ?

18. Which learning and teaching mode do you prefer?

- |  |  |
|--|--|
| <input type="checkbox"/> Lecturing           | <input type="checkbox"/> eLearning       |
| <input type="checkbox"/> Discussion          | <input type="checkbox"/> Other (Specify) |
| <input type="checkbox"/> Paper presentations |  |

Other (please specify)

19. Give motivation for your answer in 18 above

20. What method of eLearning would you prefer?

- |  |  |
|--|--|
| <input type="checkbox"/> Blended learning      | <input type="checkbox"/> Computer CD ROM |
| <input type="checkbox"/> Asynchronous learning | <input type="checkbox"/> Audio           |
| <input type="checkbox"/> Synchronous learning  | <input type="checkbox"/> Audio-Visual    |
| <input type="checkbox"/> Instruction led-group | <input type="checkbox"/> Other (Specify) |

Other (please specify)

21. Give motivation for your choice in 19 above

22. In your own opinion, what are the challenges your institution is encountering in the implementation of eLearning?

Next

Thank you for participating in this survey, I value your responses.

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## APPENDIX D

### INTERVIEWS SCHEDULE FOR ELEARNING SPECIALIST/ DIRECTOR OF ELEARNING/ CAE EXECUTIVE DIRECTOR/ THE EXECUTIVE DEAN

*This Interview Schedule aims to investigate the use of Technology Enhanced Learning (TEL) as a support tool for the Health Sciences Learning and Teaching process at the Medunsa Campus of the University of Limpopo.*

#### Perception and expectation in the implementation of TEL

##### **1. Understanding of TEL**

- What do you understand by Technology Enhanced Learning?
- What Learning Management System do you use?
- Which other TEL techniques are you using as an institution and why?
- Are your academics using Social Networks (SN) to enhance their teaching and why?
- How useful are the TEL techniques you are using, including your institution's Learning Management System (LMS)?

##### **2. Quality of Teaching and Learning using TEL**

- How does TEL add value in learning and teaching in your institution?
- How do you assure quality when using TEL?
- How secure is your network in terms of assessment leakages?

##### **3. Future of TEL**

- Is TEL fully implemented in your institution and why?
- Do you think in future TEL has a place in your institution and why?
- How do your academics and students perceive the use of TEL at your institution?

##### **4. Pros and cons of TEL**

- What are the advantages of TEL in your institution?
- What are the disadvantages of TEL in your institution?

#### Access to facilities and resources and support given to users

##### **5. Training of users and skills users possess**

- Are your students and academics trained in the use of TEL and what are they trained on?
- How do you ensure that your academics have basic computer skills, needed for the use of TEL?
- Do you have any plans to train your staff in the use of TEL, if so How?
- How are you supporting your users in their use of TEL?

##### **6. Availability of relevance and access to resources and facilities**

- Do your staff and students have access to all the sites they need to use for their learning and teaching process?
- Do you have HOTSPOT where students can connect using their own devices for the purposes of learning?
- Do the students have access to internet at their residences including outside residences?

### ***7. TEL tools used at the University of Limpopo***

- How many computers do you have in all your laboratories and can they serve the student population in your institution.
- Apart from the computer laboratories you have, where-else and what-else can students and academics use to access their LMS and other sites needed for learning and teaching?

### **Factors inhibiting or prohibiting the implementation of TEL**

#### ***8. challenges in implementation of TEL***

- What are the main challenges you encounter in the implement of TEL at your institution?
- What is your success?

### **Strategies to implement TEL at the Medunsa Campus.**

#### ***9. Ways in which TEL is implemented***

- How do you plan to implement TEL at this institution?
- Where to start?

### **Technology Enhanced Learning Policy and operations**

- Under which directorate is the TEL housed?
- Do you have dedicated qualified staff for TEL
- Do you have a policy to govern the use of TEL in your institution?

***Thank you for your time.***

## APPENDIX E

### OBSERVATION CHECKLIST

NAME OF THE INSTITUTION: **University of Limpopo (Medunsa Campus)**

DATE: \_\_\_\_\_

#### Checklist Schedule

OBSERVATION		YES	NO
1	Lecturers have basic computer skills		
2	Students have basic computer skills		
3	Both students and lecturers are trained on eLearning		
4	Both students and lectures are well supported in the use of TEL		
5	The lecturers' offices are furnished with computers		
6	Lecturers can surf the net at anytime		
7	Medunsa campus is well resourced with eLearning facilities		
8	The campus has enough computer laboratories		
9	The computers in the laboratories are connected to internet		
10	Laboratories are open 24 hours daily		
11	Students' residences have access to internet		
12	The university has HOTSPOT for the users during the day		
13	There is a unit responsible for eLearning techniques		
14	The person in charge of eLearning is well trained in the field		
15	TEL tool is used maximally		
16	There are policies governing eLearning		
17	A well-articulated policy on blended learning is in place		

#### Descriptive Observation

Date & Time	Situation	Participants	Observation	Reflection

*Adapted from Source (Maree, 2007)*



## APPENDIX F: DOCUMENT ANALYSIS SCHEDULE

<b>Author/creator</b>		<b>Status of the Document</b>	
<b>Context (place and time when the document was created)</b>			
<b>Type of document (photograph, pamphlet, government-issued document, newspaper article, diary entry, etc.)</b>			
<b>Intended audience</b>			
<b>Purpose for the document's creation</b>			
<b>Main points expressed in the document</b>			
<b>General message of the document (What is it trying to say? What perspective does it represent?)</b>			
<b>Significance of the document (So what? Why is this document important?)</b>			

<b>DOCUMENT INFORMATION (There are many possible ways to answer the questions below)</b>	
Why do you think this document was written?	
What does this document mean to me?	
What evidence in the document helps you know why it was written? Quote from the document.	
What question would you pose to the author that is left unanswered by the document:	

## **APPENDIX G**

### **LETTER: REQUEST TO COLLECT DATA**

P. O. Box 17562  
Pretoria North  
0116

25 March 2013

Professor P Govendor  
University of Limpopo- Medunsa Campus  
Research Office- MREC  
MEDUNSA  
0204

**Dear Prof Govendor**

#### **REQUEST TO COLLECT DATA AT MEDUNSA**

Kindly note the letter datSMAN\_18 March 2013 from the Acting Director: Postgraduate studies of the Faculty of Education (North-West University), on approval of my proposal. My study's target population is the Medunsa community, I therefore request MREC to allow me to collect data at the Medunsa campus of the University of Limpopo.

Kind regards,

---

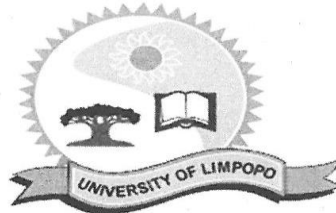
**Geoffrey Pinagase Tshephe**

Student Number-16087208

Contact- 0796977701

## APPENDIX H

### ETHICAL CLEARANCE CERTIFICATE FROM MEDUNSA



**University of Limpopo**  
**Medunsa Research Ethics Committee (MREC)**  
Prof GA Ogunbanjo: Chairperson MREC  
P.O Box 163, Medunsa, 0204, South Africa  
Tel: +27 12 521 5617/3359 Fax: +27 12 521 3749, Email: lorato.phiri@ul.ac.za

Mr GP Tshephe  
P.O Box 17562  
Pretoria North  
0116

Dear Mr Tshephe

**RE: REQUEST TO COLLECT DATA AT MEDUNSA**

**Researcher:** Mr GP Tshephe  
**Registered at:** University of North West  
**Student number:** 16087208  
**Faculty:** Faculty of Education, School of Postgraduate studies  
**Degree:** PhD Educational Technology

**Title:** Technology enhanced learning as a support tool for the Health Sciences learning and teaching process: A case study

Your request was discussed during the MREC meeting held on the 11 April 2013.

MREC **NOTED** that your protocol has been approved by University of North West Higher Degrees Committee on the 23 November, 2012.

MREC **APPROVED** the above mentioned protocol and granted you permission to conduct your study at Medunsa Campus.

Yours Sincerely,

  
PROF GA OGUNBANJO  
CHAIRPERSON MREC

11 April 2013



*Finding solutions for Africa*

**APPENDIX I**  
**EDITOR'S CERTIFICATE**

**TO WHOM IT MAY CONCERN**

July 2015

This document confirms that I, Dr Jane Murray, am a qualified language editor and have edited the following doctoral thesis:

**TECHNOLOGY ENHANCED LEARNING AS A SUPPORT TOOL FOR LEARNING AND TEACHING PROCESS IN HIGHER EDUCATION**

Name of student: **GEOFFREY PINAGASE TSHEPHE**

Submitted in partial fulfilment of the requirements for the degree

**Doctor of Philosophy in Educational Technology**

Faculty of Education Sciences: **NORTH-WEST UNIVERSITY**

**Dr Jane Murray**

MA (English): Unisa [cum laude]

DLitt et Phil (English): University of Johannesburg

Editing Principles and Practices: University of Pretoria [cum laude]

**Contact details**

072 342 0152

[jane@4with.co.za](mailto:jane@4with.co.za)