# A CRITICAL ANALYSIS OF THE IMPLEMENTATION OF E-LEARNING PLATFORMS AT SELECTED PUBLIC UNIVERSITIES IN ZIMBABWE

Submitted in fulfilment of the requirements of the

degree of **Doctor of Philosophy in** Management Sciences

Specialising in

Public Administration

in the

Faculty of Management Sciences

at the Durban University of Technology

**RICHARD MUNYANYI**

**OCTOBER 2021**

**SUPERVISOR: PROF. R BALKARAN** **DATE...** 05/11/2021

**CO-SUPERVISOR: PROF. V.P RAWJEE** **DATE...** 05/11/2021

## ABSTRACT

This research study set out to critically analyse the implementation of e-learning platforms in the teaching and learning processes at selected public universities in Zimbabwe. A questionnaire premised on ten major e-learning constructs was administered to Heads of Departments (HODs) and students regarding the implementation of e-learning initiatives. The constructs were: attitudes towards e-learning, commitment to the use of e-learning platform, complexity of the e-learning platform, user training, strategy on e-learning implementation, trialability, support and use of ICT resources by students, impact of e-learning, management commitment on e-learning use and its implementation, level of satisfaction, and barriers to e-learning. The questionnaire was administered to 100 HODs and 400 students at the University of Zimbabwe (UZ) and the Zimbabwe Open University (ZOU). In addition, the researcher carried out in-depth face-to-face interviews with the directors of the Information and Communications Technology departments in the two public institutions. The researcher therefore utilized quantitative and qualitative methods by using both questionnaires and interviews.

Responses were collated to form a dataset in SPSS from the closed-ended structured questions contained in the questionnaires. The data set was analyzed using the Statistical Package for Social Scientist (SPSS) version 24 for Windows and R 3.6.3. Several statistical approaches were employed to answer the objectives of the study. The following were the major statistical analysis techniques that were utilized: frequency tables, confirmatory factor analysis, explanatory factor analysis, descriptive statistics, t-tests, regression analysis and non-parametric tests (Kendall's coefficient of concordance). Frequency tables and descriptive statistics were used to generalize the responses of the participants concerning the use and implementation of e-learning platforms in local universities. Descriptive statistics such as correlation analysis were based on the calculated aggregated scores of the constructs of the study.

The major findings of the study were that public universities in Zimbabwe have made great strides in implementing e-learning platforms in the teaching and learning ecosystem. The research, however, noted certain factors that were affecting the

effective rollout of e-learning in the two public institutions under study. Major barriers to the implementation of e-learning platforms were identified as: inadequate ICT infrastructure, shortage of foreign currency to upgrade the hardware and software, digital skills gap and general attitude and resistance to change. The study revealed that generally, students were more prepared to use technology than their lecturers. Younger lecturers expressed more enthusiasm to infuse technology into the teaching and learning value chain compared to their older counterparts. Other findings were that most lecturers practicing in universities had not undergone basic training on pedagogy and webagogy; lecturers had not produced enough content to migrate 100% of their course content and delivery to online platforms; some students and lecturers still did not trust online learning and preferred blended learning as an alternative. The study found that there was no policy and rollout plan for e-learning implementation in the two public universities.

The researcher recommended that public universities should invest more in ICT infrastructure in terms of its acquisition, development and upgrading, enhance digital skills literacy for both lecturers and students, incentivize online teaching and content development, encourage collaboration among public universities as a way of cutting costs, reskill and upskill lecturers, and establish digital transformation centres dedicated to overseeing e-learning content development. Universities were urged to collaborate in the e-learning field so as to share knowledge, software and experience. A call was made for universities to share ICT infrastructure and apply for a free operating internet license and special spectrum for e-learning from the regulator Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) so as improve internet access and affordability.

# DECLARATION

CRITICAL ANALYSIS OF THE IMPLEMENTATION OF E-LEARNING PLATFORMS IN PUBLIC UNIVERSITIES IN ZIMBABWE

I, Richard Munyanyi hereby declare that this dissertation submitted for a Doctor of Philosophy in Public Administration, Faculty of Management Sciences at the Durban University of Technology, is my original work and has not been submitted to any other institution. I further declare that all sources cited or quoted have been acknowledged in the bibliography.

Signed …… Date: 3 November 2021

Student No 21452181

## DEDICATION

This dissertation is dedicated to my wife, Adeline and our great family for their overwhelming support in the completion of this project. Above all, I dedicate this project to the Almighty God.

# ACKNOWLEDGMENTS

I would like to thank a few people and organizations to whom I am indebted for their support and guidance and whose contributions led to the success of this study. I would like to extend my sincere appreciation to my thesis supervisors Professor R Balkaran and Professor V.P Rawjee for timely detailed guidance and critique. Special thanks to Dr G.K. Machengete for the priceless guidance. Special thanks go to the following:

- Staff and students – University of Zimbabwe
- Staff and students – Zimbabwe Open University
- Staff and students – Bindura University of Science Education
- Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development**.**

# TABLE OF CONTENTS

## LIST OF FIGURES

# LIST OF TABLES

# LIST OF ANNEXURES

# LIST OF ACRONYMS

| | |
|---|---|
| **LMS** | Learning Management Systems |
| **ICT** | Information and Communication Technology |
| **UZ** | University of Zimbabwe |
| **ZOU** | Zimbabwe Open University |
| **CAI** | Computer Assisted Instruction |
| **CBE** | Computer Based Education |
| **LMS** | Learning Management System |
| **CMI** | Computer Managed System |
| **CAE** | Computer Assisted Education |
| **ALE** | Artificial Learning Environment |
| **CSCL** | Computer Support for Collaborative learning |
| **REAL** | Rich Environment for Active Learning |
| **AI** | Artificial Intelligence |
| **VR** | Virtual Reality |
| **AR** | Augmented Reality |
| **VLE** | Virtual Learning Environment |
| **VLS** | Virtual Learning System |
| **HOD** | Head of Department |

# CHAPTER 1: OVERVIEW OF THE STUDY

## 1.1 INTRODUCTION

Globally, the emergence of cutting-edge technologies such as augmented/virtual learning, wearable computing, mobile applications, cloud computing, social media, big data processing, learning machines, and, most recently, artificial intelligence has had a big impact on e-learning in general, and in the way learners learn and teachers teach in particular (Axelsonn 2017). Most recently, e-learning has been significantly enhanced by the integration of artificial intelligence (AI) and BigblueButton (BbB), which is an add-in open-source web conferencing platform that is imbedded in learning management systems (LMS) (Gutiérrez *et al.* 2017). The introduction of e-learning platforms has seen learners asynchronously accessing learning material regardless of time and spatial separation (Gutiérrez *et al.* 2017). Advancement in e-learning technologies has also led to the development of technology-enhanced pedagogies such as flipped classrooms, gamification, and social-cultural contexts (Xie and Young 2018). Undoubtedly, these emerging technologies, pedagogics and advancement in information and communication technologies (ICTs), in general, have transformed the classroom from brick and mortar into digital learning spaces that enhance interactive learning in a process known as collaborative learning. This story however plays out differently in developing countries such as Zimbabwe.

The literature reviewed in this study showed that developing countries are still grappling with basic issues such as bandwidth, ICT infrastructure, and digital skills development. Notwithstanding these challenges, universities in Zimbabwe have tried various strategies to ensure that they digitize the teaching and learning process by embracing e-learning technologies and its associated software. Many scholars and articles reviewed in Chapter 2 argue that e-learning, when implemented effectively, enhances efficiency and effectiveness in the process of teaching and learning. It is therefore not surprising that Zimbabwean universities have invested huge sums of money in ICTs and its infrastructure relative to the budget allocations by the central government. Such investments, however, might be wasted if there is

no associated audit and research which tries to establish the level of utilization and the problems associated with the uptake of these technologies with a view to achieving better implementation of e-learning systems, processes, and procedures.

While the perceived benefits of technology-enhanced learning (e-learning) are recognized by many scholars such as Hwang and Wu (2014), Bora and Ahmed (2013), and Wang, Liu and Hwang (2017), questions continue to emerge as to whether teachers, learners, and institutions of higher learning are ready to adopt and implement these learning technologies in the teaching and learning value chains. The assumption that technology-based learning adds value to the teaching and learning processes is dispelled by Clark (1983) who argued that technologies have no more effect on learning than a grocery truck has on the nutritional value of the produce it brings to the market. With these overarching and contradicting views on e-learning, this study sought to conduct a critical analysis of the implementation of e-learning platforms at two public universities in Zimbabwe, namely, the University of Zimbabwe (UZ) and the Zimbabwe Open University (ZOU). The major aim of the study was to unpack e-learning implementation issues and subsequently proffer a generic e-learning implementation framework for public universities in Zimbabwe.

## 1.2 PROBLEM STATEMENT

Several studies have been carried out globally on the adoption of e-learning platforms. Analysis of these studies reveals that the studies were mostly carried out in European and Asian countries. The studies generalised their findings on e-learning even though scholars of e-learning such as Salmon (2014b) has observed that researchers need to be careful when interpreting findings on e-learning since they are affected by several factors such as culture, geographical location, technology, pedagogy, and user attitudes among an array of factors. Notably, existing studies on e-learning implementation also concentrated on only one of the three pillars of e-learning rather than a holistic approach that covers all three pillars. These single stakeholder approaches tend to provide only a one-sided view of e-learning adoption issues (Ansong, Anderson and Boateng, 2017). This study, therefore, incorporated all three pillars of e-learning, that is: technology, people, and

service, thereby unearthing new insights on e-learning implementation as a phenomenon from an African perspective. Further, it was observed that usage of ICTs in the teaching and learning process in university systems in Zimbabwe was still in its infancy (Govender and Chitanana 2016), despite huge investments in e-learning technologies and ICTs in general. It is in this context that this study was undertaken to critically unpack the discourse around e-learning implementation in public universities in Zimbabwe.

## 1.3 DEFINITION OF KEY TERMS

The following terms are explained hereunder so as contextualize their meaning in the study.

- **E-learning** – the application of ICT such as the internet, mobile phones, and other computer-aided systems in the teaching and learning process, either asynchronously or synchronously.
- **Virtual Reality** (VR) – computer technology that simulates reality using digital formats.
- **Augmented Reality (AR)** – the technology that converts artificial features such as 3D artefacts, multimedia content or text information into real-world images.
- **Information Technology Strategy** – the correct use of technology resources to enable information flow to the relevant audience at the right place and the appropriate time to facilitate a business or organization to deliver on its goals and objectives.
- **Learning Management Systems** – platforms used in online learning.
- **Online Collaborative Learning** is a theory (like connectivism) that stresses the importance of moving teaching and learning to the internet. It emphasizes three phases of knowledge construction: 1. Idea generating which involves brainstorming where various ideas are generated; 2. Idea organizing, which involves analysis and distillation of ideas; 3. Intellectual convergence which occurs when there is a synthesis of ideas and the creation of new knowledge.
- **Pedagogy and Webagogy** – Loveless (2011) defines pedagogy as a relationship, conversation, reflection, and action between teachers, learners,

subjects, and learning tools. Watkins and Mortimore (1999: 17) define pedagogy as “any conscious activity by one person designed to enhance learning in another”. Webagogy is thus ICT driven pedagogy.

- **Online learning theories** – online theories of learning are a scientific and proven description of variables that influence the online learning process (Mayes and Freitas 2004).
- **Blended Learning** – A mixture of face-to-face and online learning.
- **Moodle** – abbreviation for modular object-oriented dynamic learning environment, representing the most used and easy to use learning management system (LMS) (Costa, Alvelos and Teixera 2012).
- **Models of e-Learning Implementation** – These are theories that serve to explain diffusion of technology in the teaching and learning processes. One such theory is the technology acceptance theory (TAM).
- **Asynchronous e-learning** – This is a form of online study that uses an offline communication system.
- **Synchronous e-learning** – This form of online learning uses a real-time communication system.

## 1.4 BRIEF BACKGROUND TO THE STUDY

The major aim of this study was to carry out a critical analysis of the implementation of e-learning platforms in public universities in Zimbabwe thereby contributing to the body of knowledge on e-learning implementation issues in developing countries in general and Zimbabwe in particular. The study reviews several studies on e-learning implementation in Chapter 2 including those conducted by Hwang and Wu (2014) in Thailand, Bora and Ahmed (2013), Wang, Liu, and Hwang (2017) in China, Makokha and Mutisya (2016) in Kenya, Kassee and Bulunywa (2013) in Uganda, and Siritongtha and Paul (2006) in Thailand. In addition to the valuable information added to the body of knowledge on e-learning by these studies, these scholars also ignited the need for researchers to further explore the gap that existed between technology acquisition by institutions of higher learning and user readiness in the e-learning implementation matrix. These studies were mostly conducted in developed

countries whose situation is different from that of developing countries. This study could be viewed as a direct response to this reality.

Apricio, Bacao and Olivia (2016) categorized studies on e-learning into three broad pillars, that is, people, technology, and service. This study utilizes these categories in establishing a structure for the evaluation of the literature review. The research identified a number of studies that targeted the aforementioned three pillars. The studies which were reviewed were conducted beginning in the late 2000s and included the following:

a) Learning course content and activities. The major contributors in this field are Bação, Lobo and Painho (2004), and Cope (2010), Salmon (2014a).
b) Students' interaction in collaborative environments. Le and Lei (2008), Tarus, Gichoya and Muumbo (2015).
c) E-learning and cultural differences. Cooper and Zmud (1990), Huang (2014), Lee and Becker (2012).
d) Studies involving research on e-learning satisfaction. Cheok and Wong (2015), Ball and Levy (2008), van Raaij and Schepers (2008), Sanchez and Hueros (2010).
e) Studies on e-leaning and pedagogy. Loveless (2011), Wartkins and Mortimore (1999) Kop and Fourner (2011), Thomas *et al.* (2011).
f) Studies on e-learning and digital divide. Salmon (2014b), Mulwa *et al.* (2015), Van Deursen, Van Dijk and Helsper (2014).

Analysis of these studies reveals that the studies were mostly carried out in European and Asian countries. The studies generalized findings on e-learning even though other scholars in e-learning such as Salmon (2014b) later observed that researchers needed to be careful when interpreting findings on e-learning since they were affected by several factors such as culture, geographical location, technology, pedagogy and user attitudes among an array of factors. Notably, the above-mentioned studies also concentrated on only one of the three pillars of e-learning rather than a holistic approach that covers all the three pillars. This study varied from this approach, incorporating all three pillars of e-learning thereby unpacking new insights on e-learning as a phenomenon. Further, this study also chose Zimbabwe,

a developing country as the place of study, to add to the limited body of knowledge on e-learning in developing countries. This study, therefore, is aimed at bridging the knowledge gap on understanding of e-learning issues in Africa and other less developed countries who find themselves in digital isolation.

At the time of conducting this study, Zimbabwe had 14 public universities which were all funded by the central Government through the Fiscus. Further, Zimbabwe's higher and tertiary education was undergoing a paradigm shift from Education Mission 3.0 to Education Mission 5.0 (Ministry of Higher and Tertiary Education 2018). According to the Ministry of Higher and Tertiary education (2018) Mission 3.0 limited the mandate of a university to teaching, research, and community service, Mission 5.0 adopted two further objectives namely, innovation and industrialization. Mission, 5.0 was adopted after the realization that there was a skills gap between what the industry required and the type of graduates that universities were producing. Mission 5.0 was also adopted as a way of producing innovative graduates that would turn around the largely consumptive Zimbabwean economy and improve industrialization. Agenda Mission 5.0 requires that institutions of higher learning implement a paradigm shift in the way they operate their institutions by embracing smart technological solutions in the business value chain. This includes facilitating and utilizing key solutions that support extensive uptake of technological innovations that improve the quality of learning experiences for both teachers and learners. Further, during the study period 2016-2020, Zimbabwean learners and teachers were beginning to demand improved learning environments that enhanced teaching and learning. To this end, lecturers were increasingly demanding higher wages, reduced workloads, and flexible learning environments (Cronje 2016) and learners were demanding variations in teaching methodologies and pedagogy (Cronje 2016).

## 1.5 THE AIM OF THE STUDY

The major aim of this study was to carry out a critical analysis of the implementation of e-learning platforms in public universities in Zimbabwe thereby contributing to the body of knowledge on e-learning implementation issues in developing countries in general and Zimbabwe in particular.

## 1.6 OBJECTIVES

The research sought to:

1. identify e-learning platforms, resources, and infrastructure that exists in public universities in Zimbabwe;
2. establish the extent to which e-learning platforms have been implemented in the processes of teaching and learning in Zimbabwean public universities;
3. analyse the key e-learning attitudes and perceptions expressed by lecturers, students and administrators that affect the level of uptake of e-learning innovations such as LMS in public universities;
4. identify e-learning implementation strategies that exist in Zimbabwean universities; and
5. analyse the barriers to e-learning implementation in public universities in Zimbabwe.

## 1.7 RESEARCH QUESTIONS

The research sought to answer the following questions:

1. What e-learning platforms, resources, and infrastructure exist in public universities in Zimbabwe?
2. To what extent have e-learning platforms been implemented in the processes of teaching and learning in Zimbabwean public universities?
3. What are the key e-learning attitudes and perceptions expressed by lecturers, students and administrators that would affect the level of uptake of E-learning innovations such as LMS in public universities?
4. Which e-learning strategies are being used by universities in Zimbabwe?
5. What are the major barriers to e-learning platform implementation in public universities in Zimbabwe?

## 1.8 RATIONALE OF THE STUDY

According to Vithal and Jansen (2011), the rationale of a study can be defined as the driving force that has motivated the researcher to carry out the research. The purpose of this research was to build information on e-learning from an African

perspective as most of the literature on e-learning is from Asia and Europe. Further, e-learning has always been viewed using the lenses of developed countries thus e-learning models developed with this bias may not work in developing countries such as Zimbabwe. This overarching paradigm features prominently in this write-up and the need to test some of the e-learning theories in developing countries gave the researcher the impetus to pursue this research. The emergence of global pandemics such as COVID-19 in December 2019 vindicated the researcher's earlier arguments that e-learning is no longer a luxury but should be treated as a basic need. Hence, this research sought to establish the barriers to e-learning implementation in public universities in Zimbabwe and use the findings to come up with a framework that can guide the implementation of e-learning protocols based on the views of the users (students and lecturers) and the administrators of the system (IT Directors).

## 1.9 LIMITATIONS

Limitations, according to Simon and Goes (2013), are research issues that the researcher cannot control. These issues, however, impact on the conclusions and deductions that the researcher can make. The findings and the subsequent solutions proposed may not be generalized and applied to other universities which are not public institutions as the sample of the study only covered public universities. In addition, the time frame required for the completion of the study and the nature of study impacted on the sample size and sampling techniques employed. The summation of these factors, therefore, became a limiting factor to this enquiry. As articulated in the literature review chapter, most studies on e-learning, especially content on e-learning, emanated from Europe and Asia. While these studies have contributed significantly to the body of knowledge on e-learning in general, and shaped the research strategy of this enquiry, the findings of these studies cannot be generically interpolated into the Zimbabwean context. More research is needed to explore e-learning in Zimbabwe to add insights to the small body of knowledge that currently exists.

## 1.10 DELIMITATIONS

According to Simon and Goes (2013), delimitations are those issues that arise due to conscious choices made by the researcher. These usually arise due to limitations in the scope of the study, i.e., boundaries of the study. Further, these issues may arise due to positions taken by the researcher to include or exclude certain aspects during the research process. Delimitations according to Simon and Goes (2013) also include issues that arise when choices are made in the formulation of objectives, questions and the choice of the research paradigm among other choices. It begins in the first stages of the research process where the researcher makes a choice to pursue a specific problem, chosen among a basket of many problems associated with the study.

The study focused on e-learning platform implementation in two public universities in Zimbabwe hence the findings may not reflect e-learning implementation issues in other public universities whose circumstances could be different. The study focused on students, heads of departments and IT directors. The views of such informants may not be a true reflection of what the informants believed due to fear, pressure and certain rules and laws that prohibit them from disclosing certain things which may be deemed as giving competitive advantage or disadvantage. The researcher also excluded vice-chancellors and faculty lecturers from participating in the study because of time constraints and in the researcher's view, the issues under investigation could still be fairly articulated by the chosen research participants. The study had to focus on two universities close to the investigator to minimize traveling costs. The impact of these inherent delimitations was however minimized by choosing universities whose student population and geographical spread was representative of what was manifesting in the Zimbabwean environment. Further, the informants targeted were big users of the platforms (students) and senior university officers (HODs and IT Directors) whose views could arguably represent the views of most university stakeholders in public universities in Zimbabwe.

## 1.11 RESEARCH METHODOLOGY AND DESIGN

The research integrated quantitative and qualitative theoretical and methodological perspectives as well as data sources and types. This research, therefore, used a mixed-methods research design (Zikmund *et al.* (2013) and Saunders, Lewis and Thornhill (2009).

The researcher used both qualitative (face-to-face interviews) and quantitative methods (questionnaire-based survey) i.e., mixed methods design. This was done so as to counter the disadvantages that emanate if one of the design methods is used as a standalone design method. This study used concurrent design because of constraints on time; it was faster than sequential design since there are periods when universities are closed for business. The research specifically used concurrent triangulation as e-learning implementation was studied from the angle of administrators, students and lecturers. The data collected was then analyzed qualitatively using content analysis (university administrators) and quantitative techniques (students and lecturers), and data was combined to come up with interpretations and meanings.

## 1.12 TARGET POPULATION

The target population for this study were IT directors, students and lecturers (HODs) working, studying, and teaching respectively at the University of Zimbabwe (UZ) and Zimbabwe Open University (ZOU). Arguably the two universities have made great strides in ICT utilisation in the teaching and learning ecosystem. Further, ZOU has always had the mandate to offer distance education whilst UZ as the oldest university in the country was expected to have solid ICT infrastructure.

## 1.13 SELECTION OF SAMPLE

Purposive sampling was used to select HODs as a representative group of lecturers and random probability sampling was used to select elements in the student population sub-group. For IT Directors a census was used. The researcher used both probability and non-probability sampling methods to employ both quantitative and qualitative methods in data analysis as discussed in Chapter 4. The nature of

the research questions in this study required that for the sub-group of university administrators (IT Directors), structured in-depth interviews were conducted with every member. This was done mainly because the elements in this sub-group were few and they had strategic information as pointed out earlier in this chapter (purposive and non-probability sampling).

The other sub-group consisted of the users of e-learning platforms, that is, lecturers (as represented by HODs) and students. Because of the population size of the lecturers in the two universities, and time constraints, questionnaires were distributed to HODs only and not all lecturers (purposive sampling). The decision to select HODs was made after it was noted that HODs had a holistic appreciation of the phenomenon of e-learning implementation because most of them were experienced lecturers who had taught and supervised lecturers for many years. For this reason, their responses were likely to represent an informed point of view, including knowledge of the views of all lecturers. Further, HODs also chair departmental board meetings which are platforms that provide for brainstorming and interaction among lecturers and students. Hence, they understand the issues pertaining to lecturers, university and students from a broader perspective. The research established through the human resources departments in both universities that the total population of HODs was 100 in the two institutions. Since this number was manageable, the researcher used a census approach to sampling this sub-group for distribution of the questionnaires.

The choice of students to participate in this study was supported by the literature reviewed in Chapter 2 which highlighted that students were the key stake holders in e-learning implementation because they were the main users of the platforms and they make a choice to either use or ignore the platforms altogether. Students, according to Cronje (2016), nowadays demand quality education and to have an input in the way they learn. Thus, ignoring their views is disastrous. After a careful consideration of financial and data analysis constrains, the elements in this sub-group were sampled using probability sampling. Random probability sampling was used to select participants from students. The researcher established, through the student records offices of the two institutions, that the total student population in Harare was estimated at 35 000 and sample size was calculated to be

approximately 400 as per the survey monkey sample calculator at 95% confidence level and a margin of error of 3.5% (Angioha *et al*. 2020).

**Table 1.1: Calculation of sample size for students per university**

| Name of institution | Student Population | Proportional representation (%) | Sample Size |
|---|---|---|---|
| University of Zimbabwe | 21875 | 63 | 250 |
| Zimbabwe Open University | 13125 | 37 | 150 |
| TOTAL | 35000 | 100 | 400 |

## 1.14 DATA COLLECTION METHODS

Questionnaires were used as data collection instruments for two subgroups (students and HODs) and face-to-face in-depth interviews were conducted with university administrators (IT Directors).

### 1.14.1 Questionnaires

The two questionnaires designed for students and HODs were guided by information gathered from the literature review in Chapter 2. These questionnaires were divided into two major sections. Section A solicited from participants information on demographics/background, while section B solicited strategic information as informed by previous studies on e-learning implementation by Daugherty and Funke (1998), Mitev and March (1998), Siritongtha (2006), Makokha and Mutisya (2016), Kasse and Bulunywa (2013), Govender and Chitanana (2016), Davis (1989), Lapina and Renate (2016), Khairova and Egamberdieva (2016), and Venkatesh and Davis (2013), all discussed in the literature review (Chapter 2). Both questionnaires had closed-ended and open-ended questions in Section A and Section B. At the end of each closed-ended question there was an open-ended question which asked participants to “add any other issues relevant to the question.” A five-point Likert scale was used to allow respondents to indicate the extent to which they agreed with issues on each of the ten constructs discussed in detail in Chapter 3.

### 1.14.2 In-depth face-to-face interviews

According to Boyce and Neale (2006), in-depth face-to-face interviews are a qualitative research technique that involves conducting intensive interviews with a small number of respondents to explore their views on a phenomenon (Boyce and Neale 2006:3). They are normally used to contextualize data collected by other survey tools (Boyce and Neale 2006). In this study in-depth face-to-face interviews were preferred because a) they provided detailed information on the ICT infrastructure, policy and the phenomenon of e-learning and this information could not have been articulated equally well by HODs and students using a questionnaire and b) they provided a more relaxed environment for respondents to air their views. A relaxed environment was particularly critical because, as the researcher found out, public universities in Zimbabwe are highly censored to the extent that some respondents requested the interviewer to switch off the recording when they wanted to convey information that they deemed to be confidential. For each of the ten constructs discussed in Chapter 3, face-to-face interview guide questions were constructed to guide the process.

## 1.15 PILOT TESTING

Pilot testing for this research was conducted at Bindura University of Science Education, a public university located North East of Harare, the capital city of Zimbabwe, with a student population of about 10 000 students. The pilot study targeted students and HODs with a minimum of 30 participants from each category (Radhakrishna 2007). Questionnaires were distributed to 30 students and 30 HODs. The Vice Chancellor and the IT Director were also interviewed using structured questions.

The input gathered from informants was used to fine-tune the research design and data collecting tools. As stated by Schade (2015), piloting helps fine-tune studies and research designs leading to more reliable results. For example, whereas the researcher thought that data would be collected from students by approaching them individually, the pilot study revealed that it was time consuming and it would be better to target venues where faculty wide courses were offered across levels of

study. Further, according to Schade (2015), pilot testing provides an opportunity to validate the wording of the questions, understand the time necessary for the sessions and may provide additional data points for the study. It became apparent from the pilot study that some questions needed fine tuning especially the face-to-face in-depth interview questions. The researcher discovered that the discussion needed to be more open to obtain more relevant information. The pilot study also revealed that Vice-Chancellors have very little operational information on e-learning; hence, these were dropped from plans for the main study.

## 1.16 DATA ANALYSIS

The responses for each closed-ended question in the structured questionnaire were collated to form a data set in SPSS. The data set was analyzed using the Statistical Package for Social Scientist (SPSS) version 24 for windows and R 3.6.3. Several statistical approaches were employed to answer the objectives of the study. The following were the major statistical tools: frequency tables, confirmatory factor analysis, explanatory factor analysis, descriptive statistics, t-tests, regression analysis and the non-parametric tests (Kendall's coefficient of concordance). Frequency tables and descriptive statistics were used to generalize the responses of the participants concerning the use and implementation of e-learning platforms in the two universities. Since most of the questions were measured on a five-point Likert scale, the frequency tables were relevant in tracing the distribution of the responses from strongly agree to strongly disagree in the form of proportions. Descriptive statistics such as correlation analysis were based on the calculated aggregated scores of the constructs of the study. The aggregated scores were computed from all the questions which were assessing a single aspect, for example all questions which were asked to assess the attitude of participants were collated in computing the aggregated scores taking attitude as a construct.

Kendall's W (also known as Kendall's coefficient of concordance) is a non-parametric statistic (Hlegendre 2005). This is a normalization of the Friedman test (Salkind 2012), and was used for assessing the attitudes, knowledge and perception among the participants concerning the e-learning platforms in the local universities.

Kendall's W ranges from 0 (no agreement) to 1 (complete agreement). Kendall's coefficient of concordance was defined as follows:

> Assume there are *m* raters rating *k* subjects in rank order from 1 to *k*. Let $r_{ij}$ = the rating rater *j* gives to subject *i*. For each subject *i*, let $R_i = \sum_{j=1}^{m} r_{ij}$. let $\bar{R}$ be the mean of the $R_i$ and let *R* be the squared deviation, i.e.
>
> $$R = \sum_{i=1}^{k} (R_i - \bar{R})^2$$
>
> Now define Kendall's *W* by
>
> $$W = \frac{12R}{m^2(k^3 - k)}$$

Confirmatory factor analysis (CFA) is a multivariate statistical procedure that was used to test how well the measured variables represented the number of constructs (Harrington 2009). Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA) are similar techniques, but in EFA, data are simply explored and provide information about the numbers of factors required to represent the data (Schreiber *et al.* 2006). In EFA, all measured variables are related to every latent variable. Using CFA, the researcher was able to specify the number of factors required in the data and which measured variable was related to which latent variable (Finch and French 2018). Confirmatory factor analysis was used to confirm or reject the measurement theory. Explanatory factor analysis was employed to determine the most influential variables that explain the constructs of the study better. All the variables/questions with the recommended scoring were considered in calculating the aggregated scores and building of the constructs for further statistical analysis procedures such as regression analysis and t-tests.

Regression analysis was used to assess the overall relationship of e-learning platform users and other constructs of the study. A t-test is a type of inferential statistic used to determine if there is a significant difference between the means of two groups, which may be related in certain features (Ashcroft and Pereira 2003). A t-test was used as a hypothesis testing tool, which allowed testing of assumptions applicable to a population. Figure 1.1 summarizes the data analysis procedure.

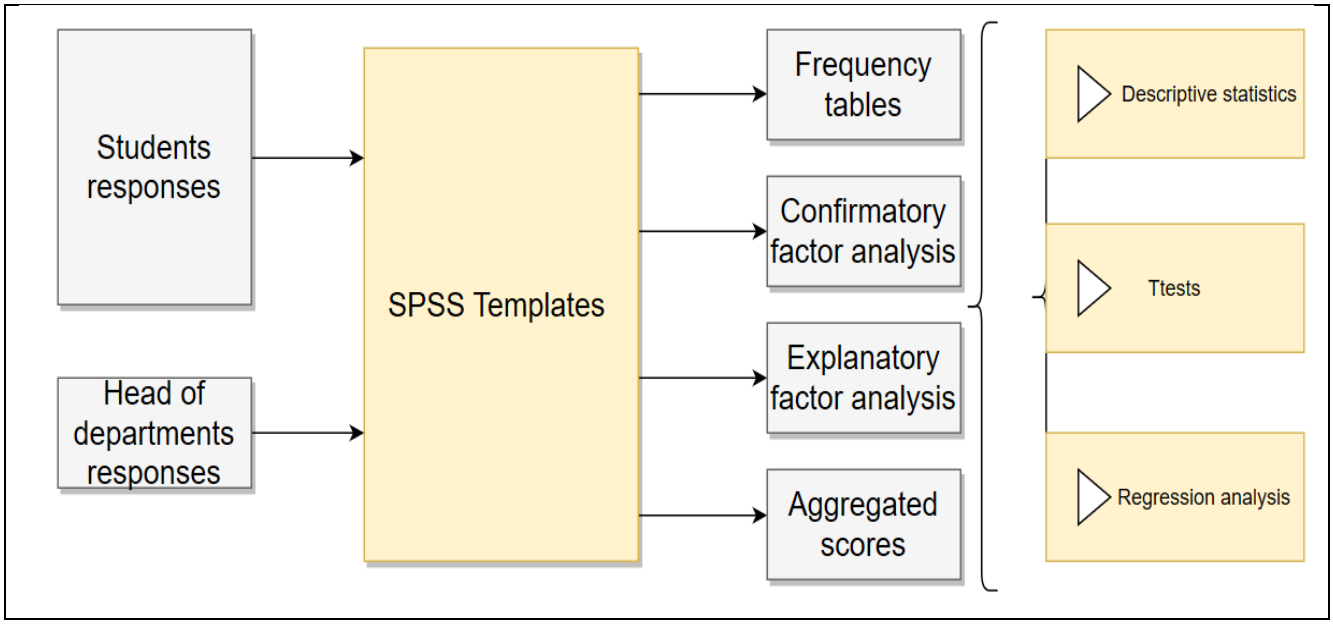



**Figure 1.1: Analysis framework**

## 1.17 VALUE OF THE STUDY

The researcher would be awarded a PhD and two publications in refereed journals are envisaged. The study proffered an e-learning adoption framework for universities in Zimbabwe. The research also provided primary data for research around higher education management for international scholars. The findings were forwarded to policy formulators, government officials, university administrators, academics and students for their information and use. It is hoped that such information can be useful in the formulation of e-learning strategies in public universities and other institutions of higher education.

## 1.18 ORGANIZATION OF THE STUDY

The structure of the write up is as follows:

**Chapter 1** introduced the study providing an overview, background to the study, research objectives, research questions, and significance of the study.

**Chapter 2** is a review of the available literature on e-learning implementation. The literature review helped the researcher in discussing the findings in Chapter 4 and 5.

**Chapter 3** is an overview of the education and state of ICTs in Zimbabwe.

**Chapter 4** presents the methodology and research design used in the study, including the research method, research strategy, data analysis and sampling.

**Chapter 5** presents the findings of the study. The findings were analyzed and presented using tables, charts, and graphs.

**Chapter 6** is a discussion of the findings and proposal of an e-learning implementation framework for public universities.

**Chapter 7** marks the conclusion of the study and presents the recommendations, contributions of the study and areas for further research.

## 1.19 CHAPTER SUMMARY

This chapter provided an overview of the research as it introduced issues of e-learning implementation from a global perspective and funnelled down to introduce the subject in the Zimbabwean context. The chapter provided a summary of the background and an overview of the literature review and the methodology that was deployed in building up the evaluation of the level of e-learning implementation in tertiary institutions in Zimbabwe. The next chapters discuss in detail all issues that were highlighted in this chapter.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 INTRODUCTION

Technology-based innovations such as e-learning continue to change the face of higher education and, as a result, lecturers will increasingly be expected to infuse more technology in face-to-face courses while teaching in multiple course delivery modalities. Arguably, e-learning has been a fascinating phenomenon; its implementation, however, is more recent and controversial in institutions of higher education such as universities, particularly in developing countries. E-learning implementation could be a mirror image of the manifestations of the digital divide between the rich and the poor nations. According to Sangrà, Vlachopoulos and Cabrera (2012), e-learning evolved from distance education. The concept of distance education had its origins in the 19$^{th}$ century as a result of increased demand for education. Mohamed and Willis (2014) define e-learning as the application of information technology such as the internet, mobile, and other computer-aided systems in the teaching and learning process, either asynchronously or synchronously. Garrison and Anderson (2011) define e-learning as electronically mediated communication for knowledge creation and confirmation. In this thesis e-learning simply means teaching and learning achieved through the harnessing and use of technological innovations. This chapter presents studies, debates, and issues associated with e-learning in general and implementation thereof, with a view to creating a platform to tackle research questions raised in Chapter 1.

## 2.2 E-LEARNING, HISTORICAL PERSPECTIVE

E-learning systems are an evolving concept. Aparicio, Bacao and Oliveira (2016) observe that the concept of e-learning first appeared in 1955 as an offshoot of Computer Assisted Instruction (CAI). At that time, CAI was being used to teach problem-solving. From 1960 to the year 2014 a lot of e-learning related concepts evolved from CAI (Aparicio, Bacao and Oliveira 2016). This information by Aparicio, Bacao, and Oliveira however, needs to be understood with caution. While the authors rightly point out that e-learning is an offshoot of CAI, including CAI as a concept of e-learning as they did in their study, is misplaced. In the timelines below,

the researcher, therefore, excludes CAI in the narration of concepts of e-learning but traces the progressive development of CAI concepts as follows: Computer-Based Education (CBE) 1963, Computer Assisted Learning (CAL) 1966, Learning Management Systems (LMS) 1968, Computer Managed Instruction (CMI) 1969, Computer Assisted Education (CAE) 1970, Electronic Learning (e-learning) 1983, Artificial Learning Environment (ALE) 1985, Mobile Learning (m-learning) 1989, Self-Regulatory Efficacy (SRE) 1994, Computer Support for collaborative learning (CSCL) 1995, Rich Environment for Active Learning (REAL) 1996, Learning Content Management Systems (LCMS) 2001, Blended Learning (B-learning) 2003, Self-Directed Learning (SDL) 2004, Internet-based Learning Medium (ILM) 2009, Massive Open Online Course (MOOC) 2009, Little Open Online Course (LOOC) 2012 and Small Private Online Course(SPOC) 2013 (Aparicio, Bacao and Oliveira 2016).

From the timelines given above, it can be argued that although the term e-learning was first used in 1983, today the concept, apart from technology, includes “learning strategies, learning methods and lately is also directed to the vast possibilities of content diffusion and connection. The concept trends no longer mean simply the use of a computer as an artefact in the learning process” (Aparicio, Bacao and Oliveira 2016: 295). Aparicio, Bacao, and Oliveira (2016) further argue that most concepts of CAI are still being used today as standalone terms, but some have been incorporated into the taxonomy of technology-based education. What follows is a brief discussion of some of the key concepts relevant to this study, which have emerged as a result of the infusion of technology in the teaching and learning processes.

### 2.2.1 E-Learning conceptualization

Aparicio, Bacao, and Oliveira (2016) assert that the term e-learning was first used in 1955. However, the concept of e-learning was first used by White in 1983, followed by Rosenberg in 2000 and Dorai, Kernani, and Steward in 2001 (cited in Aparicio, Bacao, and Oliveira 2016). In these three cases, e-learning was limited to learning via electronic sources and providing interactive distance learning. It was also viewed as the use of a web system to access the information available,

disregarding time, and space. The term has since evolved. Garrison and Anderson (2011) view e-learning as electronically mediated communication for knowledge creation and confirmation. Aparicio, Bacao and Oliveira (2016) argue that the e-learning concept, in addition to technology, articulates issues to do with learning strategies, learning methods, and more recently it encapsulates the possibilities of content diffusion and connection. These definitions, as informed by the literature discussed above, imply that e-learning has evolved as a concept from the mere excitement of the use of computers to teach and learn to a point where it has been developed into an organic interactive platform able to effect the desired change among various users. Questions are now being raised by both producers and consumers of e-learning, whether e-learning adds value in the teaching and learning process. In this study, an attempt is made to critically analyze the value of e-learning and its facets in the discourse of teaching and learning in higher education.

E-learning is a unifying term that describes online learning Web-Based Training, (WBT) and Technology-Based Training (TBT) (www.learnactivity.com). E-learning can be synchronous (real-time) and asynchronous (flexitime). It can involve individuals or a group of learners (Romiszowski 2003).

### 2.2.2 Synchronous e-learning

Synchronous e-learning describes an interaction between a user and a system that uses a communication system that is responsive in real-time (online). It may involve one user or a group of individuals. Individuals may use synchronous communication in self-study through surfing the internet accessing websites to obtain information or to learn (Romiszowski 2003). E-learning may also be synchronously used by a group of learners in collaborative learning (Romiszowki 2003). In collaborative learning, a group of students may use chat rooms, electronic whiteboards, audio conferences, and internet meetings to share information and learning. In this mode of learning, learners may not share information outside a given framework of time and space.

### 2.2.3 Asynchronous e-learning

This form of study uses an offline communication system. In asynchronous e-learning, learners can use the system as individuals or collaboratively as a group. As individuals, learners may use standalone courseware involving downloading materials from the internet for later local study, while as groups students may use asynchronous communication by email, discussion lists, or an e-learning management system such as WebCT, Blackboard, Moodle, or Sakai (Romiszonku 2003). Put differently, this mode of learning enables learners to share information independent of time and place.

### 2.2.4 E-Learning Instructional designs: the 'promise'

According to Clark and Mayer (2016), e-learning makes three major promises, namely: 1. Customized training 2. Engagement in learning, and 3. Multimedia. Promise number 1 made by e-learning proponents asserts that structural designs should address the needs of the learner and their diversity through the production of relevant content and the use of relevant teaching strategies or methods. This promise is fulfilled by asynchronous e-learning which allows learners to progress at their own pace at their own time. Regarding promise number 2, proponents of e-learning such as Clark and Mayer (2016) argue that e-learning requires engagement regardless of delivery media. Engagement can be behavioural or psychological and occurs during the learning process. Finally, promise number 3, which is multimedia, promises that any e-learning courseware will use a combination of text, audio, still and motion visuals to facilitate learning (Clark and Mayer 2016). Any courseware design worth its salt should therefore, at least, fulfil the three promises (Clark and Mayer 2016).

### 2.2.5 E-Learning tools and cutting-edge technologies

E-Learning has revolutionized the classroom from a mere brick and mortar structure to a digital learning space characterized by electronic interactive whiteboards that allow richer and consistent experiences for the learners and teachers. Whiteboards

make it easier to share, add and edit content with students while bringing online content on the fly to support the discussions in classrooms (Gutiérrez *et al*. 2017).

In the digital learning space, students are encouraged to bring their own devices (laptops, tablets, mobile phones, etc.) to facilitate learning. This brings flexibility in learning as the students can take home the work performed in the classroom to revise and reinforce the concepts in their leisure time. According to Gutiérrez *et al*. (2017), students can use micro-controller development boards such as Arduino, Raspberry Pi, and STM32 Nucleo as small Internet of Things (IoT) platforms. The existence of a single-board computer with bluetooth and USB connectivity, an LED display, and two programmable buttons enables collaborative, self-directed, and independent learning.

The integration of learning management systems (LMS) platforms with BigblueButton (an open-source web conferencing system) means that students can get instant response and feedback, and therefore learning becomes feasible and more attainable. Furthermore, the use of LMS, discussed in section 2.2, facilitates sharing of information by students on an official platform. Cloud computing based LMS enables learners to continue interacting even after graduation as it utilizes existing platforms such as Facebook, YouTube and wikis. The six major cutting-edge technologies in e-learning are: Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), Big Data, Machine Learning, and Wearable Devices (Gutiérrez *et al. 2*017).

#### 2.2.5.1 Virtual reality (VR)

According to Gutiérrez *et al.* (2017), the term ‘virtual reality’ refers to computer technology that simulates reality by using digital formats. Virtual reality creates realistic sounds and images and other sensations that locate users in an imaginary environment. This technology takes learners to imaginary spaces surrounded by a deeply engaging environment (Axelsonn 2017). Virtual reality has shown great potential in teaching courses such as physics and astronomy. However, VR requires expensive hardware and software such as Unity 3D which makes it complicated and

expensive to use (Axelsonn 2017). Nevertheless, the harnessing of this technology into training simulators has great potential in education and training.

#### 2.2.5.2 Augmented Reality (AR)

Augmented reality technology converts artificial features such as 3D artefacts, multimedia contents, or text information into real-world images (Gutiérrez *et al*. 2017). This enhances the interaction between the learner and content. A good instructor can take online learners to the planet Mars while they are in the comfort of their home. Like VR, AR requires expensive 3D software and content, and the development requires specialist knowledge. Augmented Reality and VR are likely to change the way learners learn and teachers teach as work is ongoing to marry the technologies to cheaper gadgets like mobile phones.

#### 2.2.5.3 Artificial Intelligence (AI)

Artificial intelligence (AI) is the intelligence exhibited by machines and has been harnessed in developing intelligent tutoring systems where learning can be conducted by a computer program. The machine can interact with the learner and solve their problems in real-time. Artificial intelligence systems have the capability of identifying areas where learners have problems and as a result the learner can concentrate more on their weaker areas. These systems are interactive hence they have advantages over traditional linear pre-programmed e-learning courses. Although AI is a game-changer in e-learning, it requires skilled programmers and expensive AI engines.

#### 2.2.5.4 Big data

Big data, in the context of e-learning systems (also called Big Learning Data), “consists of information sources (courses, modules, experiments, etc.) created by the teachers, but especially data coming from the learners throughout the education process” (Magdalena *et al.* 2018). This data is usually collected by the LMS, social networks, and multimedia. Big data also entails information produced by learners as they go through online training e.g., their assessment results, progress, and social

sharing. Using big data, e-learning experts can make informed decisions about learners in terms of where they need improvements, areas of interest, and how the module can be fine-tuned for the maximum benefit of the learner.

#### 2.2.5.5 Machine learning

Axelsonn (2017) defines machine learning as computer science that gives computers the capacity to learn without being programmed. When used together with LMS, machine learning can offer customized e-learning solutions based on previous e-learning learners' past performance and enables efficient distribution of resources as online learners receive resources which are tailor-made to address their learning gaps (Axelsonn 2017).

#### 2.2.5.6 Wearable devices

According to Axelsonn (2017), wearable devices are smart electronic devices that can be worn or implanted in the body. These can deliver training programs regardless of time and space. Wearable devices have the potential of making e-learning exciting and effective. The above cutting-edge technologies are revolutionizing e-learning. The progression and advancement of digital tools is ushering in an era where literacy will not be measured by one’s ability to read and write, but by one’s ability to harness ICT as decision support systems and engines for social transformation (Wang 2017). The benefits of such technologies will, however, remain elusive in developing countries if efforts are not made to enable such countries to leapfrog into this digital era. Developing countries should prioritize investments in ICT research and development to unlock the value in it.

### 2.2.6 Diffusion of e-learning innovations

The graph in Figure 2.1 shows how the introduction of e-learning innovation diffuses and progresses in a given organization.

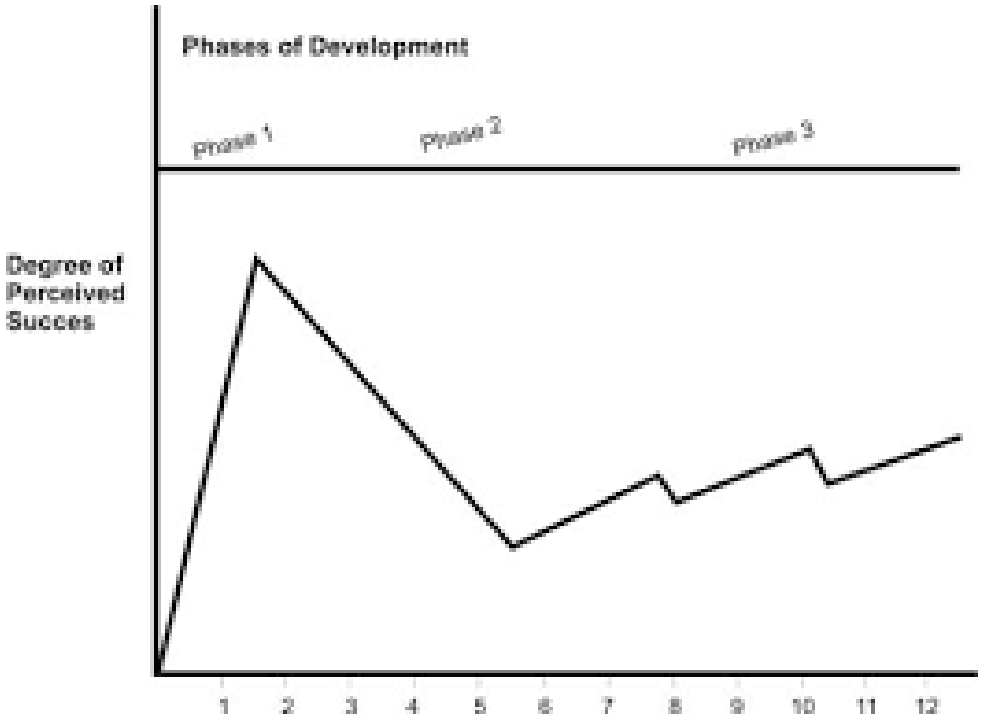



**Figure 2.1: Typical diffusion pattern shown by recent innovation**
Source: Romiszowki (2007)

- **Phase 1**

This phase is driven by euphoria and enthusiasm, there is funding and support for the innovation and early adopters are very excited and expect returns (Romiszowki 2007).

- **Phase II**

This is the tumble back to earth period (Romiszowki 2007). This phase is characterized by the project failing to deliver the promised benefits. Typically, stakeholders withdraw funding and support (Romiszowki 2007).

- **Phase III**

This stage signifies the rebirth of the innovation, broken pieces come together slowly. Mistakes are corrected and the project is redefined and takes off again (Romiszowki 2007).

### 2.2.7 E-learning implementation success and failures

In e-learning, failure can be categorized in terms of the following elements, ‘E’-electronic, “L”-learning, “M”-Management, and “N”-the needs (Romiszwki 2007). Authors tend to emphasize one of the letters depending on the author's background and knowledge.

#### 2.2.7.1 ‘E’ for electronic

Clarke (2002) argues that technology must fit into learners’ needs and not vice versa. This implies that whatever technology is used in enhancing e-learning, it must be simple and supportive of existing teaching methodologies. To prevent e-learning failure attributable to the “E”, the technology used to support e-learning must be in line with good teaching methodologies that create personalized lesson plans, allow students to have a hands-on performance-based experience, and keep students interested (Romiszowki 2003).

#### 2.2.7.2 ‘N’ for Need

Before any e-learning innovation is created, it must be the result of a scientific process of needs analysis. E-learning systems created to satisfy individual egos are bound to fail.

#### 2.2.7.3 ‘M’ for Management

Management decisions are very important in the success or failure of e-learning initiatives. Broadbent (2001) lists issues that may cause e-learning implementation to fail including the following:

1. When an entity thinks that training is not a business.
2. Promising the moon / over promising.
3. Outsourcing everything.
4. Making it available to see if employees like it.
5. Forcing it on users.
6. Not undertaking an evaluation.

#### 2.2.7.4 'L'-for Learning

The "L" in the phrase e-learning shows that e-learning is still learning therefore it must conform to the Socratic method of learning. This implies the use of tried and tested pedagogies to effect the desired change in behavior. To support this view, Greenagel (2002) posits that e-learning innovations fail to diffuse because of all or one of the following:

a) Developers are not exposed to pedagogics.
b) Emphasis on return on investment (ROI), not the student.
c) Flawed models in understanding technology in education; that is, technology should never lead teaching and learning, but it should be led by teaching strategies.
d) Failure to focus on the learner, that is, technology solutions being used in the planning of education.

### 2.2.8 Levels of e-learning failure

According to Greenagel (2002), e-learning failure can take place at three levels, i.e., product, learner, and organizational levels.

#### 2.2.8.1 Product level

At this level, failure is a result of poor course design, poor e-classroom design, ill-performing technology, and slow instructor/mentor response times (Romiszowski 2003).

#### 2.2.8.2 Learner level

At this level various factors are identified as inhibiting e-learning diffusion such as inadequate time, lack of interest in subject matter, low motivation for learning, poor self-study, lack of necessary e-skills, and psychological resistance to losing face-to-face (F2F) learning perks (Romiszowski 2002).

#### 2.2.8.3 Organizational level

The organization may also aid poor diffusion of e-learning innovations through poor marketing, absence of reward structure, failure to provide conducive learning environments and quality equipment, failure to provide training opportunities, unshared vision, and failure to match internet training to its most appropriate needs (Roomiszowski 2003).

## 2.3 LEARNING MANAGEMENT SYSTEM (LMS)

The term ‘learning management system’ was used by Becker (1968), Izmerli, and Kurt (2001), and Lee and Lee (2008) to describe a system that supports registering of services, tracks and also supports the delivering of content to learners (Aparicio, Bacao, and Oliveira 2016). The term also reports learner progress and assesses results, thus focuses on content and teacher/student interaction. LMS systems are known by various terminologies, including Course Management System (CMS), Learning Content Management System (LCMS), Virtual Learning Environment (VLE), Virtual Learning System (VLS), Learning Portal, or e-learning platforms. In this study, LMS shall be taken to mean e-learning platforms and their related software. While there are many LMS systems including but not limited to Desire2learn, Instructor Canvas, Pearson LearningStudio, Sekai and Edmodo, according to Sharifov and Mustafa (2020), Moodle has about 78 million active users followed by Edmodo 72 million, Quizlet 50 million, Google Classroom 40 million, Absorb LMS about 9.6 million, Instructure Canvas 30 million and Blackboard 4 million users (Sharifov and Mustafa 2020: 168).

Generally, LMS falls into one of three categories: proprietary, open-source, and cloud-based. Aparicio, Bacao and Oliveira (2016) assert that proprietary LMS is commercial and very expensive. The users cannot adapt them. Their advantage, however, is that they are developed by professionals and thus are reliable, and support services such as backup and training by the vendors are always guaranteed. Aparicio, Bacao, and Oliveira (2016) list Blackboard and Desire2Learn as examples of leading proprietary LMS providers.

Open-source LMS systems, according to Dahlstrom, Brooks, and Bichsel (2014), are developed by individuals for free. Moodle, which was developed by Martin Dougiamas after he was frustrated using one LMS used at the University of Curtin, is a typical example of an open-source LMS. According to Wright and Valerie (2014), open-source LMS can be customized to suit local needs. Sakai, another well-known open-source LMS, was designed in late 2004 by a consortium of four traditional universities that is the Massachusetts Institute of Technology (MIT), Michigan, Stanford, and Indiana Universities (Wright and Valerie 2014). The advantages of open source LMS are that they are low cost, adaptable and can be updated at no cost, their major disadvantages are that they need support services; they are not robust (Wright and Valerie 2014).

### 2.3.1 Survey of major LMS platforms

#### 2.3.1.1 Moodle

The abbreviation Moodle stands for ‘modular object-oriented dynamic learning environment’ and it represents the most used and easiest to use LMS (Costa, Alvebs and Teixera 2012). According to Douglamas and Tylor (2003), Moodle was designed to be compatible, flexible, and adaptable. Written using PHP language, Moodle is compatible with most computer platforms. The Moodle platform, according to Douglamas (2003), was built in a highly modular fashion and uses common technologies such as shared libraries, abstraction, and cascading style sheets. Moodle can be integrated with other systems such as mail servers and

student directories. The Moodle platform enables the creation of a course website that can only be accessed by students registered to use it (Costa, Alvelos and Teixeira 2012).

Moodle enables content creation, organization, delivery, communication, collaboration, and assessment of learning activities (Costa, Alvelos and Teixeira 2012). It has two broad functionalities that can be categorized into two major classes which are, resources and modules (Costa Alvelos and Teixeira 2012). These categories are defined as follows:

- **Resources**

These are teaching materials that are created in digital format and then uploaded onto the platform. Examples of resources are web pages, PowerPoint files, Word documents, flash animations, video, and audio files (Costa, Alvelos and Teixeira 2012).

- **Modules**

These are components created via the Moodle platform which enable interactions among the following players: students, and teachers; students and platform, and teacher and platform. Modules enable content creation and design. Examples of modules are databases, lessons, assignments, workshops forums, news, wikis, quizzes, and survey feedback. Activities of the learning platform can be classified into six classes: creation, organization, delivery, communication, collaboration and assessment.

#### 2.3.1.2 Blackboard

Blackboard LMS is an industry-leading application used to power virtual learning environments. The Blackboard system enables learners and teachers to engage in classes delivered online. Unlike Moodle, the blackboard software comes with a fee and is therefore proprietary.

#### 2.3.1.2.1 Characteristics of the Blackboard LMS

Blackboard, according to Subramarrian (2014), has the capabilities shown in Table 2.1.

**Table 2.1: Blackboard LMS characteristics**

| Feature | Description |
|---|---|
| Course creation | Teachers may set up or design a course using an easy to follow wizard. |
| Course management | Instructors may update features of a course |
| Course content assignments | Teachers may upload notes, videos, and notes. |
| Calendar | Can be used to manage and post-deadline for submission |
| Assessment and surveys | It is possible to have online tests and exercises. Assessment may be done by the teacher online. |
| Control | Instructors may determine when learners can access discussions, assignments, and other learning material and activities. |
| Grade centre | Instructors may store works, grading scales and Weighting. |

#### 2.3.1.2.2 Cloud-based LMS

Cloud-based LMS use existing internet capabilities to facilitate learning, for example,

> a blog page, Facebook page, or wiki page could be used as a base or hub where the course topics and activities are outlined. Then, students could be directed to Google Drive to share documents, Dropbox to store and synchronize files, Skype to communicate and hold meetings, Flickr to share photographs, YouTube to share videos, and Camtasia to capture screenshots and record synchronized audio (Wright and Valerie 2014: 22).

The major disadvantage of cloud based LMSs according to Aparicio, Bacao, and Oliveira (2016) is that they are expensive, difficult to use, use a lot of tools at once, advertisements often appear as pop ups and their security is questionable. Their major advantage according to Dahlstrom, Brooks, and Bichsel (2014) is that students are already familiar with the internet-based tools utilized and students can use these tools even after completion of their studies. Admodo is an example of a cloud based LMS. The literature points to the existence of the three categories of

LMS and their advantages and disadvantages; the researcher sought to confirm the existence or knowledge of LMS in public universities in Zimbabwe and the reasons for using a particular LMS.

Figure 2.2 is a graphic which summarizes types of LMS.

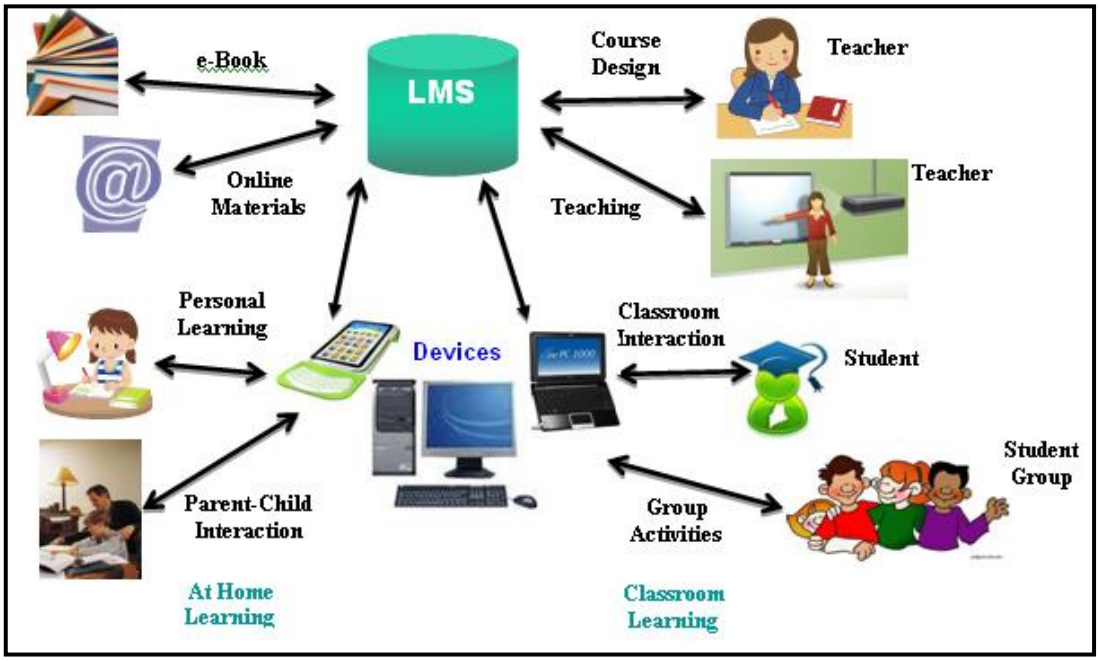



**Figure 2.2: Summary of learning management system**
Source: promptcloud.com

## 2.4 THE FUTURE OF LEARNING MANAGEMENT SYSTEMS (LMS)

In a study titled “The Higher Education LMS Ecosystem”, Dahlstrom, Brooks, and Bichsel (2014) observe that the global LMS revenue was estimated at $1.9–2.6 billion in 2013, with a projected growth to $7.8 billion by 2018. The same study also makes critical observations in that,

> to meet users’ needs and expectations, the next-generation LMS should be mobile-friendly, personalized, adaptive, intuitive, integrated, and designed to enhance student learning. These systems will function as digital learning environments for students, administrative systems for the faculty to manage their courses and interoperable systems that institutions can integrate into their administrative IT portfolio to leverage analytic applications (Dahlstrom, Brooks, and Bichsel 2014: 4).

Dahlstrom, Brooks, and Bichsel (2014) predicted that most of the United States of America higher education institutions were likely to change their LMS because the current systems were not user-friendly. These findings are critical for institutions of higher education to consider as they make their strategic plans and decisions regarding digitalising the way they do business. While literature suggests that in the developed world implementation is not an issue, developed countries are grappling with the usability and trendiness of LMS. The story in the developing world such as Africa could be different as observed by Makokha and Mutisya (2016) in a study on the status of e-learning in public universities in Kenya. They observed that lack of skills, sufficient human capacity, limited bandwidth, and lack of policy harmonization were significant factors that were hindering the growth of e-learning and subsequent implementation in that country. While the researcher will make an effort to check for e-learning compliance as informed by factors emerging from literature, this study will also interrogate compliance issues as informed by the basics such as learner/teacher background, education, bandwidth, hardware, and software issues, as well as infrastructure and general internet connectivity issues.

The issue of revenue, which is projected to grow to about $12.48 billion by 2024, reflects a very positive growth in the use and investment opportunities in LMS (Sharifov and Mustafa 2020: 167). These figures, however, do not tell us how much of that will be contributed by Africa. Using such data to plan and draw policy could be misleading; Africa must produce its own data and uptake profile in order to make decisions based on the African situation. Literature also reveals that open-source LMS is free and cheap. The question then would be in whose interest are they being designed and for how long are they going to be provided for free? Proprietary LMS is big business, so the question arises: do we need them, and do the vendors of these LMS simply want to make money? The other question would be: how safe are the examination papers, finances, and other information we exchange on these platforms? It is a considered view in this study that open-source LMS is likely to be utilized as orientation programs for institutions of higher education and most institutions are likely to graduate to the use and integration of more robust and expensive proprietary systems. This argument, however, should never be seen to eclipse the advantages of using LMS in undertaking university business since this is well supported by literature and articulated elsewhere in this thesis.

## 2.5 A SURVEY OF E-LEARNING STUDIES

According to Aparicio, Bacao and Oliveira (2016), e-learning studies can be categorized into three areas: people, technology, and service as shown in Table 2.2.

**Table 2.2 Survey of e-learning studies (cited in Aparicio, Bacao and Oliveira 2016)**

| e-Learning studies | People | Technology | Services | Authors |
|---|---|---|---|---|
| Studies on course contents and activities | √ | √ | | Brox *et al.* (2004); Piccoli *et al.* (2001); Rosenberg (2005); Zinn 2000; De Medio *et al.* (2020) |
| Studies on augmented reality in e-learning | | √ | | Bacca *et al.* (2014); Lee, Choi and Park (2009); Mena-Guacas (2020) |
| Studies about students' interaction in collaborative learning environments | √ | | √ | Bain *et al.* (1998); Ludvigsen and Morch (2010) Sharjeel and Haider and Aslam (2020); Asad *et al.* (2020) |
| Studies on the success of e-learning systems courses and modules | √ | | | Aggelidis and Chatzoglou (2012); Kassim *et al.* (2012); M. K. O. Lee *et al.* (2005); S. H. Lee *et al.* (2009); Wang, Wang and Shee (2007) |
| Study on the Internet-based learning medium in a motivational perspective | √ | | | D. Lee, Chung and Kim (2013); J. Lee *et al.* (2011) |
| Studies on e-learning systems adoption | √ | √ | | Chen and Liu (2013); J. Lee *et al.* (2011) |
| Studies on the satisfaction level of e-learning systems usage. | √ | √ | | Aggelidis and Chatzoglou (2012); Sun *et al.* (2008) |
| Studies on e-learning and digital divide | √ | √ | | Chen and Liu (2013); Cruz-Jesus, Oliveira, and Bacao (2012); Rahim *et al.* (2020) |
| Studies about trust level, satisfaction, and adoption of e-learning. | √ | √ | | Kassim *et al.* (2012); Thoms *et al.* (2008) |
| Studies on e-learning evaluation processes | √ | √ | | Oliver and Herrington (2003); Vavpotič, Žvanut, and Trobec (2013) |
| Studies on MOOCs' business models | √ | √ | | Aparicio, Bacao and Oliveira (2014); Belleflamme and Jacqmin (2014); Dellarocas and Van Alstyne (2013) |

This research predominantly falls in the category of studies conducted on the satisfaction level of e-learning systems usage and studies on e-learning systems adoption. To ground the study, the literature review cuts across most of the study categories as shown in the table above so as to create a solid foundation of the

issues at hand. The author briefly discusses e-learning studies in the following categories as propounded by Aparicio, Bacao, and Oliveira (2016).

### 2.5.1 E-Learning, course contents and activities

In their study titled “International Exchange of E-Learning Courses”, Brox, Bacao and Painho 2004 (cited in Aparicio, Bacao and Oliveira 2016) argued that after the expiry of many internationally and nationally funded e-learning studies there was a need for new models in e-learning courses to be created which were cheaper and of high quality. They proposed an international platform for the exchange of e-learning courses and teacher exchange programs. They argued that e-learning courses can be transferred from one country to another without any problems; according to them, all that was needed was translation. This was in sharp contrast to the views of Hudson ( 2015), Kalantzis and Cope (2010), Mayes and de Freitas (2007), and Salmon (2014b) who argued that even though e-learning figured highly in the aspirations of many policy-makers and senior managers, there was considerable evidence that most higher education institutions were still struggling to engage a significant percentage of students and staff in e-learning, real research was not providing answers to this problem, and more models were needed to demonstrate the transferability and scalability of e-learning (Salmon (2014b). Arising from their study, De Medio *et al.* (2020) recommend the MoodleREC system for creating courses using the Moodle e-learning platform. Their argument is that e-learning should not be left to individuals; the creation of its contents should be system driven if the goal is to improve on uptake of these technologies. The studies discussed above converge on two important issues: for any e-learning to succeed there must be the involvement of both learners and teachers and implementation should not be left to chance; the e-learning must be borne from a structured program of action.

### 2.5.2 Students’ interaction in collaborative learning environments

Le and Lei (2009) designed an interactive e-learning system using algorithms and augmented reality. In this highly scientific experiment, Le and Lei (2008) proved that

technology-based learning tools such as e-learning support learning by making it more interactive and realistic. Mena-Guacas (2020) carried out research on interaction through mobile technology in short-term university courses and argued that “collaboration is a form of social interaction that provides educational environments with multiple benefits, and the incorporation of technological tools for communication purposes encourages interaction” (Mena-Guacas 2020: 2). These findings were similar to those by Tarus, Gichoya, and Muumbo (2015) who argued that adoption and use of ICT in schools can promote collaborative, active, and lifelong learning, increase students’ motivation, offer better access to information and shared working resources, deepen understanding, and help students think and communicate creatively. The studies by Le and Lei (2009) and Tarus, Gichoya, and Muumbo (2015) noted that complexity was a major factor in e-learning implementation. They proposed that for e-learning to be less complicated, there is a need to train the users continuously. More so, the two studies called for ‘blended learning’. Blended learning, according to Gichoya, and Muumbo (2015), is the thoughtful fusion of face-to-face and online learning experiences. The argument put forward here is that e-learning should run in parallel with face-to-face tutorship to achieve desirable outcomes.

### 2.5.3 E-Learning and cultural differences in learning

An understanding of culture is important to the study of information technologies in that culture at various levels, including national, organizational, and group, can influence the successful implementation and use of information technology (Cooper and Zmud 1990). In their study on strategies for smooth and effective cross-cultural collaboration in online learning, Huiju and Huang (2014) point out that communication between different cultures is becoming more and more frequent because of online platforms, and the competence of cross-cultural awareness and collaboration is emerging as a key enabler in online learning. They further assert that there are few opportunities now for face-to-face encounters between people of different cultural orientations in the 21st century. In this study, e-learning is identified as a platform to cultivate students’ cross-cultural competence. Lee and Becker (2012) looked at the impact of culture on online management education and discovered that high-context and collectivist cultures were more conservative

regarding the adoption of online education and training. They authors noted that a nation's culture directly affects how participants engage, relate, and benefit from online education, concluding that "these insights may help multinational companies predict adoption of online management education and the appropriateness of online training across regional differences in order to formulate more effective online management education and training strategies by accommodating their cultural influences" (Lee and Becker 2012: 399). The authors further argue that online content designers must contend with the fact that cultures differ across regional, linguistic, and national boundaries and learning can be strongly influenced by local cultural perspectives. They write:

> The majority of management training programs and online learning systems have been developed in Western countries because the internet and modern management principles originated in Western culture. Subsequently, cultural differences relating to course design, delivery, and the underlying technology between Western and non-Western cultures may significantly influence the ability to transport programs designed in one culture to another (Lee and Becker 2012: 402).

Important issues emerge from the literature discussed in this section; that e-learning enhances collaborative work across cultures, that e-learning platforms provide a platform for people-to-people interaction, and that the packaging of e-learning material should be culture-specific. In this regard, bringing the issues of culture to e-learning implementation is very important in this study, particularly Zimbabwean culture which, for example, team work is embraced, there is veneration and influence of role models, and a learning approach that is usually underpinned by mimicking the teacher. These are critical design considerations in any e-learning product in Zimbabwe. Culture has a significant impact on the shift from face-to-face learning environments to virtual classes. Research conducted by Sharjeel, Haider and Aslam (2020) on dimensions of organizational culture of universities in Baluchistan support this observation. The research identified the need to train university leaders in human psychology and human resources management to improve their understanding of differences in individuals.

### 2.5.4 Satisfaction level of e-learning systems usage

Satisfaction is when there is no difference between service encounters and consumer expectations. The rationale is that satisfaction may lead to a variety of important outcomes that are of interest to education administrators, policymakers, and instructors. Cheok and Wong (2015) classify predictors of e-learning satisfaction into three categories: user-related factors, organizational, and e-learning related factors. User related factors include such issues as self-efficacy, attitude, and anxiety (Cheok and Wong 2015). According to Bandura (2009), self-efficacy is a person's inner conviction that they can complete a given task. It can be argued therefore that unless lecturers believe in themselves that they can use e-learning tools in teaching and learning, the benefits of e-learning remain elusive. Cheok and Wong (2015) argue that those who have positive attitudes towards technology were more comfortable in using it and thus, prepared to overcome any challenges. Measuring self-efficacy could thus be important in unpacking lecturers' level of preparedness in facilitating e-learning implementation.

Researchers have shown that the relationship between computer anxiety and its effects on computer use and computer acceptance cannot be underestimated (Ball and Levy 2008; Van Raaij and Schepers 2008). Anxiety can be defined as the fear of the unknown (Cheok and Wong 2015). Organizational related factors in e-learning satisfaction include training, management, and technical support (Cheok and Wong 2015). Training designed for end-users must consider their specific job performance's needs and their job satisfaction; it must also convince the users that the new system is worthwhile. Training should be continuous and should make sense (Cheok and Wong 2015). At the same time, management in schools and universities must create conditions in which educators can continue to grow and learn as professionals (Cheok and Wong 2014). Technical support is very important in the use and adoption of learning management systems (Sanchez and Hueros 2010; Bryant 2006). Failure to provide it will result in frustration.

The third category relates to e-learning factors such as perceived usefulness, perceived ease of use, flexibility, and interaction (Cheok and Wong 2015). Perceived usefulness is defined as the degree of improvement after the adoption of

a system (Cheok and Wong 2015). Studies by Aggelidis and Chatzoglou (2012) and Sun *et al.* (2008) have shown that a positively perceived usefulness affects the adoption of e-learning. Perceived ease of use, according to Davis (1989), refers to the extent to which an individual believes that using a particular system would be free from physical and mental effort. Rahim *et al.* (2020) noted that in the COVID-19 era, 8.8% of the faculty agreed that online education was convenient for their working and the online mode of teaching was acceptable to 65.6% of respondents. Faculty-development workshops were appreciated by 60%, while 70% disagreed that face-face lectures can be replaced by online lectures. More, therefore, needs to be done to improve the level of satisfaction of e-learning. Users prefer simple and friendly systems. Flexibility, another e-learning factor, is defined as "learners' perception of the efficiency and effects of adopting e-learning towards their work, learning process, and the learning hours involved. Flexibility has been shown in many studies to affect users' satisfaction when they are using an e-learning system" (Cheok and Wong 2015: 83). Finally, interaction refers to the level of collaboration between lecturers and students in the teaching and learning process (Cheok and Wong 2014). Considering the literature, this study critically evaluates the existing LMS and their potential in public universities and whether they are responsive to this factor of satisfaction as detailed by the above literature. Learning management platforms should pass the satisfaction litmus test among others and this study attempts to relate these factors to implementation issues.

### 2.5.5 E-learning and pedagogy

Loveless (2011) defines pedagogy as a relationship, conversation, reflection, and action between teachers, learners, subjects, and learning tools. Watkins and Mortimore (1999: 17) defined pedagogy as, "any conscious activity by one person designed to enhance learning in another". Perkins 1993 (cited in Loveless 2011) warned of the dangers of the 'finger-tip effect', where access to tools and artefacts such as ICTs alone cannot lead to effective learning without some form of guidance from an experienced mentor. "The emergence of technology in teaching and learning meant that teacher knowledge has to incorporate understandings of the construction of knowledge through distributed cognition, design, interaction, integration, context, complexity and dialogue" (Loveless 2011: 30). Kop and

Fournier (2010) in their study of massive open online courses (MOOCs) concluded that it was possible to undergo a paradigm shift from viewing technology as a pedagogy of abundance to a pedagogy that supports human beings in learning. They argue that e-learning systems such as MOOC should be platforms to build connections, collaborations and the exchange of resources between people, the building of a community of learners that harnesses the information that flows through the network (Kop and Fournier 2010).

The emergence of ICTs in teaching and learning means that the teacher no longer has a knowledge monopoly (Kop and Fournier 2010). Aparicio, Bacao and Oliveira (2016) also corroborate this view and conclude that pedagogical models applied to e-learning support teaching and learning in that learning is a social process, learning in a group is fundamental to achieve knowledge, distance is unimportant, and teaching and learning can be segregated in time and space. For Thomas *et al.* (2011) good pedagogical design needs to express congruence between the content, teaching strategies, learning environment, assessment, and feedback, and reflect underlying theories of learning.

The issues raised by the foregoing literature are critical in that there is convergence on the issue that e-learning should comply with the theories of learning and how best to teach. Viewing e-learning as an alternative to pedagogy could have disastrous consequences. To understand e-learning, therefore, teachers should be grounded in the Socratic methods of teaching. The theories of teaching are not only responsive to the learning environment, the pupil's background knowledge, experience, and learning goals, but are also responsive to the mentor and mentee's relationship. Teaching should conform to Bloom’s taxonomy where learning occurs chronologically from the cognitive, affective, and psychomotor domains (Anderson and Krathwohl 2001). The argument that Anderson and Krathcohl (2001) make in this study is that lecturers in universities should undergo comprehensive teacher education training so that they understand how to use available teaching tools such as e-learning in teaching and learning. Ideally, developers should be trained teachers as well. Salmon (2005) argues that the reason why most lecturers in universities do not embrace innovative teaching methods is that these are never tied to promotion (reward) and the guarantee of tenureship. Lecturers would rather

spend more time publishing than improving or infusing new teaching methods. Salmon (2005) further argues that

> to engage large numbers of academics, any approach must seek to ensure that ownership, not only of content but also of pedagogy, continues to lie directly within academic departments, but also recognizes that there is a need for a wide variety of supportive mechanisms must underpin the continued developments (Salmon 2005: 1743).

Another interesting dimension on this matter is brought to the fore by Asad,Hussain, wadho, khand and Churi (2020) who found that teachers are not encouraged by the management of the learning institution to implement ICTs in their teaching and learning due to their concerns on the limited resources and lack of competencies. This observation is interesting because it reveals the level of mistrust between management and lecturers. It also unpacks the fact that pedagogy will never change if resources and training are not availed to the lecturers.

### 2.5.6 E-Learning and the digital divide

In his report titled “Distance learning, E-learning and the Digital Divide” (2011) Simon concluded the following:

> It is important to ensure that, while taking best advantage of developing technologies for learning, we do not contribute to a ‘digital divide’ by leaving behind those with limited or less sophisticated connectivity or other problems with access to ICT, be they geographical, socio-economic, personal or even preferential (Simon 2011: 9).

Mulwa, Kyalo,Matula and Ndaita (2015) carried out a study to establish the influence of the personal characteristics of the principals, teachers, and students on the readiness to adopt e-learning in public secondary schools in Kitui County, Kenya and found out that the level of education of principals and teachers had the greatest influence on the readiness to adopt e-learning, while for students it was the type of school attended that affected their readiness to adopt e-learning. The study recommended that

> the government should plan to address the issue of e-learning infrastructure by availing e-learning equipment, enhancing connection to reliable sources of power, improving connectivity to various internet services and augmenting human resource capacity by organizing training programs for principals, teachers and students (Mulwa *et al.* 2015: 99).

The results of a study by Van Deursen, Van Dijk and Helsper (2014) suggest that overcoming digital divides is a rather complex challenge that goes beyond improving access or internet skills but rather relate to individual motivations and socio-cultural preferences. Such preferences can only partly be changed by, for example, governmental, social, and cultural policies in education and community building (Van Deursen, Van Dijk and Helsper 2014).

Rizvi and Nabi (2021) found out that inadequate bandwidth and poor network connectivity were major hindrances during online learning in developing countries. The other challenges unpacked by the same study were unsuitable home environment for attending online classes, feeling of isolation and demotivation due to lack of face-to-face interaction, and excessive screen-time causing fatigue. This study supports the arguments made by many scholars that e-leaning may not take off effectively if poverty and the digital divide, the twin evils of digitisation, are not holistically addressed.

## 2.6 THEORIES OF LEARNING

According to Mayes and Freitas (2004), online theories of learning are a scientific and proven description of variables that influence the online learning process. This section discusses the literature on how online learning theories inform pedagogy and the teaching and learning process. Learning theories generally describe how learning takes place. Pedagogical frameworks broadly describe the application of learning theories for teaching and learning (Mayes and Freitas 2004). A model of learning is a pictorial representation of a theory. Picciano (2017) posits that for one to understand online learning theory, one needs to understand the theories of learning in general. The classical theories of learning, according to Picciano (2017),

can be classified into three major categories: behaviourism, cognitivism, and social constructivism.

### 2.6.1 Behaviourism

This theory has its roots in the positivist philosophy. It focuses on the behaviour of learners when exposed to a learning experience. According to the behaviourists, learning is said to have taken place when there is an observable change in behaviour (Picciano 2017). Behaviourism does not focus on the cognitive processes; rather, it makes the argument that if you cannot see it, it cannot be learned (Picciano 2017). Behaviourism is associated with Ivan Pavlov whose experiments with dogs' food and audible stimuli are well documented. Though the experiments were conducted in the 19th Century they continue to influence present-day studies on teaching and learning theories.

B. F. Skinner and Edward Thorndike were also major figures in behaviourism. Whereas Pavlov concentrated on reflex stimuli, Skinner introduced operant conditioning (Pacciano 2017: 66). In operant conditioning, the instructor uses positive and negative reinforcement to promote desired behaviour. Both Skinner and Pavlov's approaches promoted repetitive behaviour leading to habit formation. According to Picciano (2017), Skinner's work influenced computer-assisted instructional models. CAI programs relied on positive reinforcement to promote learning.

### 2.6.2 Cognitivism

Unlike behaviourism that focuses on the stimulus and its associated response, cognitivism focuses on the period between stimulus and behaviour. Cognitivism, according to Picciano (2017), argues that the period between the behaviour and stimuli involves the mind which is processing information. Cognitivism, therefore, places motivation and imagination as critical aspects of learning. Chomsky (1959) posits that the mind is creative, and learning can never be reduced to the relationship between stimuli and behaviour. Cognitivism is associated with the

taxonomy of learning that links learning and the development of intellectual skills. Bloom (1956) argues that learning takes place at six levels: remembering, understanding, applying, analyzing, evaluating, and creating (Figure 2.3).

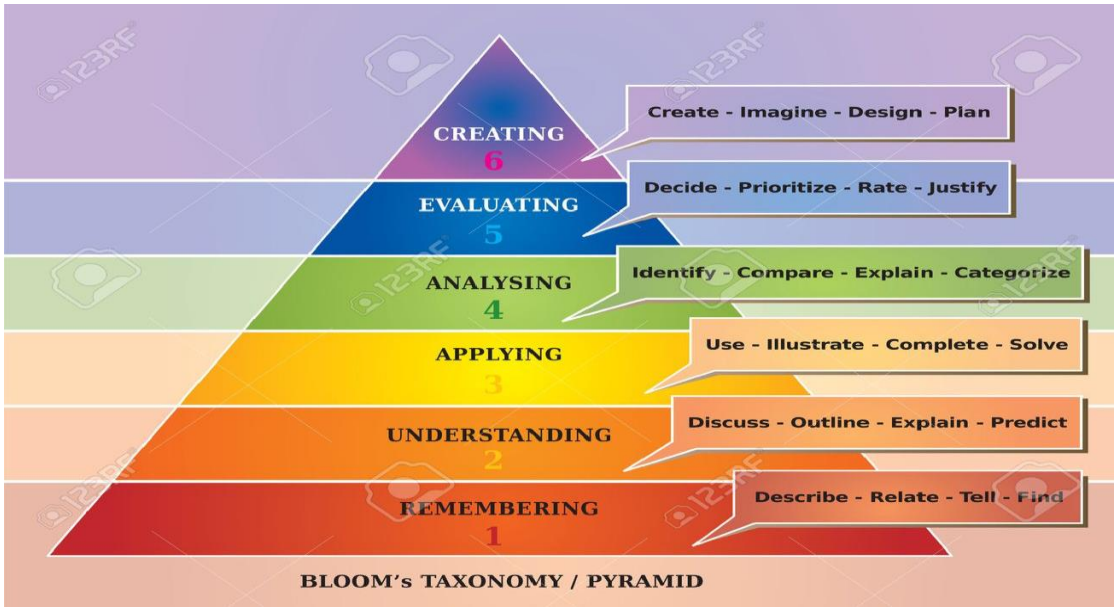



**Figure 2.3: Bloom's levels of learning**
Source: Picciano (2017)

Bloom, therefore, argues that when designing a learning program, the learning objectives should target the six levels. In assessing learning, the assessment should be across the six levels. Cognitivism will become very relevant in the future as it will shape the development of advanced software in online learning, especially the development of adaptive and personalized applications that seek to integrate artificial intelligence and learning analytics into learning programs (Picciano 2017).

### 2.6.3 Social constructivism

This theory, according to Picciano (2017), is parallel to behaviorism and cognitivism. Its originators or proponents are Lev Vygotsky, John Dewey, and Jean Piaget. According to these authors, constructivism is a theory that describes teaching and learning as a complex interactive social process between teachers and learners. Social constructivists make important observations about learning as follows:

1. Learning is problem-solving.

2. Learning exists because one wants to solve a problem and interaction is key in problem-solving.
3. The teacher provides a conducive social environment for the learner.
4. Learning occurs through doing, collaborating, and reflecting with others.

Instructional designers who are supporters of constructivism include activities that encourage the sharing of experiences, discussions and collaborative work in their lesson plans and content. In social constructivism lecturing is replaced with an interactive pedagogy, whether in face-to-face learning or online learning.

## 2.7 LEARNING THEORIES OF ONLINE EDUCATION

There are three theories whose roots can be traced back to the classical theories of learning discussed above. Each theory discussed below has its roots in classical theories of learning.

### 2.7.1 Community of inquiry (COI)

This theory according to Picciano (2017) places value on the creation of an active or organic environment where there is an interaction among three ‘presences’, that is, cognitive, social, and teaching presence to create a learning experience. This theory, therefore, argues that instructional design should have a social presence, cognitive and teaching presence where students, teachers, and learning platforms interact in the process of knowledge creation, sharing of information, ideas and opinions. The influence of social constructivism and cognitivism is apparent in this theory.

### 2.7.2 Connectivism

Siemens (2017), one of the pioneers of MOOCs, is the main proponent of connectivism. Connectivism, according to Siemens (2017), is an online learning theory that acknowledges the power of networks in learning. Connectivism is

important in the instructional design of online courses with high student enrolment. It is anchored on eight principles which are:

1. Learning and knowledge rest in a diversity of opinions.
2. Learning is a process of connecting specialized nodes or information sources.
3. Learning may reside in non-human appliances.
4. The capacity to know more is more important than what is currently known.
5. Nurturing and maintaining corrections are needed to facilitate continual learning.
6. Ability to see connections between fields, ideas, and concepts in a core skill.
7. Currency (up-to-date information) is the intent of all learning activities.
8. Decision making is a learning process and choosing what to learn and the meaning of incoming information is seen through the lens of shifting reality. A right answer now may be wrong tomorrow due to alterations in the information climate.

### 2.7.3 Online collaborative learning (OCL)

This theory, like connectivism, stresses the importance of moving teaching and learning to the internet. It emphasizes, three phases of knowledge constructions:

1. Idea generating. This involves the brainstorming stage where various ideas are generated.
2. Idea organizing. This stage involves analysis and distillation of ideas.
3. Intellectual convergence. This occurs when there is a synthesis of ideas and the creation of new knowledge.

This theory, like connectivism, encourages collaboration in problem-solving with the teacher playing the role of a facilitator. Unlike connectivism however, it is suitable for small groups of learners.

SUMMARY OF THEORIES OF ONLINE LEARNING

According to Brown and Cocking 1999 (cited in Picciano 2017) online learning theories converge within four overlapping lenses, namely, community centeredness, knowledge centeredness, learner centeredness, and assessment centeredness (Brown and Cocking 1999 (cited in Picciano 2017). Further, theories of online learning emphasize the emergence of networks, big data, and interactions among learners, teachers, and learning content. Any learning theory of online education should thus seek to address or provide an environment where the interactions among the online stakeholders are high. Sound online learning models should link pedagogy and technology (Picciano 2017). A single online theory might not address all the facets of online learning, but an integrated online theory might satisfy the requirements of learning in general, pedagogy, and online learning.

## 2.8 INTEGRATED ONLINE LEARNING THEORY

It must be noted that a common online learning theory is difficult to come by mainly because of the variety of definitions of online learning itself. Some scholars view online learning as a subset of learning while others see it as tool of trade, and others see it as an offshoot of distance education. Educational psychologists, however, argue that online learning or e-learning is just learning and must satisfy the Socratic learning principles which were articulated in the preceding sections. This debate is further complicated by the fact that some scholars argue that good e-learning should incorporate face-to-face interaction therefore connect the three issues (face-to-face, pedagogy, teacher/learner/content interactions) which is not an easy task. Garrison and Anderson (2011) however, attempt to integrate all important facets of online learning as shown in Figure 2.4.

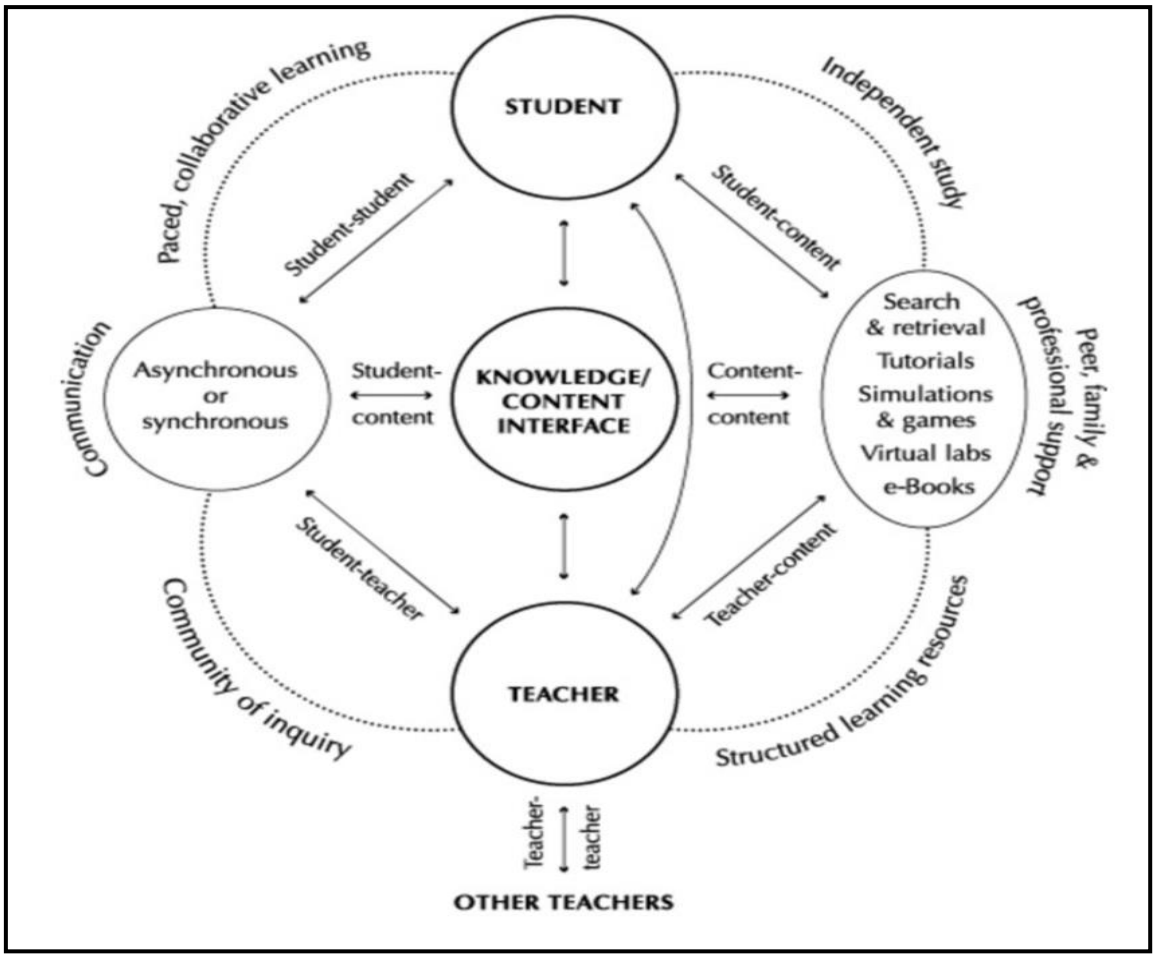



**Figure 2.4: Online learning model**
Source: Garrison Anderson (2011)

Figure 2.4 shows the major interactions among students, teachers, and content. Students may access information via the web or learning platforms in independent study. Students may also access content through the teacher. The teacher's role is to package and impart the information. The information may be delivered to a community of learners synchronously or asynchronously.

The major weakness of this model is that it excludes blended learning and the link between pedagogy and technology is not well-articulated. From the literature discussed above, it can be argued that online learning is a component of learning and therefore, any model of online learning should conform or at least expand on the theories of learning which are behaviourism, cognitivism and social constructivism. Online learning models discussed in this section, can therefore be easily traced back to the Socratic learning theories. Instruction designers should therefore seek to integrate content, pedagogy, learning communities, networks,

student, teacher, and web capabilities in the process of teaching and learning as shown in the model in Figure 2.5.

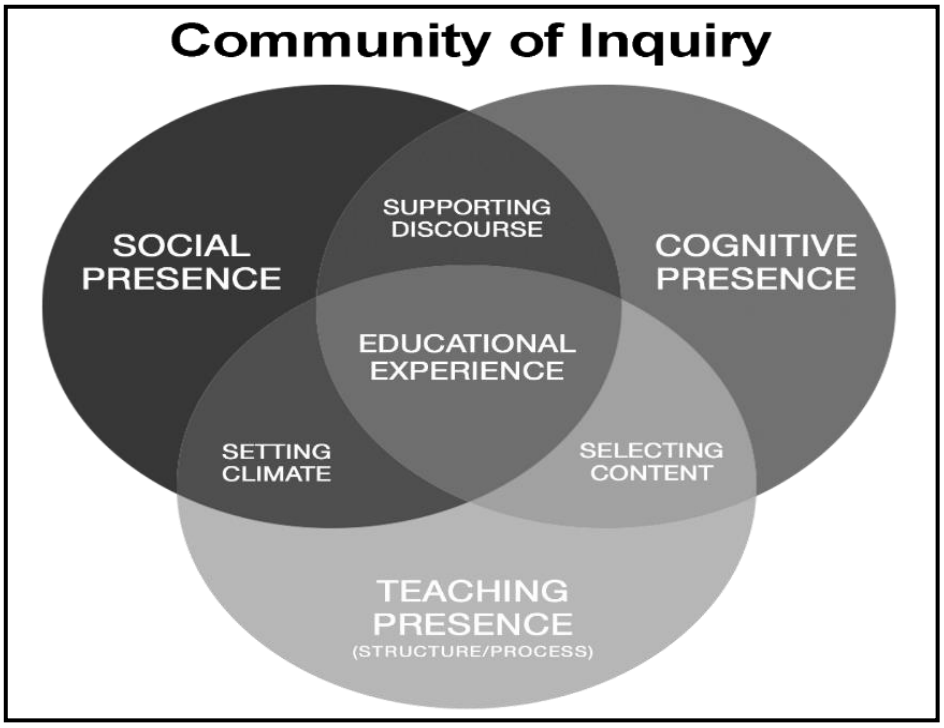



**Figure 2.5: Community of inquiry**
Source: Adapted from Garrison and Anderson (2011)

## 2.9 ASSESSING E-LEARNING IMPLEMENTATION READINESS

Akaslan and Law (2001) argues that the level of e-learning implementation can be assessed at three phases:

1. Readiness;
2. Acceptance; and
3. Training.

The readiness phase involves issues such as content availability, the human capacity, technology, and management willingness to support the initiative. In the acceptance phase the attitude of the users are interrogated and finally in the training phase the level of training determines the uptake of e-leaning (Figure 2.6).

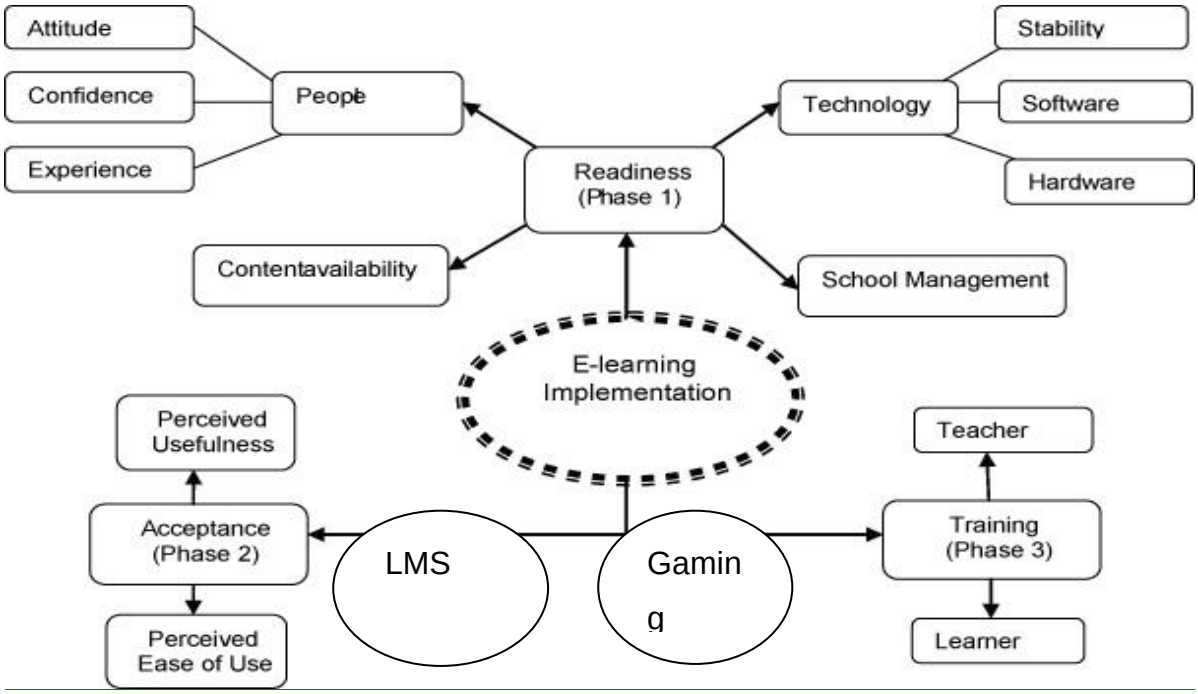



**Figure 2.6: Framework for assessing the level of readiness to implement e-learning**
Source: Akaslan and Law (2001)

## 2.10 E-LEARNING IMPLEMENTATION STUDIES: TOWARDS A THEORETICAL FRAMEWORK

According to Mohamed and Willis (2014), e-learning is the infusion of technology such as the internet, mobile, and other computer-aided systems in the teaching and learning process, either asynchronously or synchronously. In this context, e-learning can be broadly defined as the use of technology to enhance the quality and effectiveness of education systems. E-learning implementation is thus the adoption and use of technological innovations in administrative, teaching, and learning processes. Daugherty and Funke (1998), Mitev and March (1998), Wallace (2001) and Fabry and Higgs (1997) investigated the critical factors that influence the success and failure of e-learning implementation and categorized them into three major groups: organizational, personal and technological. Siritongtha, Worn, and Paul (2006) conducted a study on e-learning implementation in Thailand universities. In addition to the three factors mentioned above, they discovered other factors that influence e-learning implementation and grouped them as resistance to change, time of adoption of innovation, online course design preference, instructor-led learning, and self-directed learning.

In addition, Dang and Foster (2015) carried out a study on the implementation of e-learning in a Vietnamese university and identified the technology acceptance model (TAM) (Davis, 1989) and the diffusion of innovations (Rogers, Graham and Mayes 2007) as the main theories used in e-learning implementation studies. Further, Dang and Foster (2015) argued that TAM is the most suitable model in evaluating acceptance and or rejection of e-learning technology and that diffusion of innovation was most suitable in studying the decision-making process surrounding the adoption and diffusion of new technology. In view of this, Dang and Foster (2015) proposed a configuration approach to solving e-learning implementation challenges. According to Dang and Foster (2015), a configuration approach to e-learning implementation entails that the e-learning process should incorporate and interact with relevant contextual factors of organization, pedagogy, learning, and technology. Dang and Foster (2015) used a case study method. These findings had a bearing on the manner this study unfolded. Ghavifekr and Rosdy (2015), in their study of factors affecting the use of e-learning platforms, argue that students' background experience in information technology and attitudes towards e-learning were essential in ensuring successful e-learning implementation. They further observed that the transition between traditional and digital approaches to learning was always an issue in determining the levels of success in e-learning implementation (Ghavifekr and Rosdy 2015). Additionally, Ghavifekr and Rosdy (2015) state that identification of factors that affect usage of e-learning should not be an end but should be used to improve existing systems. The call here is that research on e-learning should not end by identifying factors that affect the implementation of e-learning but should go further to the use of such factors in improving existing models or in coming up with new implementation models for e-learning. This is the challenge this research wishes to address. McConnell (2018), in his study of e-learning in higher education in China, laments the lack of information on how lecturers design, run their online courses and perceive e-learning since this lack of information is a major barrier to understanding the reasons for low uptake of e-learning platforms.

Further, the McConnell (2018) study brought the following interesting issues to the fore, that the lecture method was still central to the Chinese education and was unlikely to be superseded by any other method shortly. The lecture system is

considered by many to be the only way to pass on knowledge and is the benchmark for all teaching methods. Only lecturers wishing to innovate in their teaching were using e-learning. Chinese students were found to be resistant to collaborative learning and did not know how to do it. China's tradition of competitive learning was hard to throw off, and the strength of educational traditions and the inherently conservative nature of Chinese higher education suggested that a shift to mainstream e-learning was not likely (McConnell 2018).

The insights in McConnell's study points to the issues of culture and change management and how they may affect the implementation of an otherwise beneficial program. In Zimbabwe and indeed many other countries, the lecture method is still considered the main medium of instruction, and as observed in this study, those who use technology may be using it because it is mandatory to do so. While the benefits of e-learning have been well articulated in many studies, it is still considered a choice to use e-learning in teaching and learning in many developing countries. In his conclusion McConnell (2018) makes very important suggestions: that university teachers should receive evidence-based e-learning development training that reflects current best practices; that consideration should be given to the relevance and challenges of e-learning to mainstream higher education and to the cultural and pedagogical values that underpin e-learning; university teachers should be allowed to critically reflect on conceptions of e-learning with a view to self-evaluation thereby challenging the way they teach; students should be supported in e-learning by teachers and other support services with a view to instilling in them a paradigm shift from being receivers of knowledge to partaking in its creation, and; universities should support the professional production of content and pedagogy of e-learning which is networked across faculties and departments.

While the researcher agrees with these solid recommendations, two issues that seem to be unaddressed are the issues of an implementation strategy and a model of implementation. All the issues raised could be symptoms of lack of a strategy and a framework for adoption which the current research will attempt to address. According to the e-learning implementation strategy and plan for the University of Zululand 2009 (cited in Evans and Roux 2015), an implementation strategy examines critical success factors and points out the role of governance and the

financial implications of implementing the e-learning program. It has a vision which is the rallying point for all stakeholders. It creates ownership of the exercise as the first step is the “requirements analysis” where ownership is created through the involvement of all university players, i.e., faculty deans, lecturing staff, and other stakeholders (e-learning implementation strategy and plan for the University of Zululand 2009, cited in Evans and Roux 2015). Such a strategy would improve the competence, confidence, and effectiveness of the university. This study, however, will borrow a lot from McConnell (2018) in terms of its research approach, research instruments and data analysis. Many studies of e-learning seem to favour the case study method because of depth and thoroughness (Dang and Foster 2015).

Kasse and Bulunywa (2013) assessed the implementation of e-learning, and their findings were that 12% of discussions were e-learning based, 2% for assessment and 80% for delivery of learning material. Makokha and Mutisya (2016) carried out a study on the status of e-learning in public universities in Kenya and their findings were that lack of skills, sufficient human capacity, limited bandwidth, and lack of policy harmonization were significant factors that were hindering the growth of e-learning and subsequent implementation. The same study conducted in Uganda by Makokha and Mutisya (2016) revealed that e-learning implementation was still very low despite the opportunities offered by ICTs and a supportive government.

All the studies discussed above identify factors that affect the implementation of e-learning but fail to propose a solution to these challenges. To address this, the study seeks to address two critical questions: What are the key e-learning expectations expressed by teachers, learners, and administrators that would increase the level of uptake of e-learning innovations such as LMS? How can the identified key e-learning expectations be utilized as leverage to come up with a general e-learning implementation model that is fluid, adaptable and applicable to any ICT driven innovations such as LMS? By attempting to answer these questions, the researcher hopes to fill a research gap that is glaring in most of the literature discussed above.

The value chain-based model proposed in this thesis would be stakeholder-driven and would address the technical, administrative, teaching and learning functions of the stakeholders of e-learning. The model will address the three key variables in e-

learning, namely, people, technology and service (Aparicio, Bacao and Oliveira 2016). The researcher is of the view that the implementation model that this research seeks to propose will go a long way to solving the challenges of e-learning implementation in institutions of higher education.

Further, the sample size used in most of the studies reviewed in this chapter was too large meaning that most of the time was spent on data collection rather than critical analysis of the factors affecting e-learning implementation in order to get a deeper understanding of this phenomenon. In contrast, the current study focuses on a few key informants and devotes most of the time to analyzing issues and proffering solutions. Whereas the studies mentioned above broadly focused on identifying impediments to the implementation of e-learning, this study is more focused and concentrates on proposing implementation models for e-learning platforms.

## 2.11 SUMMARY OF THE FACTORS THAT AFFECT E-LEARNING IMPLEMENTATION

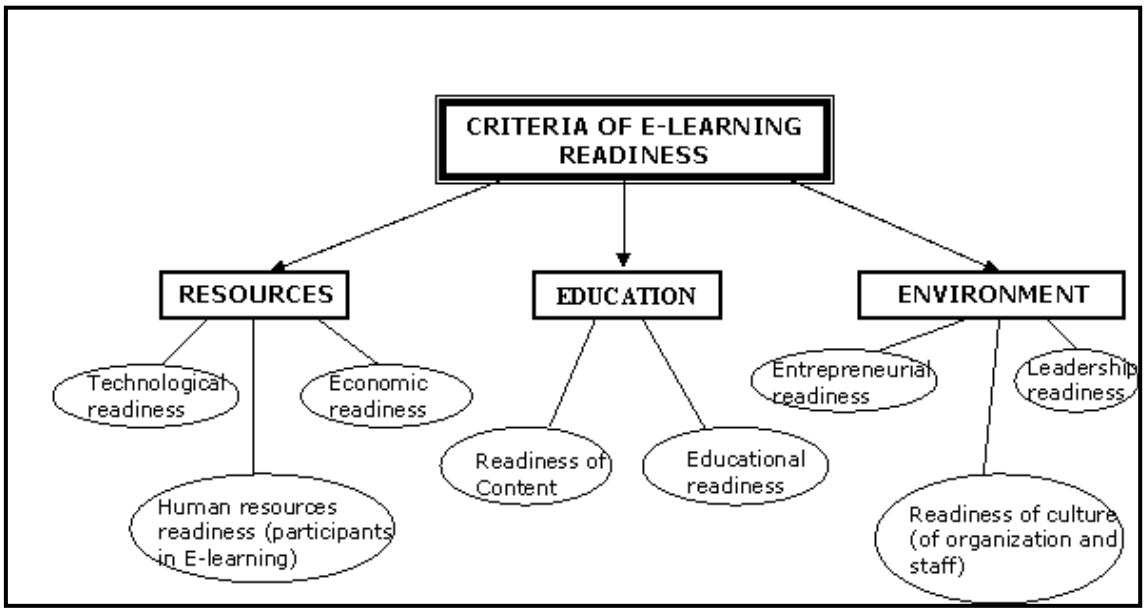



**Figure 2.7: Criteria of e-learning readiness**
Source: Psycharis (2005)

Figure 2.7 shows a summary of generic factors that affect the implementation of e-learning as revealed by studies analysed by Psychris (2005). These factors were

found to cut across many studies and largely informed the general direction of this study and most of the survey questions were constructed around these factors.

## 2.12 MODELS OF E-LEARNING IMPLEMENTATION

Korpelainen (2011) identifies six theories/models of technology implementation: Theory of Reasoned Action (TRA); Technology Acceptance Model (TAM); Diffusion of Innovations (DOI); Theory of Planned Behavior (TPB); Unified Theory of Acceptance and Use of Technology (UTAUT), and model of ICT Implementation. This study adopted and adapted TAM because it has proven to be a reliable theoretical model in helping explain and predict user behavior in information technology (Legris, Ingham and Collerette 2003, cited in Korpelainen 2011). Further, TAM incorporates and is an extension of another useful theory, which is the Theory of Reasoned Action (Ajzen and Davies 1989). When two good theories are blended, they tend to reinforce each other. Technology Acceptance Model provides an understanding of the role of external variables in influencing belief, attitude, and intention to use a system (Le and Lei 2008: 151). This is in line with the research questions which this research seeks to answer.

According to Le and Lei (2008), several studies have reported the usefulness of TAM in examining technology acceptance. According to the results published by Korpelainen (2011), TAM was the most cited theory in studies involving ICT system implementation i.e., 869 citations out of 2474 studies representing 35.1%, TRA 20.3%, DOI 20.1%, TPB 13.4 %, UTAT 4.4 % and others 6.7%. While the study took into account the argument that the above statistics could be used to dismiss the use of TAM as it has been overused, this study utilizes TAM because it is a tried and tested theory to investigate the phenomenon of e-learning implementation. The issue of which theory is the best could be left for other studies in the future. The major advantage of TAM is that it is the only theory which talks about technology and was designed specifically to deal with its acceptance. The Technology Acceptance Model, like most of the theories used in technology implementation, has its shortcomings. The theory makes an assumption that ICT systems are used and developed by and for individuals forgetting that most contemporary organizations are committee-driven and decisions are made by consensus. As Benbasat and

Barki (2007) point out, ICT systems have changed a lot from the early days of TAM, so the model falls short in addressing social contexts and the use of organizational functional groups such as teams in accomplishing tasks. According to Korpelainen (2011), the prevailing management and the business context differs from that which prevailed when the theoretical basis of TAM was formulated.

TAM has, however, remained useful for modern-day scholars as it is simple and parsimonious (Davis 1989). Its major strength is that it can be adapted and domesticated by adding other variables and extensions. This study remained aware, however, of the argument put forward by Bagozzi (2007), Barki (2007) and Whetten (1989) that extensions, alterations, and aberrations of theories, if not managed, might result in a new theory that is weak, confusing, shallow and lacking in clarity. In coming up with an implementation model, an attempt to balance the two extremes was made.

## 2.13 TECHNOLOGY ACCEPTANCE MODEL (TAM)

Proposed by Davies (1989) the TAM theory is used to predict and explain ICT usage behaviour. It is a behaviourist theory that posits that the propensity to use technology is affected by one's attitude and attitude is a factor of two variables, namely, perceived usefulness and perceived ease of use (Park 2009). Perceived ease of use and usefulness are affected by external and internal factors such as management support, training, motivation, rewards, promotions, feedback, and accessibility. Davies (1989) defines perceived usefulness as the proposed user's subjective probability that using a computer system will increase their job performance in an organization. Perceived ease of use refers to the degree to which the prospective user expects the computer system to be free of cognitive effort (Davies 1989). This implies that people form intentions to perform behaviours toward which they have a positive effect. The diagram in Figure 2.8 shows TAM as a process.

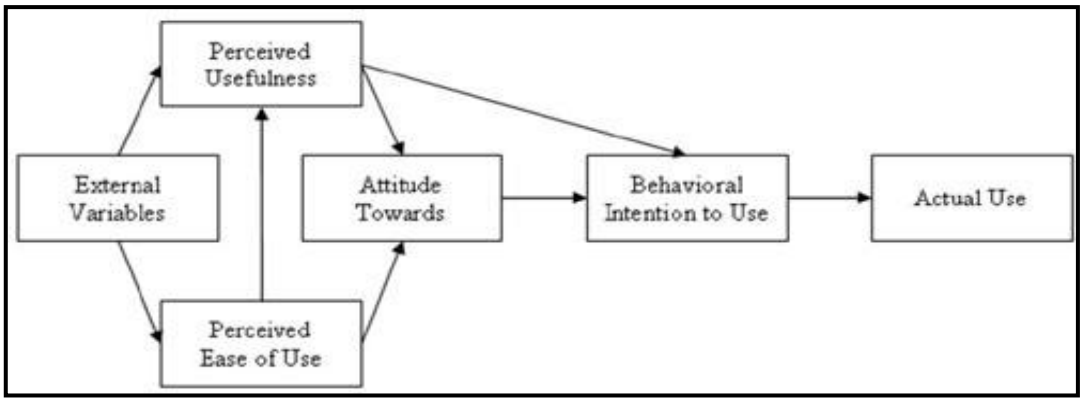



**Figure 2.8: Original Technology Acceptance Model (TAM)**
Source: Korpelainenn (2011)

## 2.14 A SURVEY OF STUDIES THAT UTILIZED TAM IN THE ADOPTION OF E-LEARNING

Tshabalala (cited in Govender and Chitanana 2016) in a study, "Perceptions of Academic Staff towards the adoption of Blended Learning" argues that TAM is robust and useful for determining how work-related IT innovations are adopted by employees for their work. In the same study Tshabalala (cited in Govender and Chitanana 2016) noted the factors that militate against e-learning adoption as follows:

> lack of comprehensive institutional and organizational mechanisms for facilitating the development and growth of e-learning, lack of a policy that promotes e-learning within teaching and learning, lack of quality management processes to enhance e-learning, limited initiatives for the professional development of staff to integrate e-learning within existing curricula, no structures in place for technical and system support, lack of support from leadership for change management and the lack of considerable funding needed to implement a successful e-learning program (Tshabalala cited in Govender and Chitanana 2016: 71).

Venkatesh and Davis focused on understanding the previous history of perceived ease of use and found out that computer self-efficacy acts as a determinant of perceived ease of use both before and after hands-on using and that the objective usability was found to be a determinant of ease of use only after a direct experience with a system (Venkatesh and Davis cited in Le and Lei 2008). Grandon, Alshare

and Kwan (cited in Park 2009) found that e-learning self-efficacy has an indirect effect on students' intentions through perceived ease of use. Mungania and Reio (cited in Park 2009) found a significant relationship between dispositional barriers and e-learning self-efficacy. Chiome (2013) carried out a study to identify the factors affecting user adoption of e-infrastructure in e-health, e-agriculture, and e-education in Zimbabwe and found that the ability to navigate complex life and work environments in the globally competitive information age requires e-infrastructure developers to pay rigorous attention to technology acceptance.

## 2.15 EXTENDED MODEL OF E-LEARNING IMPLEMENTATION

Critics of TAM argue that it is parsimonious because it excludes social and organizational factors (Korpelainen 2011). The adapted model shown in figure 2.9 below attempt to address the weaknesses of the original TAM model. To ground this study, the researcher utilised some of the issues considered by the extended model. The extended model further elucidates the concepts of perceived usefulness and perceived ease of use, as shown below. Figure 2.9 also shows that other variables such as experience, subjective norm and job relevance affected how users of technology perceive the usefulness of a given technology.

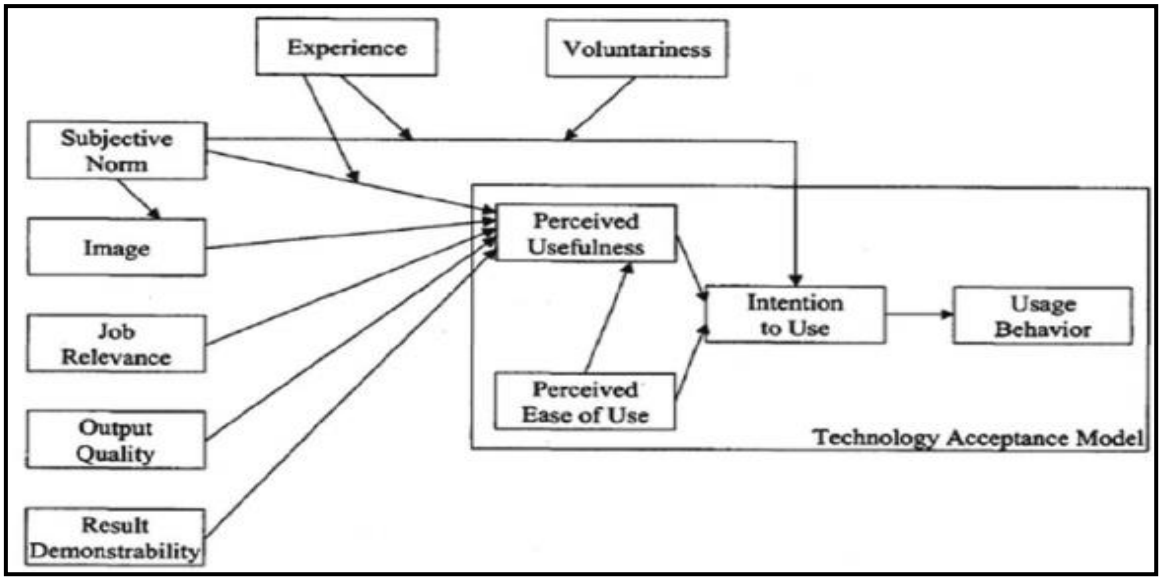



**Figure 2.9: Extended Technology Acceptance Model**
Source: Venkatesh and Davis (2013)

## 2.16 REGIONAL EFFORTS IN THE ADOPTION OF E-LEARNING IN UNIVERSITIES IN AFRICA

E-learning adoption has seen regional groupings converging on the matter. The Association of African Universities (AAU) has called upon universities in Africa to move “urgently” to implement alternative methods of delivering teaching and learning using technology and other distance learning techniques in the wake of the closures of higher education institutions to limit the spread of COVID-19 (University World News 2020). The AAU has been supporting institutions of higher learning by organizing webinars targeted at building capacity in the area of e-learning and giving advice to university practitioners on this matter. The AAU also called upon African universities to collaborate on the development of e-leaning software (University World News 2020).

# CHAPTER 3: EDUCATION AND THE STATE OF ICTs IN ZIMBABWE

## 3.1 INTRODUCTION

Whereas the previous chapter dealt with debates, theories, and models of e-learning at a global level, this chapter funnels down these debates to discuss these issues in the Zimbabwean context. It chronicles the historical background of the Zimbabwean education system and how the education system has affected the prevailing systems and policies. This study assumes that e-learning issues cannot be studied in isolation; the educational environment of both the learner and teacher has a bearing on the future understanding of issues. The chapter unpacks issues to do with the status of ICTs and examines initiatives taken by the government of Zimbabwe to enhance e-learning in early childhood education and at the tertiary level. The chapter concludes by giving an overview of the state of ICTs in the two public universities under study.

## 3.2 GEOGRAPHICAL LOCATION OF ZIMBABWE

Zimbabwe is a landlocked country with a land area of 390 800 $km^2$ bordered in the south by the Republic of South Africa, in the east by Mozambique, in the north by Zambia and in the west by Botswana. The capital and largest city is Harare. Zimbabwe has a total population of 12.6 million, of which 38% live in urban areas and 62% in rural areas (Zimbabwe National Statistics Agency 2015).

## 3.3 STATUS OF ICTs IN ZIMBABWE

The ICT sector, according to the Ministry of ICT and Courier Services (2016) is characterized by a multiplicity of players who have over the years contributed to the growth of this sector. On its part, the Government of Zimbabwe has made key policy decisions which have contributed to the growth of the sector. These include, but are not limited to, (a) liberalization of the telecommunications, postal and courier

services sector, (b) establishment of regulatory bodies in the ICT sector, i.e. Postal and Telecommunications Authority of Zimbabwe (POTRAZ), Zimbabwe Media Commission (ZMC) and Broadcasting Authority of Zimbabwe (BAZ), (c) establishment of a cabinet committee on scientific research, technology development and applications, (d) computerization of government ministries in the main centres of the country, (e) creation of a ministry responsible for ICT, (f) increase in the internet penetration rate, and (g) enactment of the Criminal Law Amendment (Protection of Power, Communications and Water Infrastructure Act, No. 1 of 2011) to deal with the problem of vandalism of existing power, communications and water infrastructure; and (h) temporary removal of duty on ICT hardware and software (Ministry of ICT and Courier Services 2016).

### 3.3.1 ICT infrastructure in Zimbabwe

According to the African Development Bank 2019 (Cited in Bonga and Sithole 2020) equitable and adequate access to ICT is essential for the growth of the Zimbabwean economy. Donou-Adonsou (2016) observed that 1.38% in GDP growth can be realized following a 10% increase in broadband penetration. Donou-Adonsou (2016) further observed that an increase in internet and mobile phone usage has a positive impact on GDP growth.

According to the African Development Bank report 2019 (cited in Bonga and Sithole 2020), Zimbabwe has been lagging in terms of ICT investments as it has not regarded it as a priority. Although in theory the government of Zimbabwe has rolled out e-Government initiatives, it is still ranked 124 out of 139 in e-readiness (African Development Bank report 2019, cited in Bonga and Sithole 2020). The African Development Bank 2019 report also observed that though Zimbabwe has prioritized ICT literacy it is still behind in terms of ICT related skills. The urban to rural digital divide gap in Zimbabwe is widening because of a lack of ICT infrastructure in rural areas. The gap is increasing such that while most of the urban areas are on 3G the rural areas are still fixed to 2G (African Development Bank, cited in Bonga and Sithole 2020). Furthermore, “Zimbabwe is dependent on access to undersea cables through third parties” (Zimbabwe Infrastructure Report 2019: 19, cited in Bonga and

Sithole 2020). This scenario adds to the cost of delivering internet access to all Zimbabweans.

The Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) (2018) fourth-quarter report makes the following comments about ICTs in Zimbabwe:

- Active mobile subscriptions increased by 1.3% to a record 12 908 992 from 12 748 551 recorded in the third quarter of 2018.
- The mobile penetration rate increased by 1.2% to reach 93.1% from 91.9% recorded in the third quarter of 2018.
- Mobile voice traffic increased by 4.1% to record 1.32 billion minutes from 1.27 billion minutes recorded in the third quarter of 2018.
- Mobile internet and data usage increased by 15.7% to record 7 395TB from 6 104TB recorded in the third quarter of 2018.
- Mobile telephone revenue declined by 13.3% to reach $287 035 249 from $331 165 401 recorded in the third quarter of 2018.
- Mobile network operating costs increased by 5% to record $174.8 million from $166.5 million recorded in the third quarter of 2018.
- Active internet subscriptions grew by 13.4% to reach 8.7 million from 7.7 million recorded in the third quarter of 2018. The internet penetration rate increased by 7.5% to reach 62.9% from 55.4% recorded in the third quarter of 2018.
- Used incoming international internet bandwidth capacity also grew by 0.8% to reach 84 683Mbps from 85 333Mbps recorded in the third quarter of 2018.
- IAP revenues increased by 13.2% to record $69.7 million from $61.6 million recorded in the third quarter of 2018 (Postal and Telecommunications Regulatory Authority of Zimbabwe 2018).

Generally, the statistics above show that Zimbabwe has great potential in utilizing ICTs as an engine for industrial growth and development. The biggest opportunity lies in harnessing mobile telephones as platforms for social services such as education and banking as shown by an increase in mobile penetration which had reached about 93% by January 2019. Telecel, Econet wireless, and Net One were the three major mobile telephone operators in Zimbabwe and they have continued

to invest in infrastructure to support their data services and the ever-expanding mobile banking and e-commerce. Thus, the utilization of mobile learning platforms has greater potential. The increase in internet penetration rate is a positive development for a country with a total population of 12.6 million. The internet penetration rate though impressive (12.7%) is mainly constituted by uptake from urban dwellers revealing how the urban-rural digital divide is still significant.

Despite these impressive statistics, the Zimbabwean ICT sector is faced with a number of challenges which include but are not limited to inadequate ICT skills, inadequate communications infrastructure, inadequate commercial electricity, fragmented institutional arrangements, inadequate investment capital, absence of a cybersecurity framework, low digital literacy level, limited local ICT innovation, low level of research and development (R&D) and entrepreneurship and absence of an internet governance framework to deal with the management of national and international internet traffic (Ministry of ICT and Courier Services 2016). Ruhode, Owei and Maumbe (2008) and Chimhangwa (2012) further observe that in Zimbabwe opportunities exist for bringing the potential of Information and Communication Technologies for Education (ICTE) into reality, however the full benefits are not being realized due to weak utilization, the absence of collaboration, networking, better services, efficiency, and effectiveness. Relatedly, Kasse and Balunywa (2013) highlight that the most significant constraining factors in e-learning adoption and implementation in Africa in general and Zimbabwe, in particular, is the limited bandwidth (17%), followed by the lack of financial resources, inadequate human resource capacity, and limited electricity, all with 11%. Kasse and Balunywa (2013) argue that the challenges that limit full-scale adoption of e-learning in Africa can be categorized in terms of infrastructural, technical competence, and attitudinal challenges.

Zimbabwe like many of its African neighbours has a lot of work to do in addressing issues to do with the digital divide, ICT infrastructure development, ICT skills development, and the harmonization of laws that govern telecommunications in general. There is a lot of redundancy in the ICT infrastructure which is independently erected by competing internet providers and mobile operators. The issues of

redundancy and infrastructure sharing which are discussed below were still under negotiation at the time of conducting this research.

## 3.4 ZIMBABWE BACKBONE FIBRE LINK

Zimbabwe is linked to undersea cables as shown in Table 3.1:

**Table 3.1: Zimbabwe backbone link**

| Operator | Backbone fibre Link | capacity | Status |
|---|---|---|---|
| Powertel | • Harare-BYO- Plumtree-Botswana<br>• Harare- Mutare - TDM | STM 16<br>STM 16 | Completed<br>Complete |
| Econet/Liquid Telecom | • Harare-Masvingo-Beitbridge- South Africa<br>• Harare-BYO- Beitbridge – South Africa | STM 64<br>STM 64 | Complete<br>Work in progress |
| Tel One | • Harare-Mutare-Mozambique<br>• Harare-Mazoe-Chinhoyi<br>• Harare-Chinhoyi-Makuti-Chirundu-Zambia<br>• Masvingo-Beitbridge-South Africa<br>• Harare-Gweru- Bulawayo-Beitbridge | STM 64<br>STM 16<br>STM 16<br>STM 64<br>STM 64 | Complete<br>Complete<br>Complete<br>Work in progress |
| Africom | • Harare-Mutare-Mozambique | - | Work in progress |

Source: POTRAZ report (2018)

Table 3.1 shows that Zimbabwe had made great strides in linking with the rest of the world through the connection to the sea cables by various players in the ICT industry. Interestingly the various players except Telone were private. It is also important to note that there was a lack of cooperation among the players as they continued to establish their own links to the sea. This inevitably made internet services expensive in Zimbabwe.

### 3.4.1 Zimbabwe telecommunication backbone

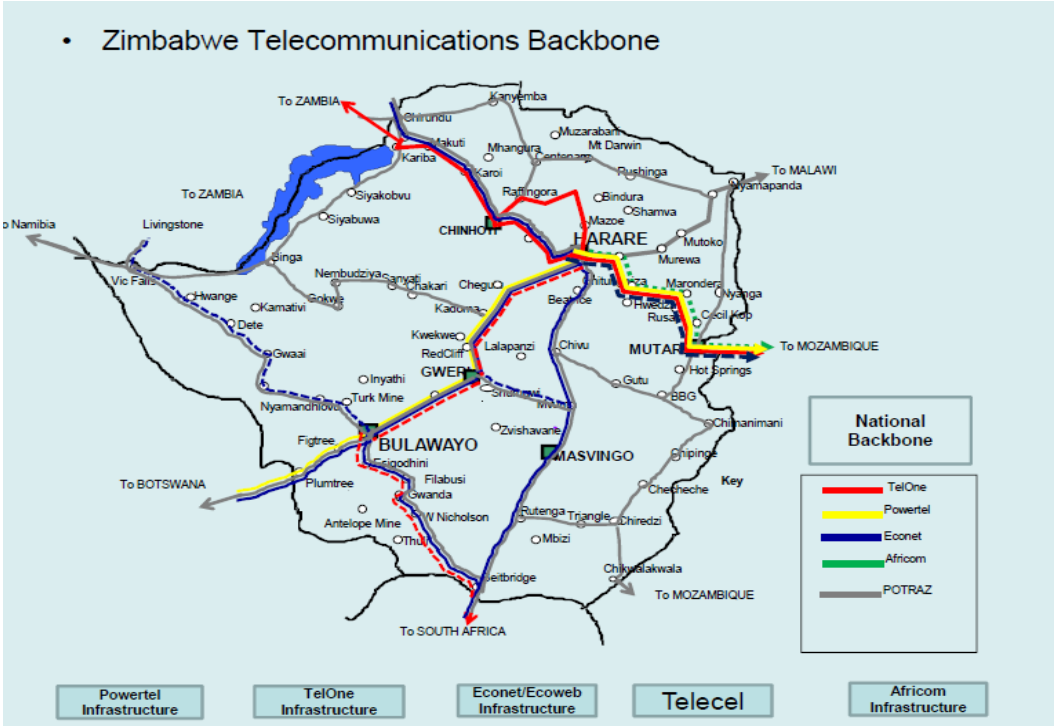



**Figure 3.1: Zimbabwe Telecommunication backbone**
Source: POTRAZ report (2018)

Figure 3.1 shows the Zimbabwe telecommunications backbone. Various operators have engaged in the construction of the national backbone. On a positive note, the national regulator POTRAZ has become visible in the national backbone framework. Since POTRAZ is a government institution, it is likely to bring sanity to the pricing models adopted by various players in the ICT industry and this will have a positive knock-on effect on the affordability of internet services in the long term.

## 3.5 LEGISLATIVE FRAMEWORK FOR REGULATION OF ICTS IN ZIMBABWE

Four separate pieces of legislation independently regulate the ICT operating environment in Zimbabwe. These are: The Postal and Telecommunications Act of 2000, the Broadcasting Services Act of 2001, the Access to Information and Protection of Privacy Act of 2002, and the Interception of Communications Act of 2007. Currently, regulation of the ICT sector is divided between the Broadcasting Authority of Zimbabwe (BAZ), POTRAZ, and the Media and Information Commission (MIC). While POTRAZ reports to the Minister of Information and

Communications Technology and Courier Services, BAZ and the MIC report to the Minister of Media, Information, and Publicity. The need to harmonize the operations and the three pieces of legislation cannot be overemphasized.

## 3.6 ZIMBABWEAN EDUCATION SYSTEM

Zimbabwe's education system has a complex history characterized by two distinct periods, pre-independence and post-independence (Shizha and Kariwo 2011). Shizha and Kariwo (2011) note that the colonial education system divided the education system along racial lines. The pre-independence era saw blacks being marginalized as compared to their white counterparts; as described by Kanyongo (2005: 66): "at independence in 1980 Zimbabwe inherited an education system that favoured mainly white Zimbabwean students and very few black Zimbabweans had access to education." The author further posits that the few blacks who had access to education found themselves in poorly funded schools with very few resources. Consequently, the curriculum for black Zimbabweans was different from that of white Zimbabweans. According to Shizha and Kariwo (2011), the colonial education system spent 20 times more on the white student than the black student.

Inevitably, the post-independence government of Zimbabwe spent the first decade of independence trying to introduce reforms in the education system. These reforms included the expansion of the education sector, racial inclusion, training of teachers, building of new schools, and increasing enrolments (Kanyongo 2011). Increased enrolment and expansion put pressure on the available teachers and hence temporary teachers were hired; this, according to Kanyongo (2011), led to the supply of low-quality teachers and resultant low-quality teaching.

From 1990 to 2001 education reforms shifted to concentrate more on the relevance and quality of education. This was achieved through the enhancement of training through new approaches to content, technologies, and devolution of technical and teacher's colleges to degree-awarding institutions (Kanyongo 2005: 67). By 1997 the proportion of trained primary school teachers rose from 51.48% to 77.2% while that of secondary school teachers increased from 48.1% to 89% (Kanyongo 2005).

## 3.7 STRUCTURE OF THE ZIMBABWEAN EDUCATION SYSTEM

The education system in Zimbabwe consists of primary, secondary, and tertiary institutions. It takes seven years of primary education and six years of secondary education for a Zimbabwean student to be eligible for tertiary education enrolment. According to (Kanyongo 2005) the curriculum is centrally planned by the Ministry of Primary and Secondary Education's Curriculum Development Unit (CDU).

## 3.8 PRIMARY EDUCATION

At the end of the first seven years of primary education students are tested in four subjects: Mathematics, English, Shona, and General Paper. These grade seven results are usually used for enrolment into secondary education.

## 3.9 SECONDARY EDUCATION

Secondary education begins at Form One (Grade 8). At the end of the fourth year, students sit for an examination for a minimum of five subjects. The examining board is the Zimbabwe Schools Examination Council (ZIMSEC). Upon passing one or more subjects with grade 'E' or better ZIMSEC issues a General Certificate of Education Ordinary Level (ZGCE O-Level). Students who normally pass five 'O' levels with grade 'C' or better proceed to do ZGCE Advanced level. At 'A' level students major in a minimum of three subjects and the choice of subjects is based on the student's long term career goals (Kanyongo 2005). Upon passing 'A' level, students are issued with a GCE A-level certificate. Ordinarily, students who pass a minimum of two 'A' level subjects are eligible to apply for tertiary education.

## 3.10 TERTIARY EDUCATION

According to Kanyongo (2005), in Zimbabwe tertiary education refers to studies at universities, technical colleges, polytechnic colleges, teacher training colleges, and other vocational skills centers. For universities, students are offered places for study according to the relevance of the subjects they studied at 'A' level. Zimbabwean universities offer their studies on a fulltime basis or part-time basis. Normally for a

General Bachelor's degree students spend a minimum of three years and for an honors degree it is four years.

## 3.11 INFORMATION TECHNOLOGY IN PRIMARY AND SECONDARY EDUCATION IN ZIMBABWE

According to Kanyongo (2011) and Shizha and Kariwo (2011), Zimbabwe, like most developing countries, has not been spared by the effects of the digital divide. The infusion of technology in teaching and learning is not progressing in line with developments in ICT in education. As Kanyongo rightly puts it: "While most schools and other educational institutions in the industrialized countries have ready access to computers and the internet, the same cannot be said of developing countries" (Kanyongo 2011:23). In fact, according to Konyana and Konyana (2013), only 0.1% of the African population use even basic internet services such as email. The lack of financial resources and poor infrastructure are the main reasons why it is difficult to introduce computer technology in most rural schools in Zimbabwe (Konyana and Konyana 2013). Although computers were introduced as early as 1990 in the education curriculum in Zimbabwe, their use has been limited to a few well-funded private and boarding schools (Kanyongo 2011).

According to Konyana and Konyana (2013) most schools in Zimbabwe do not have basic facilities required for the use of computer technology in teaching and learning. The issue then is that when students enroll for university education with an inadequate ICT background, it affects their ability to cope and navigate the digitalized learning spaces.

### 3.11.1 ICT developments in primary and secondary education in Zimbabwe

#### 3.11.1.1 Primary school

In line with the recommendations of the Presidential Commission of Inquiry on Education and Training (CIET) in 1999, the Ministry of Primary and Secondary Education undertook an updating curriculum review exercise beginning October 2014. The Curriculum Framework promotes the following principles: inclusivity,

relevance, respect (*Unhu/Ubuntu*), and diversity. Further, it is envisaged that the curriculum framework will equip graduates of the education system with the following exit skills: critical thinking, problem-solving, leadership, communication, team-building, and technological skills. This new curriculum has since been rolled out and beginning in 2017, students were exposed to the tenets of this curriculum. The emphasis on technology and Early Childhood Development (ECD) makes this curriculum stand out and be relevant to contemporary issues in education. The new curriculum makes it compulsory that mathematics, science, and information technology are taught at the ECD level. While this is a welcome development, children from poor backgrounds will remain marginalized as their parents may fail to raise funds to purchase learning aids such as computers and other gaming apparatus which are requirements for study at this level.

#### 3.11.1.2 Secondary education

According to Konyana and Konyana (2013), use of ICT in educational development is at the center of the United Nations Millennium Development Goals (MDGs). Zimbabwe, therefore, as a developing nation, needs to embrace this initiative, especially in the education sector (Konyama and Konyama 2013). The biggest challenge of embracing technology in primary and secondary education in Zimbabwe could be summarized in four impediments, i.e., lack of sound ICT policies, poor information exchange between and among people, lack of development partners, and lack of a progressive attitude (Musiyandaka, Ranga and Kiwa 2013). The authors argue that central to the success of ICT integration projects in schools, the following issues should be examined: ICT literacy, community involvement, community contextual awareness, equitable access to ICT, and inadequate infrastructural development. Bukaliya and Mubika (2012) expand on these issues by suggesting that in-service and training of teachers is a very important remedy in the integration of computer education in the school curriculum. The authors also point out that administrative support is key to successful implementation of computer education in schools. The then Ministry of Higher and Tertiary Education, Science and Technology Development in Zimbabwe has also started a program to intensify the teaching of science, technology, engineering, and Mathematics (STEM). Under the STEM initiative, the government of Zimbabwe paid,

in full, the fees for students who enrolled in science subjects at ‘A’ level so as to promote and encourage students to enrol for STEM subjects at the Advanced level. The aim was to ensure increased enrolment in STEM disciplines at local universities. However, the program was later discontinued.

Given the literature above, it can be argued that the Zimbabwean Government has made some progress in ensuring that there is an infusion of ICT in the teaching and learning process at primary and secondary levels. This has manifested itself in the following programs: 1) Donations of computers to schools through the Presidential computer program. According to Chimusoro (2013) about 7 300 computers were donated to schools between 2004 and 2006. 2) Enactment of favourable policies and legislation. According to the Government of Zimbabwe (2016), all school and college students must do a computer module before the completion of their studies. Most primary and secondary school training colleges have introduced compulsory ICT skills training (Zengeya 2008).

The Government of Zimbabwe has made it a policy that ICT features at every stage of basic education as a standalone subject and as a crosscutting function in the new curriculum framework (Chimusoro 2013).

Furthermore, the Government is reviewing its national ICT policy with a view of developing local content in e-learning to preserve the Zimbabwean culture and its values (Chimusoro 2013). The Government has also made strides in ensuring that most rural schools are electrified, and most secondary schools have been connected to the national grid. School infrastructure is regarded as one of the key components of a successful education system. In this regard, Zimbabwe has successfully constructed and established 8 179 schools across the country, and as a result, in 2013, 3 994 773 students had enrolled in both primary and secondary schools (Gadzirayi *et al.* 2016: 26).

Despite these impressive statistics, it is apparent that the Government of Zimbabwe must step up its efforts to bridge the gap between the rural and urban schools in terms of resources, infrastructure, and ICT in general. There should be a follow up on donated ICT equipment in schools to ascertain whether they are being put to

good use. Some teachers and school authorities tend to decorate their offices with these valued resources at the expense of the learner. The policy framework should not remain academic but should be implemented in a good time. A lot still needs to be done to enhance the adoption of ICT in schools by way of introducing well-planned programs in staff development and computer literacy awareness if the benefit of ICT is to be realized in Zimbabwean schools.

It would be unfair to expect students from rural schools to easily learn and adopt computer and digital literacy skills in terms of ICT utilization when they enrol as first-year students at universities without the relevant and adequate exposure. The studies reviewed in this research did not cover this gap of evaluating the impact of students' primary and secondary school backgrounds as possible causes of their failure to embrace technology later during their tertiary education. Further, literature has also revealed the importance of training and retraining of teachers so that they can teach using technology. This should also apply to university lecturers. It is the researcher's considered view that in addition to training lecturers on the use of ICT in teaching, they should be exposed to pedagogy and andragogy basics in order to recreate in them a firm ground of teaching.

## 3.12 HIGHER EDUCATION IN ZIMBABWE

In Zimbabwe, tertiary education refers to studies at universities, technical colleges, polytechnic colleges, teacher training colleges, and other vocational skills centers (Kanyongo 2011). For this study, the researcher reviewed literature relating to public universities.

The Zimbabwe Council for Higher Education (ZIMCHE) (2020), state that Zimbabwe has 20 universities, 14 public and 6 private institutions. According to Garwe (2016), a public institution is one that obtains the bulk of its financial resources from the government while a private institution is funded mainly by their responsible authorities (churches or trustees) (Garwe 2016: 233). The Zimbabwe Council for Higher Education (ZIMCHE) Act (2006) defines a university as a registered degree awarding institution. In Zimbabwe, the registering authority is the Zimbabwe Council for Higher Education (ZIMCHE).

The expansion of the university system in Zimbabwe from one institution in 1980 to 15 by 2016 was mainly in response to ripple effects created by the massive expansion of primary and secondary education soon after the attainment of political independence in 1980 (Majoni 2014: 20). Currently, public higher education institutions are heavily dependent on the fiscus for capital and recurrent expenditures (Majoni, 2014). According to ZIMCHE(2020), 80% of budgetary support is from the fiscus, 15% from fees and 5% from other sources (ZIMCHE 2020).

Higher education in Zimbabwe is governed by four major legal instruments: the Manpower Planning and Development Act, Chapter 28:02 (1996) amended in 2020, Individual State University Acts, Individual Private University Charters, and the ZIMCHE Act, Chapter 25:27 (2006). Individual university Acts of public universities provide for the establishment of individual public universities and their governance (ZIMCHE 2020). The process of establishing a public university in Zimbabwe starts with the relevant minister formulating the proposal followed by a bill which is tabled before parliament. Each university Act or Charter is granted by the President who is also the Chancellor of all public universities. This is communicated through a statutory instrument by proclamation. The Act or Charter of the university provides for a Senate which is the academic authority of the university. Each university has a specific mandate as specified by the relevant ministry.

### 3.12.1 Challenges faced by public universities in Zimbabwe

Majoni (2014) argues that “Higher education in Zimbabwe faces challenges which include dropouts, high tuition and accommodation fees, underfunding, staff shortages and economic decline, foreign currency shortages, hyperinflation, and large public debt” (Majoni 2014: 1). Majoni (2014) further grouped the challenges faced by public universities into three categories as follows: university teaching and learning, research and publication, and quality assurance.

#### 3.12.1.1 Teaching and learning challenges

In this category, Majoni (2014) noted the major challenges faced by universities as being a shortage of skilled and experienced teaching staff, lack of proper infrastructure for teaching, libraries with outdated books unavailability of modules for students, lack of training and induction, poor academic leadership and management of processes, low remuneration and non-payment of part-time lecturers, and short semesters (Majoni 2014: 21).

#### 3.12.1.2 Research and development challenges

In this category, lack of computer literacy, poor skills for research, lack of necessary induction and training, poor emphasis on research, unavailability of local journals for publication, poor internet connectivity, lack of exposure to research and publication, high workload, lack of research support, lack of information thereof, and the lack of education on the publication process were cited as major issues in public universities (Majoni 2014: 23).

#### 3.12.1.3 Quality Assurance

Among challenges faced by higher education in Zimbabwe, Majoni (2014) found that there was lack of funds to acquire resources, bring in external assessors as well as put in place quality assurance committees and panels in universities. Quality assurance has always been in place through peer review and student evaluation, but these were not being fully utilized due to lack of funds and inadequate quality control mechanisms. The author found that most universities lacked effective quality monitoring and evaluation systems, so the courses offered by these universities do not meet the needs of the industry. Leakage of exam papers and cheating and the harsh economic climate tended to have negative impact on quality. Lecturers were poorly remunerated, as such their morale was low, faculties and departments were not well trained and inducted in quality assurance (Majoni 2014).

### 3.12.2 The state of ICT infrastructure in public universities in Zimbabwe

Universities in Zimbabwe have come to the realization that having a robust internet service is no longer a luxury but is a strategic resource for competitive advantage. Information on ICT infrastructure is thus not easily obtained or divulged from universities since it is considered strategic. The state of internet connectivity in public universities, according to Chitanana (2012) can be summarized as too little, too expensive, and poorly managed (Chitanana 2012: 67). In a study conducted by Chitanana (2012), the data collected showed limited development regarding e-learning infrastructure in universities. The number of network points compared to the numbers of users showed a low computer user ratio (Chitanana 2008: 7) as shown in Table 3.2.

**Table 3.2: Network infrastructure in some public universities in Zimbabwe**

| Network Service | University Of Zimbabwe | Midlands State University | Chinhoyi University Of Technology | National University Of Technology |
|---|---|---|---|---|
| No. of network points | 3000 | 1000 | 350 | 4000 |
| No of users | 12000 | 10000 | 1560 | 6000 |
| Size of bandwidth | 2 Mbps | 1 Mbps | 2 Mbps | 2 Mbps |
| Cost of bandwidth per month (Z$) | 140 million | 120 million | 130 million | 10 million |
| Type of internet link | Leased Line | Leased Line/ Fibre optics | Leased Line | Radio Link |

Source: Chitanana (2012)

Access to computers in offices by lecturers is relatively good and stands at 77% but access to computers for teaching and learning is very low and was recorded at 29% (Chitanana, Makaza and Madzima 2008: 7). Most public universities use open-source learning management systems called “Claroline” and some have customized and developed in-house learning management systems such as Changamire (MSU), e-Mhare (UZ), and IUMS (BUSE). All public universities in Zimbabwe were giving access to e-resources such as e-journals, e-books, online catalogues and data (Chitanana, Makaza and Madzima 2008: 7).

According to Chitanana (2012), the highest bandwidth reported for a sample of public universities was 28 Mbps both upstream and downstream. This, according to Chitanana is less than a low-end broadband residential connection in Europe (Chitanana 2012: 68). The research by Chitanana (2012) also noted that by 2012 one of the universities listed still used a dial-up connection for internet connectivity (Table 3.3).

**Table 3.3: Network infrastructure in some public universities in Zimbabwe (2012)**

| NETWORK SERVICE | A | B | C | D |
|---|---|---|---|---|
| No of networked PCs | 1450 | 1000 | 400 | 450 |
| No of users | 12000 | 3500 | 2560 | 4500 |
| Size of bandwidth | 28 Mbps | 22 Mbps | 1 Mbps | 5 Mbps |
| Type of internet link | Fiber optics | Fiber optics | VSat Leased line | Radio/Fibre optic |

Source: Chitanana (2012)

#### 3.12.2.1 Band width utilization and management

Although the bandwidth is relatively small in most public universities in Zimbabwe, Chitanana observes that there was a limited range of bandwidth management techniques and universities had no bandwidth management policies (Chitanana 2012: 69). In general, bandwidth utilization was good from 08h00 to 22h00 in most universities and standby generators exist in most institutions to avert power outages.

## 3.13 A BRIEF HISTORY OF THE TWO PUBLIC UNIVERSITIES

### 3.13.1 University of Zimbabwe (UZ)

According to their website, the University of Zimbabwe was established in 1955 and was formerly known as the University College of Rhodesia and Nyasaland and later became known as the University of Rhodesia. The same website lists this university as a public institution whose core business is research.

The UZ has nine faculties and one college offering 97 accredited bachelor's degrees. The estimated total population of undergraduate students is 19 200 and the postgraduate student population stands at 2 600. Since 1955 the university has graduated 70 000 students. The head of the University of Zimbabwe is the Chancellor, who is the President of Zimbabwe. The University Council is the governing body and the leader of the University is the Vice-Chancellor (VC) who is also known as the 'Chief Executive' of the institution. The Vice-Chancellor is appointed by the Chancellor in consultation with the University Council. The Vice-Chancellor is assisted by one or more Pro-Vice Chancellors. The Senate is the academic authority and comprises the deans of faculties and all full professors, chairpersons of departments, staff, and representatives of the Student Representative Council (SRC). Each faculty is headed by an Executive Dean who chairs Faculty Boards and represents the faculty in the senate. The Faculty Board in addition to all permanent academics and student representatives, is made up of departmental chairpersons who in turn chair departmental boards that report to the Faculty Board.

#### 3.13.1.1 E-learning platforms at UZ

The University of Zimbabwe uses the open-source learning management system Claroline as its e-learning platform (Chitanana 2008: 8). The Claroline has since been given a local name and the system is referred to as 'TSIME'. The practice of giving such platforms a local name is a practice inherent across the public universities. Therefore, public universities, after customizing an open-source learning management system usually give it a local name such as TSIME (UZ), E-mhare (UZ), Changamire (MSU), and MyVista (ZOU). This practice though simplistic at face value, has a positive effect in creating the spirit of ownership of the LMS among users. It was also observed that users easily recalled the local names when asked. Unlike ZOU, the UZ has customised the Claroline system into two distinct platforms; e-Mhare (Figure 3.2), an e-working platform for administrative issues such as admissions, accommodation, registration and student account management, and Tsime which is used exclusively for collaborative e-learning (Zanamwe 2012). This has the positive net effect of decongesting the platforms.

Both Tsime and e-Mhare have easy to follow instructions embedded into the systems; hence, students and lecturers can use them with little or no assistance.

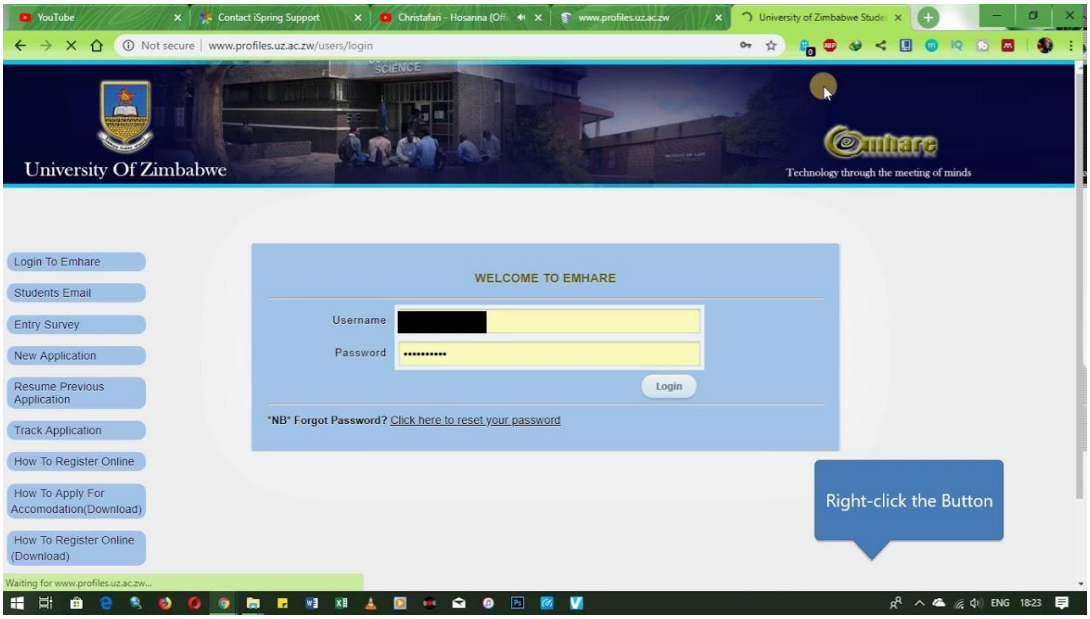



**Figure 3.2: Tsime webpage**
Source: www.uz.ac.zw

### 3.13.2 Zimbabwe Open University (ZOU)

ZOU was established in 1999, through an Act of Parliament, transforming from a University College to become the first open and distance learning university in Zimbabwe. The Zimbabwe Open University is a multi-disciplinary and inter-faculty institution of higher learning offering Open and Distance Learning (ODL) programs. ZOU offers degree and non-degree programs through distance teaching and open learning to youth and adult learners (www.zou.ac.zw).

ZOU offers 30-degree programs under six faculties. With a student population of about 30000, of which about 13 000 are enrolled in Harare province, to date, ZOU has graduated more than 27 000 students. The university Chancellor like every other public university in Zimbabwe is the President of Zimbabwe. The University Council is the official employer and the Vice Chancellor reports to it. The Senate is the custodian of all academic matters. Each faculty is headed by a dean. With the widest geographical spread, the university has regional campuses that are headed by a director.

E-learning platform at ZOU

According to Chirume and Thondhlana (2019), the Zimbabwe Open University (ZOU) uses an open-source learning management platform Claroline which they call MyVista (Figure 3.3), launched in 2015. The actual use of the platform began in 2016 when only Masters students were allowed to use it (Chirume and Thondhlana 2019). After the initial training and subsequent training of staff and students in 2015 and 2016, in 2017 ZOU began to use MyVista in all programs (Chirume and Thondhlana 2019). This open-source program has a user manual which assists users to upload files, videos, images, and other activities such as creating a chat room, participating in the chat rooms, assignment uploading, quiz creation, registration, and general uploading of files. The user manual also helps users to participate in real-time synchronous lecture presentations by teaching them how to text online. Through the manual, users are also taught how they can use the platform offline.


**Figure 3.3: My Vista**
Source: http://www.myvista.zou.ac.zw/

# CHAPTER 4: RESEARCH METHODOLOGY

## 4.1 INTRODUCTION

This chapter discusses the methods and the methodologies that were applied in the process of trying to discover the truth. It begins by unpacking the philosophical underpinnings that informed the methodological choice, research strategy, data collection techniques, and data analysis. The chapter concludes by giving the researcher's standpoint on the methodology applied in this study.

## 4.2 RESEARCH ASSUMPTIONS AND PHILOSOPHIES

Research philosophy refers to a system of beliefs and assumptions about the development of knowledge (Saunders, Lewis and Thornhill 2016: 124). Research, therefore, is the development of knowledge in a particular field, in this case development in higher education management. Research philosophy is guided by assumptions and these assumptions can be epistemological, ontological and axiological in nature. According to Saunders, Lewis and Thornhill (2016), a researcher's research philosophy shapes and forms the basis of methodological choice, research strategy, data collection techniques and its analysis. Thus, before a researcher takes a decision on how the research is to be conducted, they must take a philosophical position and philosophical positions can only be taken after making some critical assumptions. There are basically five major philosophies in business and management research (Saunders, Lewis and Thornhill 2016: 124), namely, positivism, critical realism, interpretivism, postmodernism and pragmatism. The research philosophies inform the theoretical perspective and methodological choice. Hereunder a brief discussion of research assumptions and philosophies ensues.

### 4.2.1 Epistemological assumptions

Saunders, Lewis and Thornhill (2016) define epistemological assumptions as those that revolve around knowledge, that is, its nature, acceptability, and legitimacy and

how it can be communicated from one individual to another. This assumption, therefore, takes into consideration that legitimate and different types of knowledge in the research process can be obtained from various sources such as strategic plans, numerical data, stories, textual and visual data (Saunders, Lewis and Thornhill 2016: 124). Consequently, different researchers adopt different epistemologies and thus different methods. In coming up with a research philosophy the researcher must first search for credible knowledge in that field. What the researcher views as credible knowledge, therefore, becomes their epistemology which then manifests itself in the research strategies used. In this study, quality and credible knowledge was obtained from key participants, i.e., university administrators, students and lecturers. The researcher also searched for information from websites, strategic plan documents, yearbooks and research publications from refereed journals among other sources.

### 4.2.2 Ontological assumptions

Ontology refers to assumptions about the nature of reality (Saunders, Lewis and Thornhill 2016: 124). One's ontological disposition has a bearing on how one views and studies research objects (Saunders, Lewis and Thornhill 2016: 124). Research objects can include organizations, management, individual working lives, organizational events and artefacts. Sheets, Bradley and Hendricks (2010) state that the ontological disposition of a researcher determines the research participants and their value in the research process. The choice therefore of participants is shaped by one's view of reality. In this study the researcher's ontological view about e-learning was that it enhances teaching and learning in universities and the key players would be learners, teachers and management. It was, therefore, the researcher's view that this phenomenon of e-learning implementation could be better understood if the views, attitudes, feelings, and perceptions of these stakeholders are heard and analyzed through interviews and questionnaires.

### 4.2.3 Axiological assumption

Axiological assumption refers to the role of values and ethics within the research process. In other words, our values determine the actions we take against or for

others. Choice of philosophy reflects values as is the choice of data collection (Saunders, Lewis and Thornhill 2016: 124). A person who values interpersonal interaction is likely to use interviews as a method of data collection. This assumption, therefore, shapes the way the researcher treats the research participants. As a result, in this study softer issues of research, such as confidentiality, recruitment, consent, right to or not to participate, and privacy were respected and upheld throughout the study.

## 4.3 RESEARCH PHILOSOPHIES

### 4.3.1 Positivism

This philosophy relates to the philosophical stance of a scientist that works with observable social reality to produce law-like generalizations (Saunders, Lewis and Thornhill 2016: 124). In this philosophy, knowledge is clear and unambiguous. Research is done in a straightforward empirical and guided procedure yielding pure data. Epistemologically, this philosophy focuses on discovering observable and measurable facts and regularities (Saunders, Lewis and Thornhill 2016: 136). In Positivism, existing theory is used to come up with a hypothesis and the hypothesis is tested and then either adopted or discarded. Positivists believe that if there is knowledge to discover, there must be a set way of doing it in the form of an experiment where the aim, apparatus, method and the results are stated in a chronological manner. Sheets, Bradley and Hendricks (2010) state that this philosophy is anchored in mathematical calculations and the testing of a hypothesis is key. The positivist approach, in my own view, may be suitable for scientific inquiry but is not flexible enough for the work that I wanted to do and had very little influence on the way this study was conducted.

### 4.3.2 Critical realism

This philosophy originated from the work of Roy Bhaskar as a middle of the road approach between positivism and postmodernism discussed below (Saunders, Lewis and Thornhill 2016: 139). It is based on what we see and experience, in terms of the underlying structures of reality that shape observable events (Saunders,

Lewis and Thornhill 2016: 139). This philosophy argues that what we see are not actual things but are sensations produced by things in the actual world (Saunders, Lewis and Thornhill 2016: 124). Therefore, according to this philosophy what we see with our eyes may not be the whole picture of what is really happening. Believers of this philosophy make ontological assumptions and assert that reality cannot be explained by mathematical manipulations but a whole range of methods might be able to do so (Sheets, Bradley and Hendricks 2010). It is this philosophy that persuaded the researcher to triangulate data gathering techniques in this study in a bid to unpack the phenomenon of e-learning.

### 4.3.3 Interpretivism

This philosophy argues that humans are different from phenomena because they create meaning (Saunders, Lewis and Thornhill 2016: 140). Adherents of this philosophy argue that there should be a difference between social science research and natural sciences and that life cannot be reduced to general equations and universal laws. They believe that insights into reality are easily lost if the complexity of human nature is reduced to generalizations (Saunders, Lewis and Thornhill 2016: 124). Interpretivists create new, richer understandings of social worlds by looking into the perspectives of different groups of people. In other words, if we are to understand a university, the views of different stakeholders should be heard.

### 4.3.4 Postmodernism

This philosophy emphasizes the role of language and relations. It questions the normal way of thinking and provides room for marginalized views (Saunders, Lewis and Thornhill 2016: 141). This philosophy owes its birth to French philosophers such as Gilles Deleuze and Felix Guattari among others. This philosophy emphasizes the chaotic primacy of flux, movement, fluidity and change (Saunders, Lewis and Thornhill 2016: 141). Postmodernism targets processes rather than objects in understanding an organization. Postmodernists deconstruct existing knowledge. This philosophy had a greater impact in the face-to-face interviews where participants were asked questions which had an effect on their comfort zones and what they knew.

### 4.3.5 Pragmatism

Pragmatists assert that concepts are only relevant where they support action (Kelen and Rumens cited in Saunders, Lewis and Thornhill 2016: 124). For a pragmatist, research starts with the identification of a problem and aims to contribute to the body of knowledge of the present and the future. According to Saunders, Lewis and Thornhill (2016: 143), if one were to undertake a research study informed by pragmatism, the research design and strategy should be in such a way that they address research questions and problems. The pragmatist approach used in a study allows the use of multiple methods in solving a research problem.

In summary, Saunders, Lewis and Thornhill (2016: 124), assert that there is no single best philosophy, each philosophy contributes a unique and valuable way of addressing the research questions. By understanding research philosophies and their strength and weaknesses, the researcher was able to come up with a robust research strategy. The best approach was for the researcher to understand the philosophies and angulate them so as to come up with credible results. There is, therefore, a triangular interlinked relationship among the following issues: research philosophy, beliefs and assumptions and research design as shown in Figure 4.1.

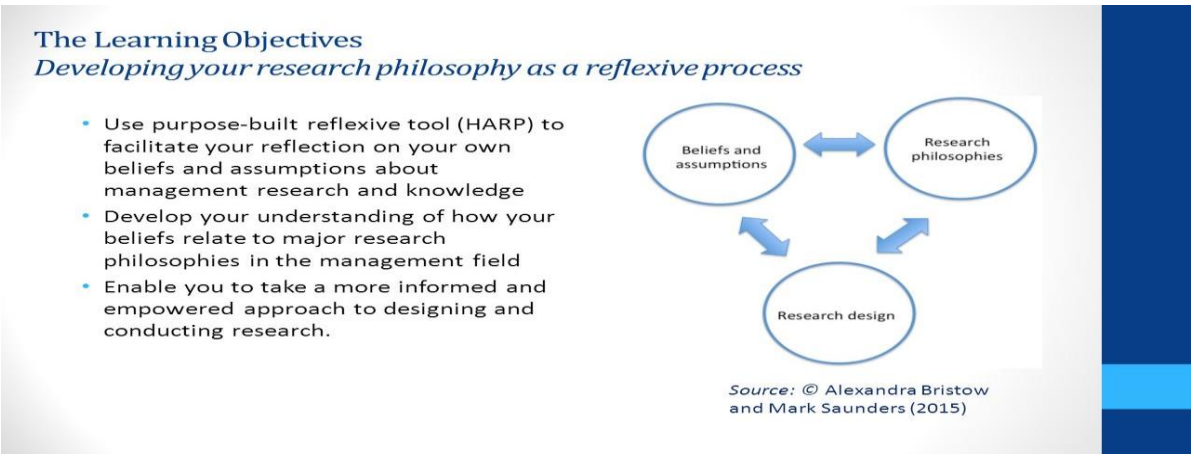



**Figure 4.1: Triangular interlink – philosophy, beliefs and research design**
Source: Alexandra and Saunders (2015)

### 4.3.6 Implications of the research philosophies to the study

This research was guided mainly by the pragmatist paradigm because pragmatist research starts with the identification of a problem and aims at contributing to the body of knowledge of the present and the future which was in line with the aim of this research. Further, the pragmatist approach confirms that multiple methods and approaches are sometimes used in solving a research problem. Unlike other philosophies, pragmatism allowed the angulation of research design, collecting instruments and methodological choices. This research emphasizes practical solutions and outcomes which is the hallmark of this philosophy. It recognizes the existence of multiple realities.

## 4.4 AN OVERVIEW OF THE RESEARCH DESIGN

According to Saunders, Lewis and Thornhill (2016), a research design is the practical application of research questions and objectives in the research project. Bryman and Bell 2015 (Cited in Graue 2015) define a research design as a framework for collecting and analyzing data. Saunders, Lewis and Thornhill 2016) argue that a research design is a plan or blueprint on how one intends to conduct the research. It is, as stated by Creswell (2013), the logical sequence that connects the empirical data to a study's initial research questions and ultimately its conclusions (Creswell 2013: 5). The research design is informed by one's research philosophy (Saunders, Lewis and Thornhill 2016). In coming up with a research design the researcher must come up with a methodological choice on whether to follow a quantitative or qualitative or mixed methods research design (Saunders, Lewis and Thornhill 2016).

### 4.4.1 Methodological choice

There were basically three methodological choices that were available to this researcher: qualitative, quantitative and mixed methods research design.

#### 4.4.1.1 Quantitative and qualitative research design

According to Saunders, Lewis and Thornhill (2016), quantitative research is any data collection technique such as a questionnaire or data analysis procedure such as graphs or statistics that generates or uses numerical data. In contrast, qualitative research is any data collection technique such as interview or data analysis procedure such as categorizing data that generates or uses non-numerical data (Saunders, Lewis and Thornhill 2016: 165). While the two definitions distinguish the two methodological choices, some scholars argue that these definitions are problematic when one attempts to apply them to the distinction of the related designs. This is because a qualitative research design might use quantitative methods to verify or authenticate findings. Similarly, a quantitative design may also use interviews for the same reasons. A more robust distinction based on philosophical underpinnings, research approach and strategies is thus required.

- **Quantitative design**

This design is synonymous with the positivist, realist and pragmatist philosophies. Its theory development is deductive and uses data to test theory. In some cases, it can use the inductive approach where data is used to develop a theory.

- **Characteristics of quantitative design**

According to Saunders, Lewis and Thornhill (2016), quantitative designs use statistical and graphical techniques to test relationships between measurable and distinct variables. Controlled experiments are set up to validate data and probability sampling techniques are used to ensure that results and their meaning can be generalized. The researcher is usually divorced from the respondents. When one method is used in the collection of data and a corresponding analytical procedure is used then the study becomes a mono-method quantitative study, and when more than one method of data collection is used and a corresponding analytical procedure is used, then a multi-method quantitative study evolves (Saunders, Lewis and Thornhill 2016: 166). A multi-method approach uses many methods within the purview of either quantitative or qualitative methods, while in a mixed method approach the researcher uses both qualitative and quantitative approaches.

- **Quantitative research strategies**

Quantitative research is associated with experimental and survey research approaches. A survey research approach utilizes questionnaires or structured interviews or structured observation.

- **Qualitative design**

This research is associated with the interpretive philosophy because researchers need to make sense of subjective and socially constructed phenomena (Saunders, Lewis and Thornhill 2016). To achieve trust, participation and in-depth understanding, the qualitative design is conducted in the natural environment of the participants and the researcher takes part in the study. In a mixed method design, qualitative approach can also be conducted within the realist and pragmatist approach. Qualitative design is used to either build new theory or develop a richer theory than the one that exists in the literature (Saunders, Lewis and Thornhill 2016: 168).

- **Characteristics of qualitative design**

Data collection is not standardized as new questions may appear during the course of the study, therefore, it uses non-probability sampling techniques. The researcher's rapport with participants is critical in delivering the required goals using a corresponding qualitative analytical tool. One collection method may be used, or more than one method of collection may be applied, the former being a mono method qualitative study and the latter being a multi-method qualitative study (Saunders, Lewis and Thornhill 2016).

### 4.4.2 Mixed method research design

Mixed methods fall under a branch of multiple methods that combines qualitative and quantitative data collection and analytical procedures (Saunders, Lewis and Thornhill 2016). This design includes the philosophical position of critical realists and pragmatists. In this design the research questions and the context of the research and its consequences are key in coming up with methodological choice.

The mixed method approach uses three designs of theory development that is, deductive, inductive or adductive approaches. A quantitative approach may be used after a qualitative approach to test theory or vice versa to get a deeper understanding of theory. Mixed methods research designs can be concurrent, that is the use of both quantitative and qualitative methods during the same phase of data collection; if it is done to compare how data support each other then it is called concurrent triangulation. Research design can also be sequential exploratory, that is use of qualitative methods followed by quantitative techniques during different phases of data collection and analysis. On one hand, it is sequential explanatory if quantitative methods are used then followed by qualitative techniques. On the other hand, it is sequential multiphase if the research uses qualitative, quantitative and qualitative methods in that order at different levels or phases of the research. Fully integrated mixed methods research is when one mixes both quantitative and qualitative methods at design, data collection, analysis, interpretation and presentation of the write up. However, partially integrated mixed research methods can be used at one or a particular stage of the research. Embedded mixed methods research involves the use of qualitative and quantitative methods in data collection.

This study used the concurrent design because of constraints on time and after taking into consideration that it is faster than sequential design as universities have periods where they are closed for business. The research specifically used concurrent triangulation as e-learning implementation would be studied from the angle of administrators, students and lecturers. The data collected was then analyzed qualitatively using content analysis (university administrators) and quantitative techniques (students and lecturers) and combined to come up with interpretations and meanings.

The use of mixed methods design allowed the researcher to enrich findings by using the qualitative data obtained from the key informants (IT directors) with that obtained from the sampled students and HODs. This became a way of checking whether observations made in the interviews were significant or not. Further, the mixed method approach allowed the researcher to use in-depth interviews (qualitative method) to increase the depth of the study and at the same time used a sampled

number of students and HODs (quantitative method) to increase the breadth of the study and thus generalizations could be made.

The mixed method approach also allowed the researcher to test the Technology Acceptance Model (TAM) (quantitative method) and proffer an e-learning implementation model based on the analysis obtained from in-depth interviews (qualitative method). Using mixed methods ensured the results were acceptable to both qualitative and quantitative advocates thus ensuring that the results and recommendations were credible and generally acceptable.

## 4.5 IMPLICATIONS OF THE STUDY

The researcher used a qualitative design because scholars who advocate for its use argue that it is humanistic idealistic, in-depth in nature, and that the researcher's involvement in the research meant that the researcher obtained first-hand experience which formed the basis of data interpretation and meaning. In qualitative research, the contact between the researcher and the participants is long enough to the extent that the responses obtained from the participants are likely to be honest and valid (Benoliel, cited in Carr 1994: 716). In addition, qualitative research was used because it enabled the understanding of human beings and the nature of their transactions with themselves and with their surroundings (Carr 1994).

Qualitative research was also used because of the need to explain certain aspects of the phenomenon of e-learning. Qualitative design methods were suited to this research because the researcher sought to study a phenomenon of e-learning implementation from the point of view of users. The qualitative design allowed the full participation of the researcher and thus enabled an in-depth study and analysis of the data required in understanding of this phenomenon. The involvement of the researcher also helped to clarify issues. Qualitative methodology allowed participants to add quality by raising new issues and topics which were previously missed by the researcher (Carr 1994). This was critical in this study of fast evolving phenomenon such as e-learning implementation where cutting edge technology is incorporated continuously.

Qualitative design also allowed the researcher to use purposive sampling in the selection of participants. Qualitative design enhanced validity because validity increases when a phenomenon is studied in its natural and real life context (Carr 1994). However, the involvement of the researcher as prescribed by qualitative design can possibly influence the results and cause bias, subjectivity and distortion of outcomes. In some quarters qualitative research is not considered to be reliable because the processes of data collection and analysis are not standardized and are dependent on the researcher's abilities of hearing, noticing and description. In order to counter these disadvantages, the researcher incorporated some components of quantitative design in the form of a survey that used questionnaires as a data collection instrument. This resulted in a mixed methods design.

## 4.6 TARGET POPULATION

The target population for this study was IT directors, students and HODs working, studying, and teaching at the University of Zimbabwe (UZ) and Zimbabwe Open University (ZOU). These two universities are the leading public universities in Zimbabwe with advanced IT infrastructure. The two universities geographical spread also ensured a true representation of public universities in Zimbabwe. The University of Zimbabwe, on one hand, is the oldest tertiary institution in Zimbabwe with robust management systems and all public universities in Zimbabwe at their inception used UZ systems. ZOU on the other hand specialized in Open Distance Learning (ODL) and used technology innovations such as e-learning in administrative, teaching and learning processes more than any institution in Zimbabwe.

The views of HODs were critical and tactical as they were involved in administrative, teaching and learning activities. They interact with both management and students through formal departmental and faculty boards. HODs have a deeper understanding of the problems encountered by stakeholders in the process of teaching and learning. IT directors are members of the institutions' Senate where academic issues are discussed at a strategic level. They are the custodians of ICT resources and policy. Their views were thus important to this study since they were knowledgeable in all university issues. Of note is that HODs and IT directors'

responses were used to confirm certain aspects raised by students. The main research respondents in this study were therefore the students. The students were key to this research as they are the main consumers of e-learning platforms. Their views were thus very important in this study. The population of the respondents from both UZ and ZOU was 35 000 students, 100 HODs and 2 IT Directors.

## 4.7 SAMPLING

Sampling according to Saunders, Lewis and Thornhill (2016) refers to techniques that enable a researcher to reduce the amount of data they need to collect by considering only data from a sub-group. Sampling techniques can be categorized into two broad areas, that is, probability and non-probability sampling. Probability sampling is a sampling technique where the subjects of the population get an equal opportunity to be selected and includes simple random sampling, systematic random sampling, stratified random sampling and cluster sampling. Non-probability sampling is a biased method of sampling where it is known which individual from the population will be selected as a sample and includes convenience/purposive sampling, quota sampling, snowball sampling (Archaya *et al*. 2013). Table 4.1 shows a comparison between probability sampling and non-probability sampling methods.

**Table 4.1: Characteristics of probability and non-probability sampling**

| Comparison | Probability sampling | Non-probability sampling |
|---|---|---|
| Definition | Probability sampling is a sampling technique, in which the subjects of the population get an equal opportunity to be selected as a representative sample. | Non-probability sampling is a method of sampling wherein, it is not known which individual from the population will be selected as a sample. |
| Alternately known as | Random sampling | Non-random sampling |
| Basis of selection | Randomly | Arbitrarily |
| Opportunity of selection | Fixed and known | Not specified and unknown |
| Research | Conclusive | Exploratory |
| Result | Unbiased | Biased |
| Method | Objective | Subjective |
| Inferences | Statistical | Analytical |
| Hypothesis | Tested | Generated |

Source: Key differences.com/difference-between –probability and non-probability sampling

For this study, the researcher used mixed methods probability sampling (MM), that is, purposive sampling and random probability sampling. This strategy, according to Teddlie and Yu (2007), enables the researcher to flexibly choose the research participants and their sample size. Teddlie and Yu (2007) further support this position by asserting that mixed methods probability sampling involving purposive and probability sampling is designed to provide a sample that will answer the research questions under investigation, and they are both concerned with issues of generalizability to an external context or population (i.e., transferability or external validity) (Teddlie and Yu 2007: 83).

Sampling was intended to pick a small number of cases that would yield the most valuable information. To this end, the qualitative research participants were chosen by purposive sampling strategy, while the qualitative research participants were chosen by random probability sampling as this ensured the selection of a large number of cases that are collectively representative of the population of interest (Teddlie and Yu 2007: 83).

Teddlie and Yu (2007: 83) write that “purposive sampling leads to greater depth of information from a smaller number of carefully selected cases, whereas probability sampling leads to greater breadth of information from a larger number of units selected to be representative of the population.” Employing these two approaches became a way of cross-checking issues raised by the different stakeholders in the study. The mixed methods approach allowed the researcher to use in-depth interviews (qualitative method) to increase the depth of the study and at the same time use a sampled number of students and HODs (Quantitative method) to increase the breadth of the study and thus generalizations could be made. Table 4.2 shows the comparisons between purposive and probability sampling techniques.

**Table 4.2: Comparisons between purposive and probability sampling techniques**

**Comparisons Between Purposive and Probability Sampling Techniques**

| Dimension of Contrast | Purposive Sampling | Probability Sampling |
|---|---|---|
| Other names | Purposeful sampling<br>Nonprobability sampling<br>Qualitative sampling | Scientific sampling<br>Random sampling<br>Quantitative sampling |
| Overall purpose of sampling | Designed to generate a sample that will address research questions | Designed to generate a sample that will address research questions |
| Issue of generalizability | Sometimes seeks a form of generalizability (transferability) | Seeks a form of generalizability (external validity) |
| Rationale for selecting cases/units | To address specific purposes related to research questions<br>The researcher selects cases she or he can learn the most from | Representativeness<br>The researcher selects cases that are collectively representative of the population |
| Sample size | Typically small (usually 30 cases or less) | Large enough to establish representativeness (usually at least 50 units) |
| Depth/breadth of information per case/unit | Focus on depth of information generated by the cases | Focus on breadth of information generated by the sampling units |
| When the sample is selected | Before the study begins, during the study, or both | Before the study begins |
| How selection is made | Utilizes expert judgment | Often based on application of mathematical formulas |
| Sampling frame | Informal sampling frame somewhat larger than sample | Formal sampling frame typically much larger than sample |
| Form of data generated | Focus on narrative data<br>Numeric data can also be generated | Focus on numeric data<br>Narrative data can also be generated |

### 4.7.1 Sample size

In-depth interviews were conducted with every member of the targeted sub-group of the population (IT directors) which is a census approach.

The other sub-group consisted of users of e-learning platforms (lecturers and students). Because of the population size and time constraints, questionnaires were distributed to HODs only (purposive sampling). The decision to select HODs was made after it was noted that HODs had a holistic appreciation of the phenomenon of e-learning implementation because most of them were experienced lecturers who had taught and supervised lecturers for many years, and they chaired departmental board meetings. Therefore, their responses were likely to represent an informed point of view and would therefore be representative of the views of all lecturers. The researcher established, through the human resources departments in the two universities, that the total population of HODs was 100 in the two universities. Since this number was manageable the researcher used a census approach to this sub-group and distributed questionnaires to all of them.

The choice of students to participate in this study was informed by the literature reviewed in Chapter 2 which highlighted that students were the key stake holders in this study because they were the main users of these platforms and they make a choice to either use or ignore the platforms all together. Students, according to Cronje (2016), now demand quality education and to have an input in the way they learn – ignoring their views would be disastrous. After a careful consideration of financial and data analysis constrains, the elements in this sub-group were sampled using probability sampling. Random probability sampling was used to select participants from students. The researcher established, through the student records offices of the two institutions, that the total student population was 35 000 students and therefore a representative sample was calculated to be approximately 400 as per the survey monkey sample calculator at 95% confidence level and a margin of error of 3.5% (Angioha *et al.* 2020).

Using proportional representation, the number of students from each university was calculated as shown in Table 4.3.

**Table 4.3: The calculation of sample size for students per university**

| Name of institution | Estimated Student Population | Proportional representation (%) | Sample Size |
|---|---|---|---|
| University of Zimbabwe | 21875 | 63 | 250 |
| Zimbabwe Open University | 13125 | 37 | 150 |
| TOTAL | 35000 | 100 | 400 |

## 4.8 MEASURING INSTRUMENTS

Questionnaires were used as data collection instruments for two subgroups (students and HODS). Face-to-face in-depth interviews were conducted with university IT directors.

### 4.8.1 Data collection tool design

Cronje (2016) states that when one is analyzing a phenomenon such as e-learning implementation, one has to obtain students, lecturers and institutional perspectives on it. Further, as reviewed in Chapter 2, the most important participants in this research were students, lecturers and institutional administrators. Consequently, the researcher designed data collection instruments targeting the three categories in the form of questionnaires (for students and HODS) and recorded face-to-face interviews for the institutional perspectives. The researcher designed interview guides which were used as guidelines to interview the IT directors.

#### 4.8.1.1 Questionnaire: a brief perspective

A questionnaire is one of many data collecting tools that exist. Data collection tools take diverse forms, such as tests, interview protocols, classroom observations, and questionnaires (Nemoto and Barglar 2014: 1). The researcher incorporated principles of good questionnaire design, which are part of generic writing principles such as the measurement of one idea at a time, straightforwardness, simple language, simple and non-technical vocabulary and use of unambiguous questions (Nemoto and Barglar 2014: 2).

Ordinarily, questionnaires are used to measure abstract issues which are not observable at face value. In this study, the questionnaire was designed using a five-point Likert scale. A questionnaire was the instrument of choice because it is easier to collect data from the large number of participants, a questionnaire provides reliable person-ability estimates, it is possible to test for reliability of the instrument using statistical tests, and questionnaires provide data which is useful in comparing, contrasting and combining with the data obtained from face-to-face in-depth interviews (Nemoto and Barglar 2014: 1).

The questions can be open-ended or closed-ended measured on a Likert scale. A Likert scale is a psychometric scale that has multiple categories from which respondents choose to indicate their opinions, attitudes, or feelings about a particular issue (Nemoto and Barglar 2014: 2). The major advantages of using a five-point Likert scale is that data obtained using this scale can be easily analyzed, is comparable (as the questionnaires were adapted from previous studies that used five-point Likert scales) and that the five-point middle point is closer to the mean than other Likert scales (e.g. seven-point), thus, respondents were likely to stay focused and give an honest opinion about an item (Nemoto and Barglar 2014: 2). The use of open-ended questions was important because some scholars contend that open-ended questions allow respondents to respond freely to the inquiry, so it is better able to measure their salient concerns than the close-ended format that forces people to choose among a fixed set of responses.

The questionnaire design for students and HODs was guided by information gathered from the literature review in Chapter 2. As discussed in the literature review, Pajo and Wallace (2001) noted that the critical factors that influence the success or failure of e-learning implementation can be categorized into organizational, personal and technology. Dang and Foster (2015) argue that studies on e-learning implementation should incorporate and interact with relevant contextual factors of the organization, pedagogy, learning and technology. Ghavifekr and Rosdy (2015) state that background experience in information technology and attitudes on e-learning are essential in ensuring successful e-learning implementation. Using the above insights on e-learning implementation and the Technology Acceptance Theory (TAM) discussed in Chapter 2, the research

questionnaires for this sub-group were categorized into two major sections. Section A solicited from participants, information on demographics/background, while section B solicited strategic information as informed by previous studies on e-learning implementation by Daugherty and Funke (1998), Mitev and March (1998), Siritongtha and Paul (2006), Mukokha and Mutisya (2016), Kasse and Bulunywa (2013), Govender and Chitanana (2016), Davis (1989), Lapina and Renate (2016), Khairova and Egamberdieva (2016) and Venkatesh and Davis (2013) all of whom were discussed in the literature review (Chapter 2 ).

Two separate questionnaires were designed for students and HODs. The section below summarizes the major constructs of the questionnaire that is, participant's cognition that can be measured and quantified (Nemoto and Barglar 2014: 3).

#### 4.8.1.2 Student questionnaire design

This questionnaire had closed-ended questions in Section A and Section B. After each section of closed-ended question there was an open-ended question which asked participants to "add any other issues relevant to the question". The five-point Likert scale was used to allow respondents to indicate the extent to which they agreed with issues on a particular construct.

#### 4.8.1.3 Section A: Demographics/ Background information

In this study, the demographics or background information section of the questionnaire gathered information regarding gender, age, marital status, level and program of study, educational background, level of computer literacy, ownership of ICT equipment, home internet connectivity and knowledge and use of LMS platforms. The objective was to link the research constructs identified in the analysis chapter (Chapter 4) to the background information. Further, the information collected was used to explain the observed behaviour towards e-learning implementation as discussed in Chapter 4.

#### 4.8.1.4 Section B: Main research questions

Table 4.4 presents a summary of the student questionnaire survey questions. Using a five-point Likert scale this section was made up of questions that solicited strategic information on the following major constructs:

- Attitudes towards e-learning.
- Commitment to the use of e-learning platform.
- Complexity of the e-learning platform.
- User training.
- Strategy on e-learning implementation and trialability.
- Support and use of ICT resources by students.
- Impact of e-learning.
- Management commitment on e-learning use and its implementation.
- Level of satisfaction.
- Barriers to e-leaning implementation.

**a) Attitude**

This sub-section of the questionnaire had survey questions that captured participants' attitudes towards use of e-learning platforms in teaching and learning respectively. As discussed in Chapter 2, Davies (1989) argues that attitude is affected by two variables, ease of use and perceived usefulness. This section thus sought to measure the perceived usefulness of the platforms.

**b) Commitment to the use of e-learning platform**

This section had survey questions that sought to unpack issues to do with students' commitment to the use of the existing e-learning platforms, for example, as shown by the effort they were making to embrace the e-learning platforms. There was need to test whether the students that showed positive attitude were committed to the use of the e-learning platforms as pointed out by the TAM model.

**c) Complexity of the e-learning platform**

The survey questions in this sub-section sought to establish the perceived ease of use of the e-learning platform (Davies 1989).

**d) Training**

Training is considered an external variable according to the TAM model. On training, survey questions were constructed that sought to establish the user preparedness to take up the e-learning platforms in the learning process.

**e) Strategy/trialability on e-learning implementation**

This external variable, again adapted from the TAM model, sought to establish the existence and awareness of institutional policies and decisions that support the proliferation of e-learning. This was key in establishing the level of support and involvement of institutional leadership in e-learning.

**f) Support and use of ICT resources by students**

This section of the questionnaire contained survey questions that sought to unpack the level of support that students were getting from their institutions to utilize the e-learning platforms fully. This section also contained survey questions that sought to establish the level of usage of ICT resources by lecturers to establish capacity utilization from the viewpoint of students.

**g) Impact of e-learning**

This variable was not fully discussed in the TAM model but was borrowed from the studies carried out by Kasse and Bulunywa (2013), and Govender and Chitanana (2016). This variable had survey questions that sought to establish the extent to which e-learning had transformed the teaching and learning process from the students' point of view.

**h) Management commitment on e-learning use and its implementation**

The survey questions and the anticipated responses from this section could have been similar to those discussed in b) above. This section however sought to extract information from the students on the management investment in ICT infrastructure as was being observed by students. This

information was then juxtaposed with the information that was obtained from HODs and IT Directors to establish any variances and their explanations thereof. This strategy was used across respondents.

**i) Level of satisfaction**

This section of the questionnaire contained questions that sought to measure the students' level of satisfaction regarding the existing e-leaning platforms. This was key in establishing the usefulness of the platforms.

**j) Barriers to e-learning implementation**

This section had survey questions that sought to establish barriers to e-learning implementation in general from a student perspective. These were again juxtaposed with data obtained from face-to-face interviews and responses provided by HODs to check for convergence or divergence of views. After each closed question the researcher opened up the survey by adding a question entitled "any other issue you wish to add." This was key in capturing other views which the researcher might have omitted.

**Table 4.4: Summary of student questionnaire survey questions**

| Construct | Survey questions |
|---|---|
| Attitudes towards e-learning | 11 |
| Commitment to the use of e-learning platform | 12 |
| Complexity of the e-learning platform. | 13 |
| User Training | 14 |
| Strategy on e-learning implementation and trialability | 15 |
| Support and use of ICT resources by students | 16 |
| Impact of e-learning | 17 |
| Management commitment on e-learning use and its implementation | 18 |
| Level of satisfaction | 19 |
| Barriers to e-leaning implementation | 20 |

### 4.8.1.5 Design of HOD questionnaire

This questionnaire had closed-ended questions in Section A and Section B. After each section of closed-ended question there was an open-ended question which asked the participants to "add any other issues relevant to the question". The five-

point Likert scale was used to allow respondents to indicate the extent to which they agreed with issues on a particular construct (Table 4.5).

#### 4.8.1.6 Section A: Demographics

This section gathered information on participants' gender, age, marital status, courses taught, teaching load, the faculties they belonged to, educational background and training, knowledge and usage of computers, ICT resourcing at work and home, knowledge on e-learning platforms and their teaching experience. These constructs were found to have an effect on the adoption of e-learning as found by Mukokha and Mutisya (2016), Kasse and Bulunywa (2013), and Govender and Chitanana (2016) who carried out studies on e-learning implementation as discussed in Chapter 3.

#### 4.8.1.7 Section B: Main research questions

In designing survey questions for this section, the researcher was mainly informed by the TAM model as proposed by Davies (1989) and improved by Venkatesh and Davies (2003). As with the student questionnaire, a five-point Likert scale was used comprising questions that solicited strategic information on the following major constructs:

- Attitudes towards e-learning;
- Commitment to the use of e-learning platform;
- Complexity of the e-learning platform;
- User training;
- Strategy on e-learning implementation and trialability;
- Support and use of ICT resources by students;
- Impact of e-learning;
- Management commitment on e-learning use and its implementation;
- Level of satisfaction and
- Barriers to e-learning.

Unlike the student questionnaire, the HOD questionnaire also contained additional survey questions on teaching strategies.

#### 4.8.1.8 Attitudes towards e-learning

Section B of the questionnaire had survey questions that solicited participants' attitudes towards use of e-learning platforms in the teaching and learning process. The survey questions borrowed a lot from the TAM model Davies (1989) and the extended model of e-learning proposed by Venkatesh and Davies (2003) discussed in detail in sections 2.12 and 2.13 in Chapter 2.

#### 4.8.1.9 Commitment to the use of e-learning platform

This sub-section of the HOD questionnaire had survey questions that sought to unpack issues to do with lecturers' commitment to the use of the existing e-learning platforms as shown by, for instance, the effort they were making to teach others and how they were embracing e-learning in their teaching.

#### 4.8.1.10 Complexity of the e-learning platform

The survey questions in this sub-section, as in sub-section (c) on the student questionnaire, had survey questions that sought to establish perceived ease of use of the e-learning platforms from a lecturer's perspective (Davies 1989).

#### 4.8.1.11 Training

Training is considered an external variable according to the TAM model. On training, survey questions in this sub-section sought to establish whether lecturers were trained before the e-learning platform was introduced. This was a measure of the level of preparedness to use the e-learning platform.

#### 4.8.1.12 Strategy/trialability on e-learning implementation

This sub-section encompassed survey questions that sought to establish the strategies which were used by the university in introducing the e-learning platforms to the university users. Strategy, according to Govender and Chitanana (2016), determines the level of acceptance and diffusion of technologies.

#### 4.8.1.13 Support and use of ICT resources by lecturers

This sub-section of the questionnaire had survey questions that sought to establish the level of support lecturers were getting from the institution, especially the support from the IT department. The sub-section also had questions on the usage of available ICTs.

#### 4.8.1.14 Impact of e-learning

This sub-section contained survey questions that sought to establish how the e-learning platform had impacted on the teaching and learning process through processing of results, registration, online marking and submission of assignments.

#### 4.8.1.15 Management commitment on e-learning use and its implementation

This section contained survey questions on ICT infrastructure investment by management as a measure of their commitment to the promotion of use of technology-based teaching and learning.

#### 4.8.1.16 Level of satisfaction

This section of the questionnaire contained questions that sought to measure the lecturers' level of satisfaction regarding the existing e-leaning platforms. This was key in establishing the usefulness of the platforms.

#### 4.8.1.17 Barriers to e-learning implementation

This section had survey questions that sought to generally establish barriers to e-learning implementation from a lecturer's perspective. These were juxtaposed with data obtained from students and face-to-face interviews to establish convergence or divergence of data.

#### 4.8.1.18 Teaching strategies

This sub-section of the questionnaire had survey questions that sought to establish the presence or absence of online teaching strategies.

**Table 4.5: Summary of HOD questionnaire survey**

| Construct | Survey questions |
|---|---|
| Attitudes towards e-learning | 15 |
| Commitment to the use of e-learning platform | 16 |
| Complexity of the e-learning platform | 17 |
| User training | 18 |
| Strategy on e-learning implementation and trialability | 19 |
| Support and use of ICT resources by students | 20 |
| Impact of e-learning | 21 |
| Management commitment on e-learning use and its implementation | 22 |
| Level of satisfaction | 23 |
| Barriers to e-leaning implementation | 24 |

#### 4.8.1.19 The link between research questions and research survey questions

The major research problem of this study was the low uptake of ICT innovations by public universities despite high budget prioritization by university management. The low uptake of e-learning technologies such as LMS continues to exist despite the evidence supporting the benefits of such technologies which was unpacked in the literature in Chapter 2. The cited studies showed that ICT innovations added value to the processes of teaching and learning. To unpack the problem, the following research questions were put forward:

1. What e-learning platforms, resources, and infrastructure exist in public universities in Zimbabwe?
2. To what extent has e-learning platforms been implemented in the processes of teaching and learning in Zimbabwean public universities?
3. What are the key e-learning attitudes and perceptions expressed by lecturers, students and administrators that would affect the level of uptake of e-learning innovations such as LMS in public universities?
4. Which e-learning strategies are being used by universities in Zimbabwe?
5. What are the major barriers to e-learning platforms implementation in public universities in Zimbabwe?

The design of the survey research questions was, therefore, aimed at extracting information from the research participants that would help the researcher answer the research questions and at the same time contextualize and locate the research problem. This approach in the researcher's view, ensured that the solutions proffered to solve the problem were holistic and specific to the issues at hand. This in turn meant that survey questions (for students and HODs) and interview questions for IT directors were developed with a view to answering these research questions. The position taken by the researcher to link the research problem and questions on one hand, and the interview or survey questions on the other hand, was informed by the pragmatist paradigm which was discussed in the preceding sections.

Table 4.6 and Table 4.7 show the link between the research questions and survey questions for each category of research participants.

**Table 4.6: link between survey questions and research questions for HODS**

| Research question | Key Survey Question |
|---|---|
| Question 1 | 10a,10b 22 |
| Question 2 | 15,16,19,20,21 |
| Question 3 | 17,21, 15 |
| Question 4 | 22,23 |
| Question 5 | 25,21 |

**Table 4.7: the link between survey questions and research questions for students**

| Student survey question | Research question addressed |
|---|---|
| 10a, 8, 16(4-6), 18(3-8) | Question 1 |
| 21(1-8 | Question 2 |
| 11(1-9) | Question 3 |
| 17(1-6) | Question 4 |
| 15(1-3),16(2) | Question 5 |

#### 4.8.1.20 In-depth face-to-face interview questions

According to Boyce and Neale (2006: 3), in-depth face-to-face interviews are a qualitative research technique that involves conducting intensive interviews with a small number of respondents to explore their views on a phenomenon. They are normally used to contextualize data collected by other survey tools (Boyce and Neale 2006). In this study, in-depth face-to-face interviews were preferred because a) they provided detailed information on the infrastructure, policy and the phenomenon of e-learning and this information could not have been better articulated by HODs and students through the use of a questionnaire and b) they provided a more relaxed environment for respondents to articulate their views. This was particularly critical because as the researcher found, public universities in Zimbabwe are highly censored to such an extent that some respondents requested the interviewer to switch off the recording when they wanted to explain information they deemed “confidential”.

Interviews, however, have their own disadvantages such as being prone to bias, time consuming and require training of the respondents and are not generalizable (Boyce and Neale 2006). In support of this critique, it was noted that all participants (interviewees) wanted to spend more time saying positive things about their institution because they thought negative things would impact on their job security.

Finally, the issue of generalizability is tackled by Boyce and Neale (2006) who argue that generalizations of results in interviews are not possible because of the small samples that are used and because they are not randomly chosen. Boyce and Neale (2006), however, contend that interviews remain valuable if they are used to supplement other data collection methods. To minimize the negative effects of use

of interviews as a collection tool, the researcher in this study carried out a pilot study as discussed in section 4.8.8 below. To eliminate bias, students and HODs responses were used as control responses to verify university administrators' views. Interview guide questions were also used to ensure consistency, but they remained guides and were not cast in stone.

### 4.8.2 Interview guide questions

Based on the literature reviewed in Chapter 2, the research questions for the face-to-face in-depth interviews (Table 4.8 and Table 4.9) were premised on 10 thematic constructs, namely:

- Attitudes towards e-learning;
- ICT infrastructure;
- User training;
- Strategy on e-learning implementation and trialability;
- Support and use of ICT resources by students;
- Impact of e-learning;
- Management commitment on e-learning use;
- Implementation;
- Level of satisfaction, and
- Barriers to e-leaning

**Table 4.8: Interview guide from the 10 constructs**

| Construct | Interview guide Key question |
|---|---|
| Attitudes towards e-learning | What attitudes or perceptions are displayed by the students and lecturers towards e-learning? |
| ICT infrastructure | What is the state of ICT infrastructure at this university? |
| User training | Were the users trained before the platform was used?<br>What ICT training programs do you have for your lecturers? |
| Strategy on e-learning implementation and trialability | Do you have an e-leaning policy or strategy?<br>Did you put the e-learning platform on trial before full implementation? |
| Support and use of ICT resources by students | Do you assist your students to acquire ICT equipment, are your ICT laboratories fully equipped? |
| Impact of e-learning | How has e-learning changed the way lecturers teach and students learn? |
| Management commitment on e-learning use | Could you tell me the level of investment in ICTs at this institution? |

| | |
|---|---|
| implementation | Comment on e-learning implementation at this institution? |
| Level of satisfaction | Are students and lecturers generally happy about the e-learning platform at this institution? |
| Barriers to e-leaning | What are the barriers to the implementation of e-learning at this institution? |

**Table 4.9: The link between interview questions and research questions**

| Construct | Research question targeted |
|---|---|
| Attitudes towards e-learning | Question 3 |
| ICT infrastructure | Question 1 |
| User raining | Question 5 |
| Strategy on e-learning implementation and trialability | Question 5 |
| Support and use of ICT resources by students | Question 2 |
| Impact of e-learning | Question 4 |
| Management commitment on e-learning use and its implementation | Question 4, 5 |
| Level of satisfaction | Question 3 |
| Barriers to e-learning | Question 2 |
| Implementation | Question 4 |

As described in the preceding sections, the target population for the research was students, HODs and IT directors. Detailed recruitment letters were sent to all HODs and IT directors by email a week before the interviews to seek consent. The recruitment letter detailed a brief background of the study and issues of consent, ethics and the benefits of the research.

#### 4.8.2.1 Recruiting process and data collection method

#### 4.8.2.2 Recruitment of students

For the sub-group targeting students, the information and consent letters were administered together with the questionnaire and participants were informed by the researcher or his representative to read and sign these before completing the questionnaire.

In general, student questionnaires were randomly distributed to students just before a lecture and were collected at the end of the lecture. For the UZ, the researcher used a venue that was used to teach courses that were offered across faculties and

levels of study. This process was repeated until the required sample number of students was achieved.

The recruitment of ZOU participants was such that the researcher went to ZOU Head Office where learners from the 10 centres in the 10 provinces gather for face-to-face tutorials and distributed the questionnaires randomly during a lecture and the questionnaires were collected after the lecture. For the two universities the criteria were that the participating students should have completed at least a semester and be registered. The rationale for exclusion of participants who had enrolled for less than a semester was to get the views of experienced students who were sure to have used the e-learning platforms for a reasonable period. Such participants were likely to give useful information compared to students who had not interfaced with the platforms.

#### 4.8.2.3 Recruitment of Heads of Departments

For the sub-group targeting HODs, questionnaires for each participating university were distributed to faculty deans for further distribution to all their HODs. After completion, HODs deposited the questionnaires at the faculty office where they were collected by the researcher's assistant for further transmission to the researcher.

#### 4.8.2.4 Directors

After securing an appointment for the face-to-face in-depth interviews with the participants (IT directors), the researcher visited these participants in their offices and conducted the interviews using a question guide. Each participant was visited at his/her own office and a 30-minute-long interview was conducted and recorded to collect data from the targeted participants.

## 4.9 DATA ANALYSIS

For each closed-ended question on the structured questionnaire, the responses were collated to form a dataset in SPSS. The dataset was analyzed using the

Statistical Package for Social Scientist (SPSS) version 24 for windows and R 3.6.3. Several statistical approaches were employed to answer the objectives of the study. The following were the major statistical analyses which were conducted: frequency tables, confirmatory factor analysis, explanatory factor analysis, descriptive statistics, t-tests, regression analysis and the non-parametric tests (Kendall's coefficient of concordance). Frequency tables and descriptive statistics were used to generalize the responses of the participants concerning the use and implementation of e-learning platforms in local universities. Since most of the questions were measured on a five-point Likert scale, the frequency tables were relevant in tracing the distribution of the responses from strongly agree to strongly disagree in form of proportions. Descriptive statistics such as correlation analysis were based on the calculated aggregated scores of the constructs of the study. The aggregated scores were computed from all the questions which were assessing a single aspect; for example, all questions which were asked to assess the attitude of participants were collated in computing the aggregated scores taking attitude as a construct. Excel was used to draw some graphs using tables obtained in SPSS.

### 4.9.1 Kendall's coefficient of concordance

Kendall's W (also known as Kendall's coefficient of concordance) is a non-parametric statistic (Legendre 2005). This is a normalization of the statistic of the Friedman test (Salkind 2012), and was used for assessing the attitudes, knowledge and perception agreement among the participants concerning the e-learning platforms in the local universities. Kendall's W ranges from 0 (no agreement) to 1 (complete agreement). Kendall's coefficient of concordance was defined as follows:

> Assume there are *m* raters rating *k* subjects in rank order from 1 to *k*. Let $r_{ij}$ = the rating rater *j* gives to subject *i*. For each subject *i*, let $R_i = \sum_{j=1}^{m} r_{ij}$. let $\bar{R}$ be the mean of the $R_i$ and let *R* be the squared deviation, i.e.

$$R = \sum_{i=1}^{k} (R_i - \bar{R})^2$$

Now define Kendall's *W* by

$$W = \frac{12R}{m^2(k^3 - k)}$$

### 4.9.2 Confirmatory and explanatory factor analysis

Confirmatory factor analysis (CFA) is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs (Harrington 2009). Confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) are similar techniques, but in EFA, data is simply explored and provides information about the numbers of factors required to represent the data (Schreiber *et al.* 2006). Additionally, in EFA, all measured variables are related to every latent variable. In CFA, a researcher is able to specify the number of factors required in the data and which measured variable is related to which latent variable (Finchand French 2018). Confirmatory factor analysis was used to confirm or reject the influence of the measured variable in the research outcome. Explanatory factor analysis was employed to determine the most influential variables that explain the constructs of the study better. All the variables/questions with the recommended scoring were considered in calculating the aggregated scores and building of the constructs for further statistical analysis procedures such as regression analysis and t-tests.

### 4.9.3 Regression analysis and t-test

Regression analysis was used to assess the overall relationship of e-learning platform users and other constructs of the study. A t-test is a type of inferential statistic used to determine if there is a significant difference between the means of two groups which may be related in certain features (Ashcroft and Pereira 2003). A t-test was used as a hypothesis testing tool, which allowed testing of an assumption applicable to a population. Figure 4.2 summarizes the data analysis procedure:

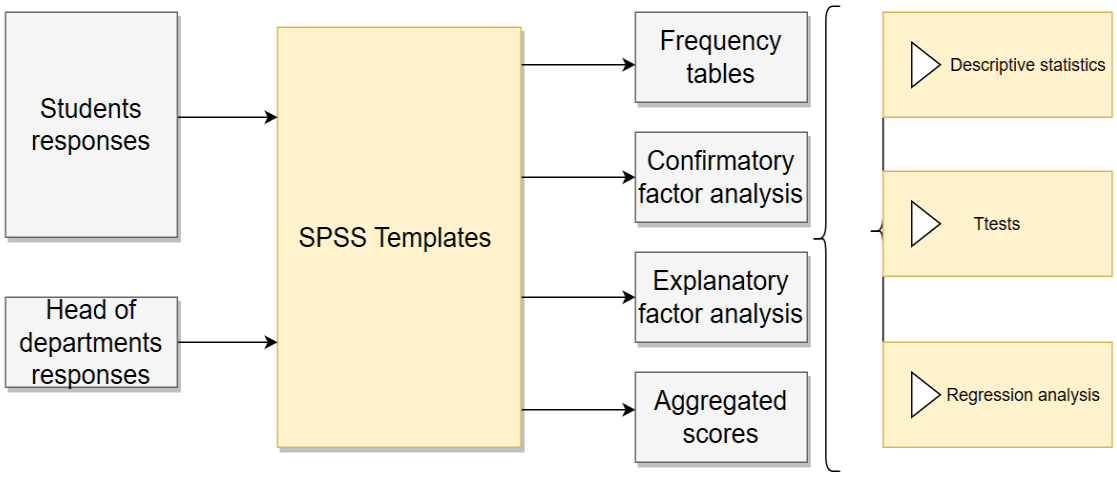



**Figure 4.2: Analysis framework**

## 4.10 PILOT TESTING

Pilot testing for this research was conducted at Bindura University of Science Education, a public university located in north-eastern region of Zimbabwe with a student population of about 10 000 students. The pilot study targeted students and HODs with a minimum of 30 participants for each category and the Vice Chancellor and the IT Director (Radhakrishna 2007).

The informant input was used to fine-tune the research design and collection tools. As argued by Schade (2015), piloting helps fine-tune studies and research design leading to more reliable results. For example, whereas the researcher thought that data would be collected from students by approaching them individually, the pilot study revealed that it was time consuming and there was need to target venues where faculty wide courses were offered across various levels of study. Further, according to Schade (2015), pilot testing provides an opportunity to validate the wording of the task, understand the time necessary for the sessions and may provide additional data points for the study. It became apparent from the pilot study that some questions needed fine-tuning especially the face-to-face in-depth interview questions. The researcher discovered that there was a need to open up the discussion to allow more relevant information to be revealed.

### 4.10.1 Validity and reliability

Reliability and validity are tools of positivist epistemology (Watling cited in Golafshani 2003: 598). Validity, according to Maxfield and Babbie (2014), is the degree of accuracy of a measured concept. In other words, validity occurs when we measure what we intended to measure. In this study one of our objectives was to measure the barriers to the implementation of e-learning platforms from the viewpoint of students and lecturers (as represented by HODs) and university administrators (as represented IT directors).

Validity of the collected responses was investigated using CFA since it is the special form of factor analysis suitable for social research. This enabled the researcher to assess if the nature of the constructs (attitudes, commitment, complexity, training, strategy, support, impact, management, trialability, satisfaction and barriers) were consistent. The hypothesis suggested there is no difference between the patterns observed in these constructs and the model specified. The model fit was assessed using the Chi-Square and Root Mean Square Error of Approximation (RMSEA). The Chi-Square probability value was significant at 95% level of significance and the null hypothesis was not rejected in favour of the alternative hypothesis which suggested that there was a difference in the patterns observed in the data and the model observed. In general, there was enough evidence of validity since the observed patterns confirmed the specified model (Table 4.10).

**Table 4.10: Confirmatory factor results**

| **Optimization method** | **NLMINB** | **Model test baseline model:** | **NLMINB** |
|---|---|---|---|
| Number of free parameters | 139.000 | Minimum Function Test Statistic | 9304.668 |
| Number of observations | 280.000 | Degrees of freedom | 903.000 |
| Estimator | ML | P-value | 0.000 |
| Model Fit Test Statistic | 6961.177 | User model versus baseline model: | |
| Degrees of freedom | 807.000 | Comparative Fit Index (CFI) | 0.268 |
| P-value (Chi-square) | 0.000 | Tucker-Lewis Index (TLI) | 0.180 |
| Log likelihood and Information Criteria: | | Number of free parameters | 139.000 |
| Log likelihood user model (H0) | -19296.499 | Akaike (AIC) | 38870.997 |
| Log likelihood unrestricted model (H1) | -15815.910 | Bayesian (BIC) | 39376.233 |

| | | | |
|---|---|---|---|
| Root Mean Square Error of Approximation: | | Sample-size adjusted Bayesian (BIC) | 38935.473 |
| RMSEA | 0.165 | Standardized Root Mean Square Residual: | |
| 90 Percent Confidence Interval | 0.161 0.169 | SRMR | 0.113 |
| P-value RMSEA <= 0.05 | 0.000 | | |
| Parameter Estimates: | | | |
| Information | Expected | | |
| Information saturated (h1) model | Structured | | |
| Standard Errors | Standard | | |

Validity, therefore, was the measure of the truth or falsehood of the data collected and the reasons for use or failure to use e-learning platforms by these participants. Babbie (2014) identifies two types of validity, i.e., internal and external validity.

### 4.10.2 Internal validity

In this study, internal validity indicated the extent to which the identified factors that affected the implementation of e-learning platforms in universities truly reflected what hindered e-learning platforms implementation rather than other factors which came up by chance. In this study, therefore, threats to internal validity were that participants could just have agreed with the listed factors that affected e-learning implementation for the sake of wanting to be ahead of time and participants could have just listed factors that they may have read about but not experienced. University administrators may also have wanted to defend their institutions and hence bring in factors which justified their existence.

### 4.10.3 External validity

According to Babbie (2014), external validity refers to the extent to which the results may be generalized. In this study, therefore, external validity reflected the extent to which the issues discovered in the implementation of e-learning platforms in the chosen two universities may apply to all the 14 public in universities in Zimbabwe, as well as the Southern Africa Development Community, Africa and globally. According to Shittu and Akinyemi (2017 cited in Okocha and Adibi 2020), the external validity of a research project can be threatened by the Hawthorne effect, the type of sampling method selected, the validity of the research instrument

(structured interview schedule in this case) and by the predictive value of the research instrument.

The Hawthorne effect refers to the behaviour of research elements when they are aware that they are under investigation. The Hawthorne effect was minimized by not pressurizing participants to give responses. To ensure external validity the questionnaires and in-depth interview questions were field tested using directors of post graduate centres in three universities outside this study. These expert opinions and comments were incorporated in the research instruments. Further, factor analysis was also applied to ensure content construct and criterion validity. The Flesch reading ease index was used to determine readability of instruments. Readability is the ease with which a document can be read and understood. Using Microsoft 2013, all the questionnaires were subjected to the readability test and the results were positive.

### 4.10.4 Reliability

According to Golafshani (2003), reliability refers to the replicability of results or observations. In other words, how consistent and similar are the results or observations over a period of time.

**Table 4.11: Reliability statistics (Guttman Split-Half Coefficient)**

| **Reliability Statistics** | | | |
|---|---|---|---|
| Cronbach's Alpha | Part 1 | Value | 0.858 |
| | | N of Items | 28a |
| | Part 2 | Value | 0.836 |
| | | N of Items | 28b |
| | Total N of Items | | 56 |
| Correlation Between Forms | | | 0.615 |
| Spearman-Brown Coefficient | Equal Length | | 0.762 |
| | Unequal Length | | 0.762 |
| Guttman Split-Half Coefficient | | | 0.761 |

Table 4.11 shows the results of the Guttman Split half-method which was used to assess reliability for the sampled sub-group of students (internal consistence). The analysis separated the items that were measured on a Likert scale into two equal

halves and the Cronbach alpha coefficient was then calculated per half as indicated in the above output. A total of 56 items were used for reliability of assessment divided into two equal halves with 28 items each. The calculated Cronbach coefficients (86% and 84%) suggested an excellent internal consistency as they were greater than 80% as shown in the above table. Correlation between forms was strong enough (0.61) in suggesting reliability. The Guttman Split-Half Coefficient was estimated to be 0.76 which confirms the Cronbach coefficient that there was evidence of internal consistency.

Over and above quantitative methods of enhancing validity and reliability of research instruments, the researcher used triangulation of methods and methodology as discussed in section 4.4. Triangulation, according to Golafshani (2003), is an important strategy in naturalist and qualitative studies that removes bias thereby enhancing the validity and reliability of the study.

Thematic analysis of data was also employed in this study to analyse qualitative data. Thematic analysis involves use of a coding procedure for the purpose of reducing information into themes and categories. Coding can take various forms such as open coding which involves codes suggested by the examination and questioning of data by the researcher, axial coding which aims at identifying the core concepts of the study, and, lastly, selective coding which is the central coding which other codes refer to. The researcher adopted the data coding process propounded by Creswell (2009: 186) in his eight steps for qualitative data analysis. The eight steps are:

1) Write down word-for-word interviews from audio tape.
2) Select one document (one interview) – the most interesting / the shortest / the one on the top of the pile, establish its underlying meaning.
3) List all the topics from several informants, grouping similar topics together in columns with titles such as major topics, unique topics and leftovers.
4) Find a suitable abbreviation for each of the identified topics.
5) Find the most descriptive wording for the topics and turn them into themes or categories.
6) Make a final decision on the abbreviation for each theme or category and alphabetize the codes.

7) Assemble the data belonging to each theme or category in one place and do a preliminary analysis.
8) If necessary, recode the existing data.

## 4.11 ETHICAL CONSIDERATIONS

Research ethics are associated with morality, i.e., what is wrong and what is right (Babbie 2014). Polit and Hungler (1999) identify three principles of research ethics: beneficence, respect for human dignity and justice. The beneficence principle occurs when participants are free from harm, exploitation and risk. In this study participants were not subjected to any harm as the questions mainly targeted the cognitive domain and the research questions were purely survey questions which did not require experimentation. The research was conducted in line with the Durban University of Technology's Research Ethics Policy and Guidelines (2015) where questions to do with informed consent, deception, recruitment, risk of participants, sponsorship and benefits, confidentiality, interest and indemnity were adequately responded to and guided the researcher throughout the research process.

The major gate keeper for this research was the Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development in Zimbabwe. A letter seeking permission was sent to the Permanent Secretary in this Ministry. After the Ministry responded favourably to the request, a letter requesting permission to carry out the study was also dispatched to the two Registrars of UZ and ZOU. These letters sought permission to carry out the study at the specific university. In general, participants were required to respond to questions in writing in the case of the questionnaires and through verbal response in the case of the in-depth face-to-face interviews. In all cases, research participants to the study were informed of possible dangers and benefits of the study through the letters of information and consent. Responses from participants were kept confidential; the results of the study, including personal details regarding participant's sex, age, date of birth, initials and diagnosis were anonymously processed into this study report.

The research did not cause psychological harm as the researcher allowed participants to seek clarification and ask questions. I addition, the researcher took

time to explain the concepts of e-learning platforms and e-learning implementation when asked by the respondents. Research participants were never exploited as each participant voluntarily took part in the study. Further, participants' gender, religion and culture were respected throughout the research by explaining to them that they were free not to answer questions that impacted on these factors.

# CHAPTER 5: DATA PRESENTATION AND ANALYSIS

## 5.1 INTRODUCTION

The focus of this chapter is presentation, analysis and discussion of data. Data were collected from university students, HODs as well as IT directors of UZ and ZOU. Data from students and HODs were collected using questionnaires while IT directors were interviewed using an interview guide protocol. Data from the students were entered into SPSS to produce frequency tables, some of which were then exported to Excel for graphs. For HODs a correlation matrix between major constructs is presented as the major outcome. This chapter presents the data in the form of pie charts, tables and bar graphs. Data collected from interviews with the IT directors were analyzed thematically. The specific research questions that this study answered were:

1. What e-learning platforms, resources, and infrastructure exist in public universities in Zimbabwe?
2. To what extent has e-learning platforms been implemented in the processes of teaching and learning in Zimbabwean public universities?
3. What are the key e-learning attitudes and perceptions expressed by lecturers, students and administrators that would affect the level of uptake of e-learning innovations such as LMS in public universities?
4. Which e-learning strategies are being used by universities in Zimbabwe?
5. What are the major barriers to e-learning platforms implementation in public universities in Zimbabwe?

## 5.2 OVERVIEW OF RESPONDENTS AND RESPONSE RATE

The response rate is the level at which the targeted sample responds to the administered research instruments. This research targeted IT directors, students and lecturers working, studying, and teaching respectively at the University of Zimbabwe (UZ) and Zimbabwe Open University (ZOU). Table 5.1 shows the response rate of the participants.

### 5.2.1 Student response rate

**Table 5.1: Response rate for students**

| Name of institution | Number Questionnaires distributed | Number of Questionnaires returned | (%) return rate |
|---|---|---|---|
| University of Zimbabwe | 250 | 176 | 70 |
| Zimbabwe Open University | 150 | 106 | 70 |
| **TOTAL** | **400** | **282** | **70** |

Source: Primary Data 2020

The researcher issued a total of 400 questionnaires to students at UZ (250) and ZOU (150). From the distributed questionnaires 176 and 106 questionnaires were returned from UZ and ZOU respectively, giving a total of 282 and a response rate of 70.5%.

### 5.2.2 HOD response rate

**Table 5.2: Response rate for HODs**

| Name of institution | HOD Population | Number of Questionnaires returned | (%) return rate |
|---|---|---|---|
| University of Zimbabwe | 70 | 65 | 93 |
| Zimbabwe Open University | 30 | 25 | 80 |
| **TOTAL** | **100** | **90** | **90** |

Table 5.2 shows that the response rate from HODs at UZ was 65 out of 70 and from ZOU 25 out of 30, which is overall a 90% rate of return.

### 5.2.3 Consolidated response rate

**Table 5.3: Consolidated response rate**

| For UZ and ZOU | Number of Questionnaires distributed | Number of Questionnaires returned | (%) return rate |
|---|---|---|---|
| Questionnaires | 500 | 372 | 74% |
| **TOTAL** | **500** | **372** | **74%** |

Table 5.3 shows that the researcher distributed 500 questionnaires to students and HODs at UZ and ZOU, and 372 were returned. The consolidated response rate was 74%.

## 5.3 DEMOGRAPHICS

Demographics of the respondents were sex (gender), age, educational level, duration of employment, and position.

### 5.3.1 Demographics of students

- **Gender**

For the purposes of this research, the researcher included both males and females. Gender composition of the respondents is shown in Figure 5.1.

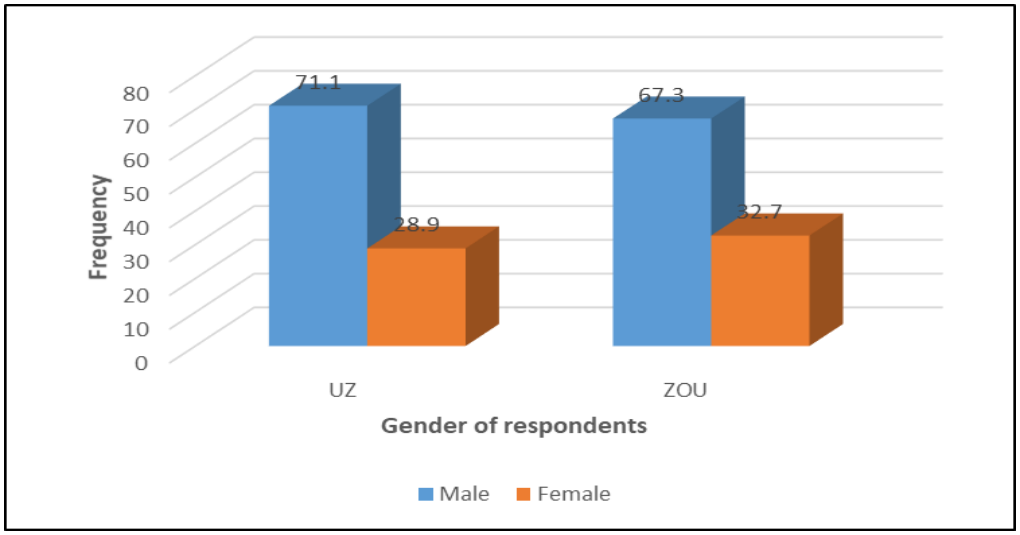



**Figure 5.1: Gender of the respondents**

The sample comprised 30% females and 70% males. In the student population of the two universities there are approximately twice as many male students as female students. Therefore, these figures reflected the admission figures which showed that there were more male than female students. It was, however, refreshing to note that through the gender policy which encourages the enrolment of more females through positive discrimination, the enrolment of female students has shown a gradual increase over the years.

- **Age**

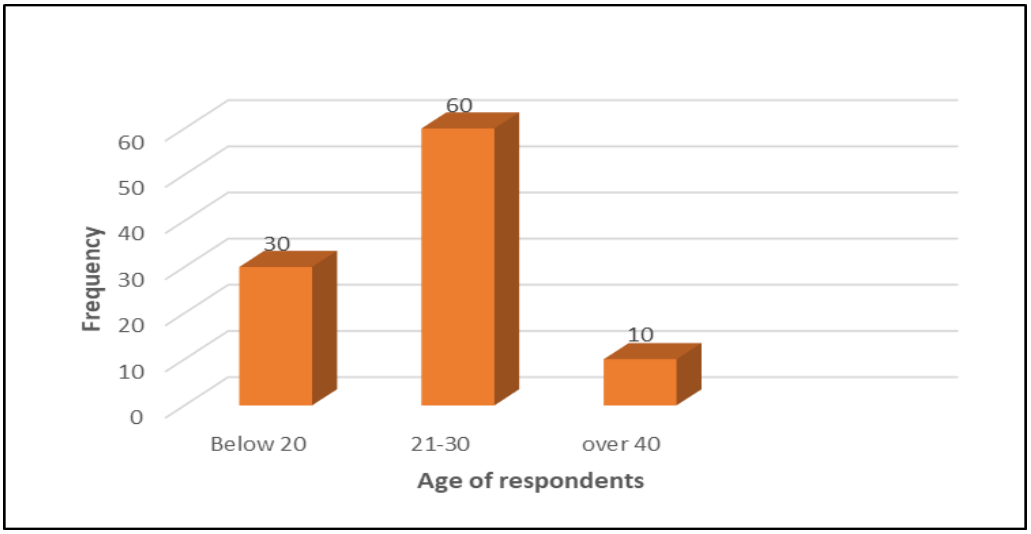



**Figure 5.2: Age group of student respondents**

Figure 5.2 shows that the age of the respondents' ranged from below 20 years to over 40 years. The majority of the students (60%) were between the ages of 21 to 30 years of age. Generally, the figure shows that the respondents were mature adults i.e., above 18 years old, which is the age of majority according to the new Zimbabwean constitution. The age distribution also meant that both the views of teenage students and mature students were captured. The modal age group was 21-30 (60%) followed by 20 (30%) and over 40 (10%). The majority of over 40 years of age were Masters students.

- **Marital Status**

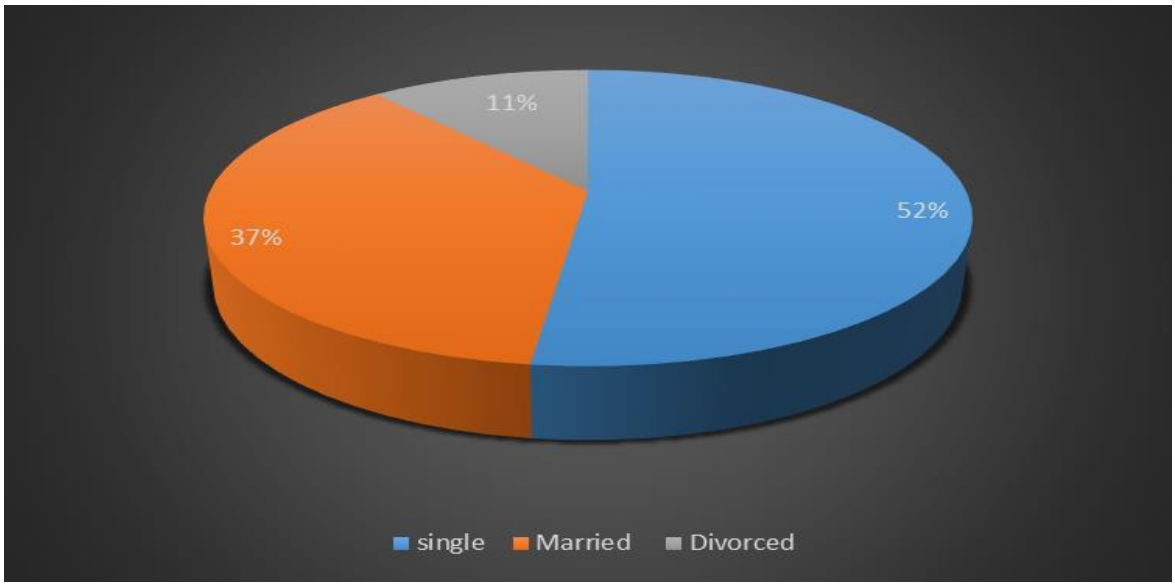



**Figure 5.3: Marital status of student respondents**

Figure 5.3 shows that 52% of the students were single, 37% were married and 11% were divorced. The majority of students were thus single.

- **Level of education**

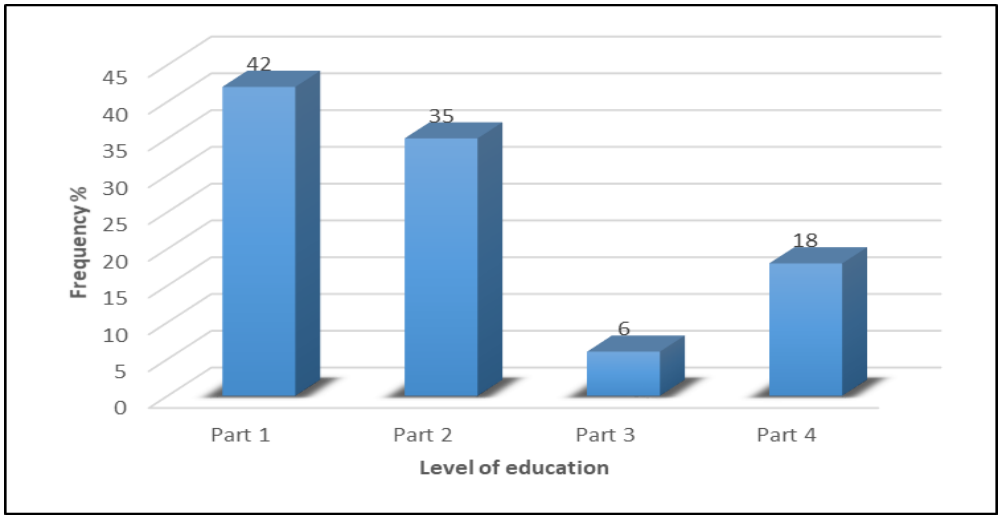



**Figure 5.4: Level of education**

Figure 5.4 shows that the majority of the respondents were part 1 (1st year) and part 2 (2nd year) students with a total contribution of 77%. Very few respondents were in part 3 (3rd year) (6%). The low number of part 3 students could be explained by the

fact that students in Zimbabwe proceed for work related learning (industrial attachment) at part 3; therefore, they were not on campus during the study period. The low number of part 4 (4th year final) students (18%) could have been due to the fact that that these were final year students who were busy studying for their final year examinations before the completion of their studies. Such students were unlikely to find time to complete the questionnaire.

- **Program of study**

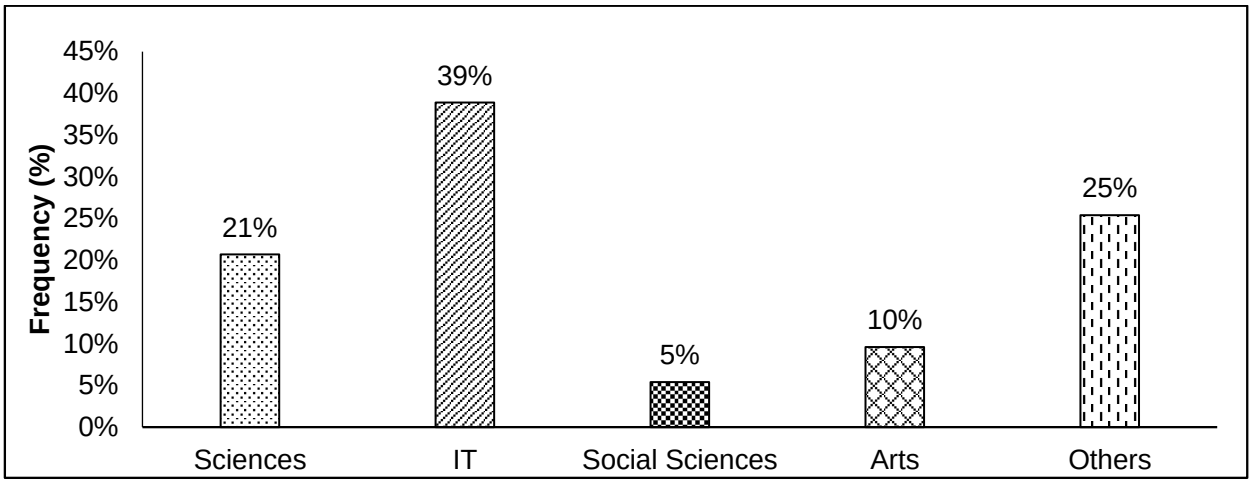



**Figure 5.5: Program of study**

Figure 5.5 shows that most of the respondents were studying IT (39%), Commerce (25%), Sciences (21%), Social Sciences (5%) and Arts (10%). The results show that IT students showed more interest in the study followed by Science and Commerce students as shown by the number of students who completed and returned the questionnaires. Social Sciences and Arts students showed the least interest in the study. This could suggest that generally non-science students were less interested in e-learning than science students.

- **School attended for primary and secondary education**

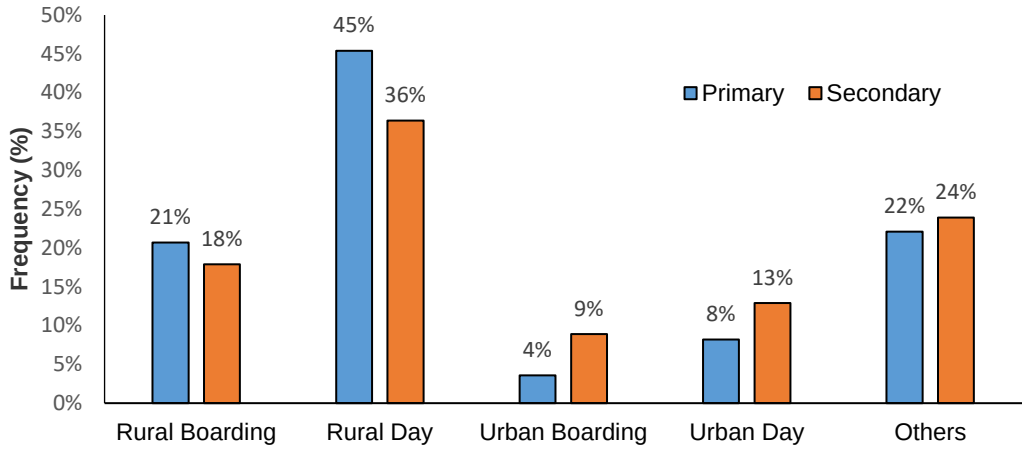



**Figure 5.6: School attended**

Figure 5.6 shows that most respondents studied at rural day schools for their primary and secondary education (45% and 36% respectively), followed by rural boarding with a 21% and 18% respectively, while 8% and 13% of the respondents had done their primary and secondary education in urban boarding schools. Urban day schools had the least respondents as the distribution shows that only 4% and 9% of the respondents did their primary and secondary education at such schools. Generally, the findings show that very few students who manage to enrol for universities are drawn from urban schools. There is, therefore, a need for the Zimbabwean educational authorities to support students in urban areas by providing them with support systems that ensure that they develop a culture of reading and proceed to universities. Other factors such as student to teacher ratio, hot sitting, cultural and moral decadence and poverty could be factors that contribute to the failure of urban students to enrol for university education. The respondents who indicated 'other' were quite significant i.e., 24% secondary education and 22% for their primary education. Such students could have studied across the given parameters.

- **Computer skills and knowledge for academic and personal tasks**

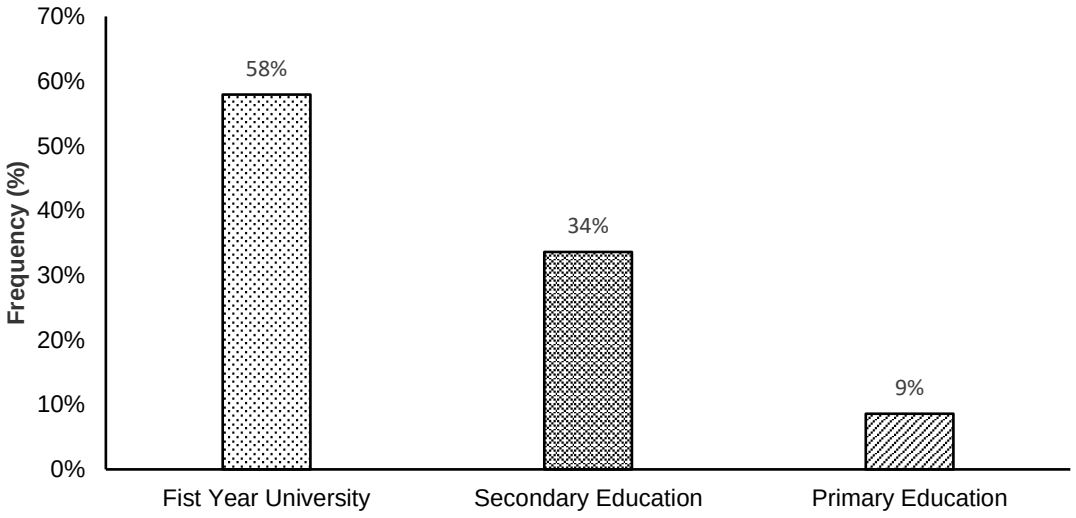



**Figure 5.7: Level student started to use ICTs in learning**

Figure 5.7 shows that most respondents (58%) started using computers in their first year of university and 34% while they were in secondary school and only 9% at primary level. The distribution shows that very few respondents (9%) start to use computers at primary school. The findings might indicate that there is a need to resource primary schools with computers, especially in rural areas where the majority of Zimbabweans live (62%).

- **Computer and internet access at home**

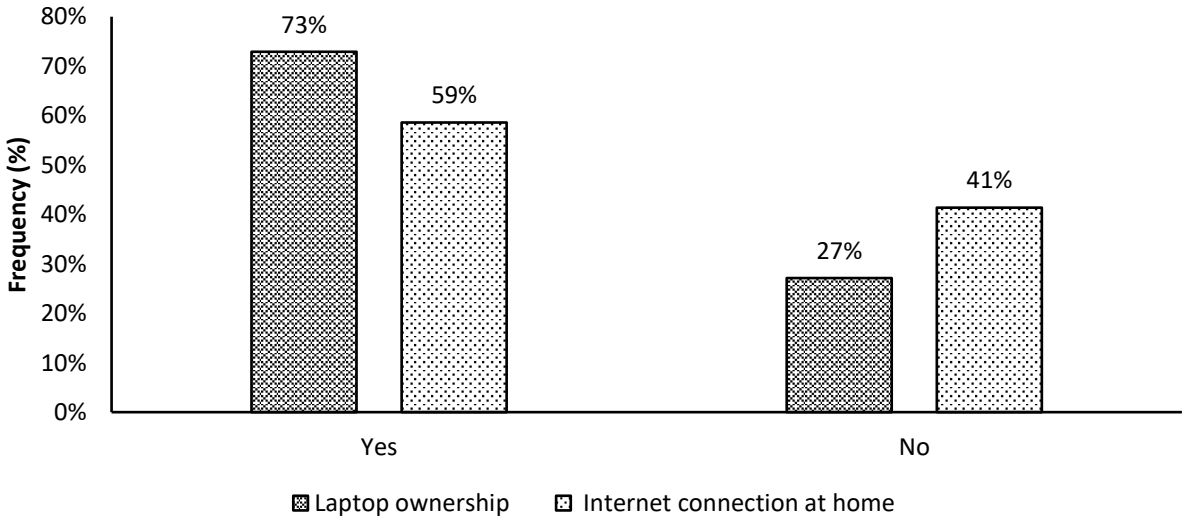



**Figure 5.8: Computer and internet access at home**

The distribution shows that most respondents owned computers (73%) and 27% did not own computers. The number of respondents who had internet at home was 59% and those who did not have connectivity at home were 41%. It can, therefore, be interpreted that 41% of the students cannot use the internet at home for their studies and 59% of the students rely on the library and friends to access a computer for e-learning and other computer-based processes since they do not have internet at home and do not own gadgets. The findings imply that the most vulnerable were those who do not own a computer and do not have internet connectivity at home or the places they rent. Social safety nets must be put in place to protect these students in the form of student loan schemes and grants to purchase laptops and afford other forms of internet access such as mobile phones. Universities can also provide facilities for such students to stay on campus where there is internet connectivity and easy access to computer laboratories. A computer loan scheme could also go a long way to enhance e-learning.

### 5.3.2 Demographics of HODs

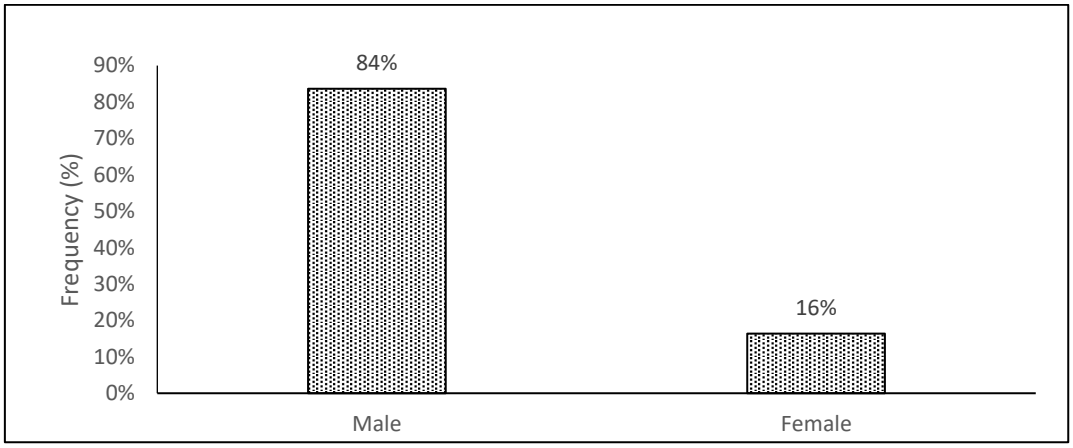



**Figure 5.9: HOD gender distribution**

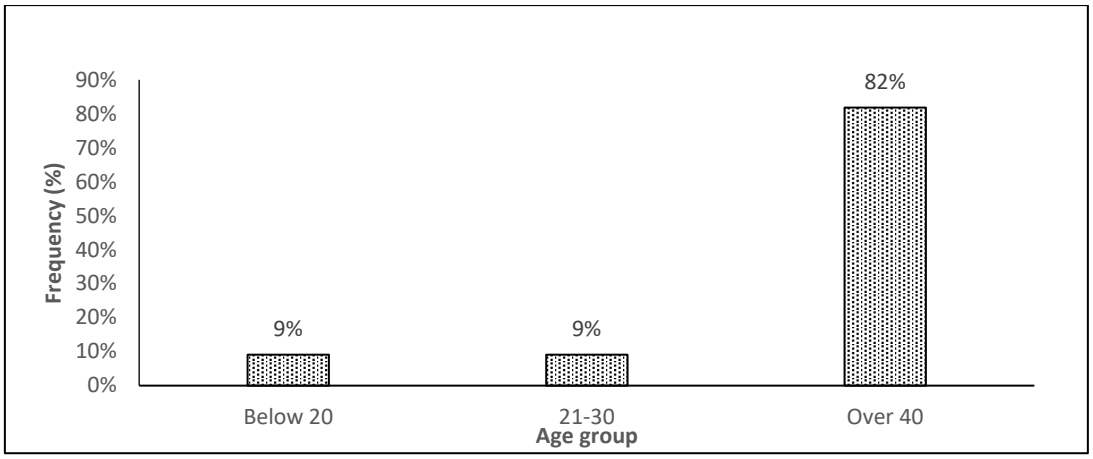



**Figure 5.10: HOD age distribution**

Figures 5.9 and 5.10 show that 84% of respondents were male and 16% were female, with 82% being above the age of 40. Fifty five percent of respondents had been in their current position for more than four years. This is a clear indication that the HODs who participated in this study were knowledgeable about both the university systems and processes as well as the e-learning implementation and challenges faced during implementation and in using the platforms.

### 5.3.3 Demographics of IT directors

The two IT Directors had been with their organizations for more than ten years and had been in the current post for more than five years. This indicates that they had full knowledge of how the implementation of e-learning processes took place, the challenges that affected the implementation processes and the barriers to the uptake of e-learning by students and lecturers.

## 5.4 RESEARCH QUESTION 1: WHAT E-LEARNING PLATFORMS, RESOURCES, AND INFRASTRUCTURE EXIST IN PUBLIC UNIVERSITIES IN ZIMBABWE?

One of the objectives of this research was to identify the e-learning platforms, resources and infrastructure that exist in universities. Students and HODs were asked to indicate the e-learning platforms at their institutions. Results are indicated in Figure 5.11.

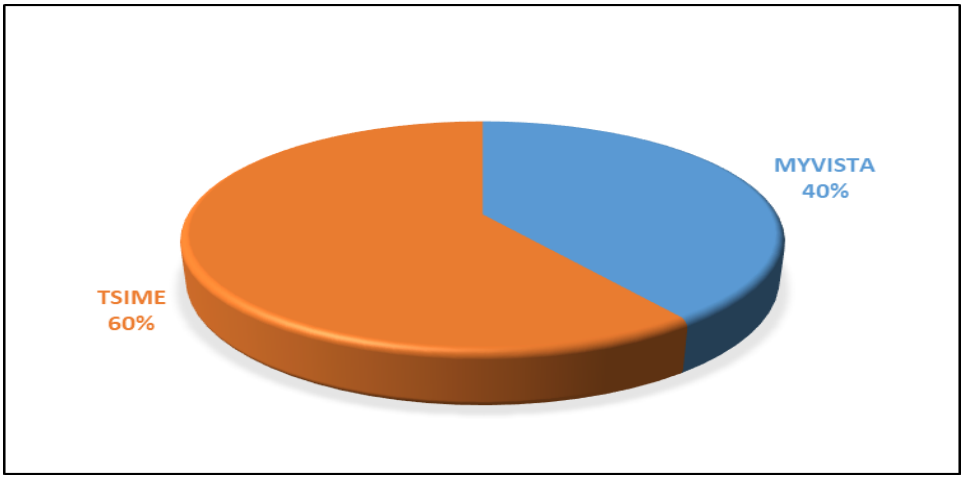



**Figure 5.11: E-learning platforms**

The distribution shows that two open-source e-learning platforms exist, identified by their generic names as MyVista and Tsime. All the students and HODs were able to identify their e-learning platform by name. This could be interpreted as indicating that the students' and HODs' level of awareness on the existence of e-learning platforms is quite high.

The directors were asked to give a background to the e-learning systems at their institutions. The IT Director at ZOU explained that the ZOU uses an open-source learning management platform Claroline which they named MyVista. The MyVista e-learning platform was launched in 2015. It emerged that the actual use of the platform began in 2016 when only Masters students were allowed to use it. After the initial training and subsequent training of both staff and students in 2015 and 2016, in 2017 MyVista came to be used in all programs. This open-source platform has a user manual which assists users to upload files, videos, images, and other activities such as creating a chat room, participating in the chat rooms, uploading assignments, quiz creation, registration, and general uploading and downloading of files. The user manual also helps users to participate in real-time synchronous lecture presentations by teaching them how to text online.

IT directors were asked to explain the state of ICT infrastructure at their respective universities. Generally, the state of infrastructure was described as poor and in a state of disrepair. Most of the equipment being used was old and obsolete. The IT

Director from the UZ argued that it would not be correct to call it infrastructure but consumables because of the rate at which they had to be replaced. According to the Director it was difficult to replace these consumables because of shortage of money especially foreign currency. Connectivity was poor and the bandwidth, though adequate, was affected by poor national infrastructure. Both Directors stated that Wi-Fi coverage at the two institutions was modest. The bandwidth at the two institutions at the time of the interviews was 1.8 Gigabytes per second and was not sufficient during semester days when all students were on campus.

> *1.8 gigabits per second but I mean there's a bandwidth and then of course access to the bandwidth itself (UZ).*

The Directors were asked to comment on the developments that have been made by their university towards e-learning. Both Directors pointed out that their universities had made some positive strides toward e-learning implementation; however, these moves were not enough to reach maximum uptake of e-learning. For example, the issues highlighted were network points and Wi-Fi coverage across the campuses. The network points, compared to the number of users, were not commensurate. In terms of infrastructure, software was identified as one major area of concern as the current software needed licencing and the budget for such was meagre.

Both IT Directors bemoaned the lack of well-equipped ICT laboratories. The situation was direr at UZ than at ZOU. At UZ students must bring in their own computers which had an effect of improving student to computer ratio. The ZOU IT Director said their student to computer ratio was 1:45 while the ideal ratio was 1:20. UZ did not provide exact student to computer ratios. However, the Wi-Fi coverage at UZ was generally good compared to that at ZOU.

> *What we are actually doing from an infrastructure point of view is to ensure that we are expanding aggressively our Wi-Fi coverage so that there is reasonable coverage around the campus (UZ).*

## 5.5 RESEARCH QUESTION 2: TO WHAT EXTENT HAVE E-LEARNING PLATFORMS BEEN IMPLEMENTED IN THE PROCESSES OF TEACHING AND LEARNING IN ZIMBABWEAN PUBLIC UNIVERSITIES?

- **Support and use of ICT resources by students**

In an attempt to find out the extent to which e-learning platforms had been implemented, the students were asked to indicate their level of agreement on the support and use of ICT resources. The responses are presented in Table 5.4.

**Table 5.4: Support and use of ICT resources by students**

| Support and use of ICT resources by students | Strongly agree | Agree | Neither | Disagree | Strongly disagree | N |
|---|---|---|---|---|---|---|
| The IT department is always available to assist me if I have problems with the platform. | 32% | 44% | 12% | 7% | 5% | 280 |
| All courses I take have online components | 17% | 54% | 4% | 9% | 16% | 280 |
| My lecturers encourage me to use internet resources to support my learning | 56% | 31% | 4% | 4% | 5% | 280 |
| I have access to computers in my faculty | 35% | 45% | 2% | 4% | 14% | 280 |
| Lecturers use the smart board to teach in class | 24% | 40% | 8% | 18% | 10% | 280 |
| The computers and internet resources I use support student-to-student and lecturer-to-student interactions | 21% | 49% | 6% | 11% | 13% | 280 |

**The IT department is always available to assist me if I have problems with the platform:** The findings show that 76% of respondents (32% strongly agreeing and 44% agreeing) were assisted by the IT department if they encountered problems, 12% (7% disagreeing and 5% strongly disagreeing) generally disagreed with the above assertion, and 12% of the respondents were neutral. The findings point to the fact that the IT departments in the two universities under investigation were doing a relatively good job in assisting users of the platforms to troubleshoot problems.

**All courses I take have online components:** The findings show that 71% of respondents (17% strongly agreeing and 54% agreeing) had online components on all the courses they were taking, 25% disagreed (9% disagreeing and 16% strongly disagreeing), and 4% were neutral. The findings point to the fact that there were some lecturers who were not using the e-learning platforms at all, in other words they were using the face-to-face method only to deliver their lectures.

**My lecturers encourage me to use internet resources to support my learning:** The findings show that 87% of respondents (56% strongly agreeing and 31% agreeing) were encouraged by their lecturers to use internet resources to support their learning and only 9% (4% disagreeing and 5% strongly disagreeing) generally disagreed, and 4% were neutral. The findings point to the fact that while some lecturers were not using the e-learning platforms, they appreciated the role of the internet in the teaching and learning process.

**I have access to computers in my faculty:** The findings show that 80% of respondents (35% strongly agreeing and 45% agreeing) had access to computers in their faculty, 18% (4% disagreeing and 14% strongly disagreeing) generally disagreed, and 2% were neutral. The findings indicate that most students had access to computers, although 18% needed to be assisted so that they could have access to computers.

**Lecturers use the smart board to teach in class:** The findings show that 64% of respondents (24% strongly agreeing and 40% agreeing) agreed that their lecturers used smart boards, 28% (18% disagreeing and 10% strongly disagreeing) generally disagreed, and 8% were neutral. The findings indicate that either there are lecturers who do not use smart boards or classes that are without smart boards. Whatever the case is, there is a need to train lecturers to use smart boards as a basic tool for teaching and learning.

**The computers and internet resources I use support student-to-student and lecturer-to-student interactions:** The findings show that 70% of respondents (21% strongly agreeing and 49% agreeing) agreed that computers and internet resources they use supported student-to-student and lecturer-to-student interactions, 24%

(11% disagreeing and 13% strongly disagreeing) generally disagreed, and 6% were neutral. The findings indicate that collaborative learning was generally taking place, but there is an opportunity to improve on it.

It can be concluded from the findings above that e-learning has been implemented to a great extent in the process of teaching and learning in the two Zimbabwean public universities under consideration. This is evidenced by the number of students who are in agreement that the universities are supporting students in using ICT resources.

- **Impact of e-learning from a student perspective**

The student respondents were asked to indicate their level of agreement with certain statements about the impact of e-learning platforms on the process of teaching and learning in their universities. The responses are indicated in Table 5.5.

**Table 5.5: Impact of e-learning**

| Impact of e-learning | SA | A | N | D | SD | N |
|---|---|---|---|---|---|---|
| The system has improved the way lecturers teach and learners learn. | 20% | 42% | 9% | 14% | 15% | 280 |
| The e-learning platform has brought efficiency in teaching and learning. | 24% | 46% | 2% | 9% | 19% | 280 |
| 50% of assignments are submitted online using the platform. | 18% | 42% | 6% | 14% | 20% | 280 |
| You fail if you cannot use the learning platform | 17% | 43% | 7% | 14% | 19% | 280 |
| The platform has made online registration easy | 26% | 36% | 4% | 23% | 11% | 280 |
| The platform is integrated (information on fees, library registration, administrative circulars is available) | 35% | 36% | 2% | 13% | 13% | 280 |

**The system has improved the way lecturers teach and learners learn:** The findings show that 62% of respondents (20% strongly agreeing and 42% agreeing) agreed that the system had improved the way lecturers teach and learners learn, 29% disagreed (14% disagreeing and 15% strongly disagreeing), and 9% were neutral. The findings indicate that e-learning has impacted on teaching and learning to a large extent; however, more needs to be done to improve the level of its impact.

**The e-learning platform has brought efficiency in teaching and learning:** The findings show that 70% of the respondents (24% strongly agreeing and 46% agreeing) agreed that the system had improved the way lecturers teach and learners learn, 28% disagreed (9% disagreeing and 19% strongly disagreeing), and 2% were neutral. The findings indicate that e-learning has brought efficiency in the teaching and learning process. Nevertheless, more needs to be done to improve the percentage points of those who agreed with the above assertion.

**Most (50%) of assignments are submitted online using the platform:** The findings show that 60% of respondents (18% strongly agreeing and 42% agreeing) agreed that half (50%) of assignments were submitted online using the platform, 34% disagreed (14% disagreeing and 20% strongly disagreeing), and 6% were neutral. The findings indicate that some lecturers may not have embraced the use of the e-learning platforms for assignment submission. This may cause students not to utilize the e-learning platforms as it is not mandatory in some courses. If the gains of the e-learning are to be realized across faculties there is need for a policy to enforce issues such as submission and marking of work through the e-learning platforms.

**You fail if you cannot use the learning platform:** The findings show that 60% of the respondents (17% strongly agreeing and 43% agreeing) agreed that a person would fail if they cannot use the learning platform, and 33% disagreed (14% disagreeing and 19% strongly disagreeing). The findings point to the fact that one may still pass examinations without the use of the platforms. Since most students value passing of examinations, it might be interesting to see how students react if the use of the platform facilitates passing of examinations.

**The platform has made online registration easy:** The findings show that 62% of respondents (26% strongly agreeing and 36% agreeing) agreed that the platform had made online registration easy, 34% disagreed (23 % disagreeing and 11% strongly disagreeing), and 4% were neutral. The findings might point to the fact that the platforms were not robust or that there was only partial integration of the e-learning platforms.

**The platform is integrated (information on fees, library registration, administrative circulars is available):** The findings show that 71% of the respondents (35% strongly agreeing and 36% agreeing) agreed that the platform was integrated, 26% disagreed (13% disagreeing and 13% strongly disagreeing), and 3% were neutral. The findings might point to the fact that the platforms were partially integrated.

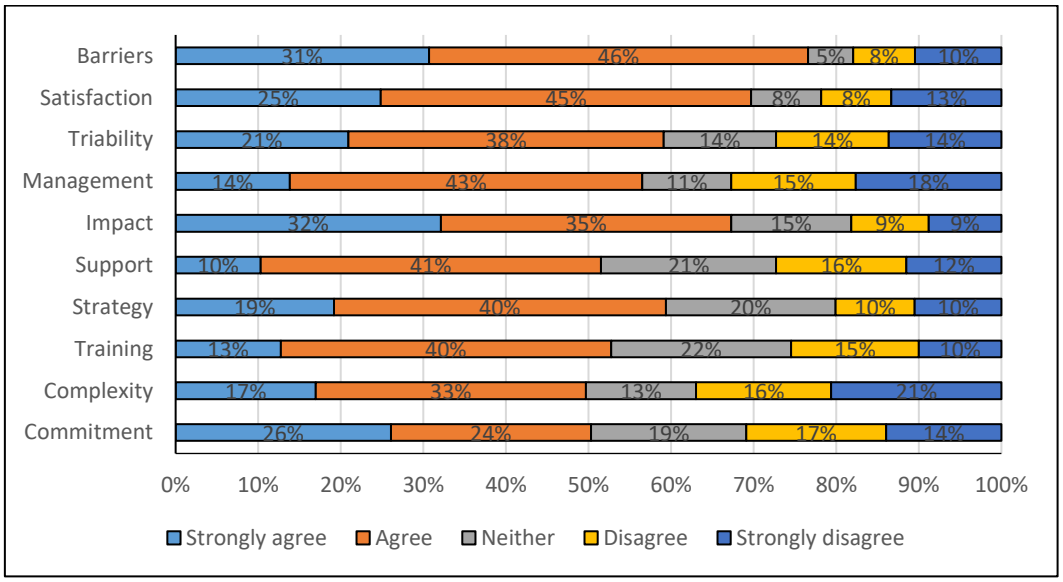



**Figure 5.12: HODs' perspective across constructs**

Figure 5.12 shows that HODs generally agreed that there was adequate management support for e-learning (51%), and the impact of e-learning on the teaching and learning was high (67%). These responses indicate that much still needs to be done to improve on the commitment to use the platforms by users (50%). In terms of user training, the two universities according to HODs were doing fairly well (53%). HODs also indicated that the e-learning platforms were not complex to use i.e., the level of complexity was 50%. Fifty nine percent (59%) of the HODs indicated that they were aware of the university strategy on e-learning, and 70% were satisfied with the current e-learning platforms at the two institutions. The majority (77%) of the HODs concurred with the survey question that there were certain barriers to e-leaning implementation.

**Summary on the level of implementation:** Research findings indicate that e-learning platforms have been implemented in the processes of teaching and

learning in the two universities under consideration and to a great extent have improved the way lecturers teach and learners learn. The e-learning system had also brought efficiency in teaching and learning as indicated by making it easier for students to submit their assignments online and making registration easier. The respondents also highlighted that the use of e-learning platforms is essential as most students agreed that if a student is not using the platform they will fail. The e-learning platforms have been implemented to a great extent as the platforms are integrated with information on fees, library registration and administrative circulars which are available as indicated by the majority of respondents.

The findings above were buttressed by findings from interviews with the IT Directors from the two universities on the implementation of e-learning. The Directors were asked to comment on their e-learning platforms. University of Zimbabwe indicated that they use an interactive open-source Moodle called Tsime as their e-learning platform, while the IT director from ZOU indicated that the level of use of the open-source platform called Myvista was increasing each year.

> *Our system is an open-source called Claroline sometimes called Docious (not clear). It originated from Belgium and we have adapted it, over here we actually call it TSIME which is a platform where students can be able to interact with lecturers. It's a typical platform where schedules can be put; notes can be put even assignments can be loaded online. Reactions can be put online. A lot of things can be put online, assignments, grading reports; you can do your normal things, which include chats and various ways of interaction through a Wiki or normal forums (UZ).*

University of Zimbabwe also had most of its learning resources online.

> *But additionally, a significant part of our learning material is online. We have got a lot of our library services now in terms of books and journals being online. We subscribe to a healthy set of digital resources which students can go and access, on and off campus using their student IDs. Services around that are quite a many because, besides the*

*material themselves, there is also the ability to electronic reference (UZ).*

University of Zimbabwe also had some add-ins on the system that includes anti-plagiarism software.

*Then in addition to that, we are also talking in terms of other services which are coming in to enhance the e-learning. Like the fact that we have put anti-plagiarism software, which is actually there to compliment the quality of what is actually provided for (UZ).*

The IT director from ZOU said students were able to access the e-learning platform both off and on campus. The bandwidth was adequate though the infrastructure downstream was not good and the costs were also prohibitive.

*We have enough bandwidth. Like I said, I think the infrastructure downstream is not very good now, individually, when you look at the question, does the student have the capacity to access the platform from wherever they are? The answer is definitely no! Costs are prohibitive; the national infrastructure which carries the bandwidth is also bad. Students have to travel to our regional offices (ZOU).*

## 5.6 RESEARCH QUESTION 3: WHAT ARE THE KEY E-LEARNING ATTITUDES AND PERCEPTIONS EXPRESSED BY STUDENTS, LECTURERS AND ADMINISTRATORS THAT WOULD AFFECT THE LEVEL OF UPTAKE Of E-LEARNING INNOVATIONS SUCH AS LMS IN PUBLIC UNIVERSITIES?

The researcher sought to find out the key e-learning attitudes and perceptions expressed by lecturers, students and administrators that affect the level of uptake of e-learning innovations such as LMS in public universities. Table 5.6 shows the students' responses to various questions that were asked in Section B of the questionnaire.

**Table 5.6: Student attitudes towards e-learning**

| Attitudes towards e-learning implementation | Strongly agree | Agree | Neither | Disagree | Strongly disagree | N |
|---|---|---|---|---|---|---|
| E-learning has transformed institutions of higher learning | 59% | 26% | 5% | 5% | 5% | 280 |
| E-learning has changed the way I learn. | 48% | 28% | 5% | 9% | 10% | 280 |
| E-learning is an impediment to my learning. | 55% | 28% | 4% | 3% | 10% | 280 |
| I use E-learning platform to check for assignments, notes, and other communication from lecturers. | 34% | 36% | 6% | 10% | 14% | 280 |
| Our e-learning platform is user-friendly and it makes our work easier | 23% | 47% | 7% | 8% | 15% | 280 |
| I prefer contact sessions with my lecturers to e-learning | 16% | 50% | 5% | 9% | 20% | 280 |
| The class size is too large for e-learning to take place | 21% | 40% | 13% | 11% | 15% | 280 |
| I have very little knowledge on e-learning | 28% | 41% | 9% | 9% | 13% | 280 |
| I have problems with e-learning, and it is a waste of my study time | 14% | 44% | 9% | 14% | 19% | 280 |

**E-learning has transformed institutions of higher learning:** The research revealed that 85% (59% strongly agreeing and 26% agreeing) of the sample agreed that e-learning had transformed institutions of higher learning, 10% disagreed (5% strongly disagreed, and 5% disagreed), and 5% were neutral. The findings indicate that in general, the respondents felt that e-learning had transformed institutions of higher learning.

**E-learning has transformed the way I learn:** The study revealed that most of the respondents were in agreement (76%) that e-learning had changed the way they learnt (48% strongly agreed and 28% agreed), only 19% disagreed (9% disagreed and 10% strongly disagreed), and even fewer were neutral (5%). The research findings therefore showed that the majority respondents were in agreement that e-learning had transformed their learning process.

**E-learning is an impediment to my learning:** 83% of respondents (55% strongly agreed and 28% agreed) agreed that e-learning was an impediment to their learning. The findings could indicate that there was a problem with the e-learning platforms that needed to be resolved. While respondents appreciated e-learning and

its transformative effects, they still felt it didn't help them much in learning. Only 13% of the respondents disagreed that e-learning was an impediment to their learning, this number being possibly too small for e-learning to take off at these institutions if this attitude is prevalent among the student population as the results seem to suggest.

**I use the e-learning platform to check for assignments, notes and other communication from lecturer:** The findings show that the majority (70%) of respondents use the e-learning platform to check for assignments and communicate with their lecturers (34% strongly agreed and 36% agreed), 24% disagreed (10% disagreeing and 14% strongly disagreeing), and 6% were indifferent. These findings showed that even though most of the respondents were of the view that e-learning was an impediment to their learning as expressed above, they were using it. This could mean that they had no choice since some lecturers required them to do so. A significant number of respondents (21%) were not in agreement that they used these platforms. Such respondents were either expressing their displeasure in using these platforms by strongly disagreeing or were not using the platforms at all for the mentioned services. The findings, therefore, indicate an inherent problem which needed to be solved, which could mean different lecturers giving different instructions in the way their work was supposed to be submitted or students were grudgingly using the platforms. This might mean that the growth of e-learning in these institutions might be affected in the long term. There is, therefore, a need to dig deeper into why these respondents were responding the way they did in this study.

**Our e-learning platform is user-friendly and it makes our work easier:** The majority of respondents (70%) agreed (23% strongly agreeing and 47% agreeing), 23% disagreed (15% strongly disagreeing and 8% disagreeing), and 7% were neutral. The respondents were generally in agreement that the e-learning platforms were user-friendly and made their work easier (70%). However, these were the same students that said e-learning was an impediment to learning. The issue, therefore, could be attributed to a change-management issue where the attitude towards e-learning needed to be proactively addressed. Universities need to have programs that are meant to produce a positive mind set towards e-learning. The

group of respondents (23%) who showed a negative attitude towards e-learning represent the kind of students who need to be identified and be given special training as they could be the ones without laptops and internet at home.

**I prefer contact sessions with my lecturers to e-learning:** The findings showed that most of the respondents still preferred face-to-face instruction as 16% strongly agreed and 50% agreed. It is, however, worth noting that of the respondents who generally agreed, only 16% were in strong agreement that this could indicate a gradual process of moving away from face-to-face towards other forms of instruction such as e-learning. Twenty percent of the respondents strongly disagreed with this assertion. The findings, therefore, indicate that there is a great opportunity in harnessing e-learning in the two institutions under study.

**The class size is too large for e-learning to take place:** The findings generally showed that 61% agreed that the class sizes were too large for e-learning to take place, with 21% strongly agreeing and 40% agreeing with the assertion. The findings could indicate that the respondents generally felt that class size affected the uptake of e-learning. This is, however, in direct contrast to the literature reviewed in Chapter 2 which generally showed that e-learning enabled more learners to be engaged at the same time. This response could be attributed to the lack of adequate learning resources such as internet access points and servers and weak Wi-Fi. The 15% of the students who strongly disagreed could be the same respondents who generally were frustrated by e-learning. However, the total respondents who generally indicated that the class sizes were suitable (29%) might be an indication that class sizes varied across faculties and courses and hence this was not an issue for them. The findings, thus, point to the need to treat faculties, departments, and even courses differently in any e-learning intervention.

**I have very little knowledge about e-learning:** The findings showed that in general, respondents had very little knowledge about e-learning 69% (28% strongly agreeing and 41% agreeing). Only 22% had sufficient knowledge about e-learning (9% disagreeing and 13% strongly disagreeing). This finding agrees with the TAM theory which asserts that attitude is a factor of ease of use and perceived usefulness. In other words, respondents' attitudes were predominantly shaped by

the lack of knowledge on e-learning or its presence thereof. The finding, therefore, points to fact that more training, exposure and advocacy on e-learning should be afforded to students in general and faculties in particular.

**I have problems with e-learning, and it is a waste of my study time:** The findings showed that the majority of respondents (58%) generally had problems with the e-learning platforms (14% agreeing and 44% strongly agreeing). However, the addition of the phrase “waste of time” could have increased the number of respondents who disagreed with the assertion, thereby lowering the percentage of those who agreed with the assertion. The findings, therefore, show that most respondents had problems with the e-earning platforms and as a result they think that using them was a waste of time.

Figure 5.12 shows the HODs’ response with regard to attitude and perceptions.

### 5.6.1 Commitment from a student perspective

In attempting to establish the key e-learning attitudes and perceptions expressed by lecturers, students and administrators which affect the level of uptake of e-learning innovations such as LMS in public universities, the researcher asked the respondents to indicate their level of agreement regarding the commitment to the use of e-learning. The responses are presented in Table 5.7.

**Table 5.7: Commitment to the use of e-learning platforms students’ perspective**

| Commitment to the use of e-learning platform | Strongly agree | Agree | Neither | Disagree | Strongly disagree | N |
|---|---|---|---|---|---|---|
| I make an effort to use the e-learning platform. | 15% | 41% | 9% | 14% | 21% | 280 |
| I teach others to use the e-learning platform. | 12% | 39% | 11% | 15% | 23% | 280 |
| I am interested and wish to know how e-learning can enhance my learning | 34% | 34% | 9% | 13% | 10% | 280 |

**I make an effort to use the e-learning platform:** The findings indicate that 15% of respondents strongly agree with the statement that they make an effort to use the e-learning platform and they were supported by 41% of the respondents. Research

findings also show that 9% of the respondents were not sure as they indicated neutral. Among the respondents, 14% disagreed with the statement and they were supported by 21% of respondents who strongly disagreed.

**I teach others to use the e-learning platform:** The findings show that 12% of respondents strongly agreed with the statement that they teach others to use the e-learning platform, 39% agreed, 11% were neutral, 15% disagreed, and 23% strongly disagreed.

**I am interested and wish to know how e-learning can enhance my learning:** The findings show that 34% of respondents strongly agreed with the statement that they were interested and wished to know how e-learning could enhance their learning, 34% agreed, 9% were neutral, 13% disagreed and 10% strongly disagreed.

Table 5.8 shows students' views regarding management's commitment to the use of e-learning platforms.

**Table 5.8: Commitment of management**

| Management Commitment | Strongly agree | Agree | Neither | Disagree | Strongly disagree | N |
|---|---|---|---|---|---|---|
| All of my friends use this platform | 22% | 45% | 3% | 13% | 17% | 279 |
| The university staff is committed to the use of ICTs. | 27% | 39% | 2% | 14% | 18% | 280 |
| The university ICT infrastructure is continuously improving | 24% | 44% | 5% | 11% | 16% | 280 |
| ICT laboratories are equipped with computers. | 24% | 33% | 5% | 27% | 11% | 280 |
| The internet is fast enough and the bandwidth is good | 18% | 34% | 7% | 28% | 13% | 280 |
| The Wi-Fi is always accessible. | 27% | 36% | 3% | 24% | 10% | 280 |
| The university assists students to acquire ICT equipment | 64% | 26% | 4% | 4% | 2% | 280 |
| There is back up in case of electricity outages | 52% | 28% | 3% | 7% | 10% | 280 |
| Internet connection points are adequate | 58% | 29% | 4% | 3% | 6% | 280 |

**All of my friends use this platform:** The findings show that 67% of respondents (22% strongly agreeing and 45% agreeing) agreed that all of their friends used the

e-learning platform, 30% disagreed (13% disagreeing and 17% strongly disagreeing), and 3% were neutral. The findings point to the fact that there might be no management policy on the utilization of the e-learning platform.

**The university staff is committed to the use of ICTs:** The findings show that 66% of respondents (27% strongly agreeing and 39% agreeing) agreed that the university staff was committed to the use of ICTs, 32% disagreed (14% disagreeing and 18% strongly disagreeing), and 2% were neutral. The findings point to the fact that a number of students generally felt that management was not committed enough to the use of ICTs at the two institutions.

**The university ICT infrastructure is continuously improving:** The findings showed that 68% of respondents (24% strongly agreeing and 44% agreeing) agreed that the university ICT Infrastructure was continuously improving, 27% disagreed (11% disagreeing and 16% strongly disagreeing), and 5% of the respondents were neutral. The findings point to the fact that management was generally doing some work to improve ICT infrastructure, but perhaps they could do more visible things to improve the infrastructure at the two institutions under investigation.

**ICT laboratories are equipped with computers:** The findings show that 57% of respondents (24% strongly agreeing and 33% agreeing) agreed that ICT laboratories were equipped with computers, 38% disagreed with the above assertion (27% disagreeing and 11% strongly disagreeing), and 5% of the respondents were neutral. The findings indicate that while management was making an effort to equip ICT laboratories, a lot more needed to be done in this area.

**The internet is fast enough, and the bandwidth is good:** The findings show that 52% of respondents (18% strongly agreeing and 34% agreeing) agreed that the internet was fast enough and the bandwidth was good, 41% disagreed (28% disagreeing and 13% strongly disagreeing), and 7% were neutral. The findings largely point to the fact that both the bandwidth and the speed of the internet needed to be improved.

**The Wi-Fi is always accessible:** The findings show that 63% of respondents (27% strongly agreeing and 36% agreeing) agreed that the Wi-Fi is always accessible, 34% disagreed (24% disagreeing and 10% strongly disagreeing), and 3% of the respondents were neutral. The findings largely pointed to the fact that more could be done to improve coverage of the Wi-Fi and its accessibility.

**The university assists students to acquire ICT equipment:** The findings show that 90% of respondents (64% strongly agreeing and 26% agreeing) agreed that the university assisted students to acquire ICT equipment, 6% disagreed (4% disagreeing and 2% strongly disagreeing), and 4% were neutral. The findings largely point to the fact that the two institutions' management assisted their students in acquiring ICT equipment which was refreshing since the ICT laboratories were not well equipped with computers as revealed by the same respondents.

**There is back up in the case of electricity outages:** The findings show that 80% of respondents (52% strongly agreeing and 28% agreeing) agreed that there is back up in the case of electricity outages, 17% disagreed (7% disagreeing and 10% strongly disagreeing), and 3% were neutral. The findings largely point to the fact that in these two institutions management had invested in power backup infrastructure.

**Internet connection points are adequate:** The findings show that 87% of respondents (58% strongly agreeing and 29% agreeing) agreed that internet connection points were adequate, 9% disagreed (3% disagreeing and 6% strongly disagreeing), and 4% of the respondents were neutral. The findings point to the fact that the two institutions have placed adequate internet connecting points for their users.

### 5.6.2 Satisfaction from a student perspective

In an attempt to examine the key e-learning attitudes and perceptions, expressed by lecturers, students, and administrators, and that affect the level of uptake of e-learning innovations such as LMS in public universities, the researcher asked the students to indicate their level of agreement regarding whether they were satisfied with e-learning ((Table 5.9).

**Table 5.9: Satisfaction**

| Satisfaction | Strongly agree | Agree | Neither | Disagree | Strongly disagree | N |
|---|---|---|---|---|---|---|
| The e-learning platform is reliable and good. | 20% | 52% | 3% | 5% | 20% | 280 |
| The e-learning platform has user instructions | 26% | 42% | 11% | 9% | 12% | 280 |
| I can no longer learn without this e-learning platform | 32% | 44% | 7% | 6% | 11% | 280 |
| The platform makes me get better grades | 16% | 50% | 6% | 11% | 17% | 280 |

**The e-learning platform is reliable and good:** The findings show that 72% of respondents (20% strongly agreeing and 52% agreeing) agreed that the e-learning platform was reliable and good, 25% disagreed (5% disagreeing and 20% strongly disagreeing), and 3% were neutral. The findings point to the fact that approximately 72% of the respondents were happy about the e-learning system and trusted that it was reliable and good.

**The e-learning platform has user instructions:** The findings show that 68% of respondents (26% strongly agreeing and 42% agreeing) agreed that the e-learning platform has user instructions, 21% disagreed (9% disagreeing and 12% strongly disagreeing), and 11% were neutral. Eleven percent (11%) of respondents who were not sure as to how to answer this question indicated that while the user instructions were available, they were not easily accessible.

**I can no longer learn without this e-learning platform:** The findings show that 76% of respondents (32% strongly agreeing and 44% agreeing) agreed that they could no longer learn without this e-learning platform; only 17% disagreed (6% disagreeing and 11% strongly disagreeing), and 7% were neutral. The findings show that the e-learning platform had become part of most students' learning process, hence the perceived usefulness indicator among users was high.

**The platform makes me get better grades:** The findings show that 66% of the respondents (16% strongly agreeing and 50% agreeing) agreed that the platform made them get better grades, 28% disagreed (11% disagreeing and 17% strongly

disagreeing), and 6% were neutral. The findings indicate that while the perceived usefulness of the e-learning platform was generally high, respondents noted that the e-learning platform alone could not make them excel in their studies. However, it is interesting to note that the e-learning platform had an effect on the quality of the learning outcomes as shown by the number of the users who agreed with this question or assertion.

Findings above are supported by data collected from HODs see Figure 5.12 above.

### 5.6.3 Summary of findings on attitude, commitment, and perceptions on e-learning platforms from student and HOD perspective

Responses presented above show that generally the HODs' and students' attitudes towards e-learning were similar and positive. Both sets of respondents identified negative attitudes as a barrier to the effective e-learning implementation. HODs and students agreed that e-learning platforms have transformed higher learning institutions and the process of teaching and learning. Most of the respondents agreed that e-learning was changing the way they learn and teach and that they used the e-learning platforms to check assignments and post notes. Both students and HODs viewed e-learning platforms as being user-friendly platforms that they could use to communicate with each other during the learning process. However, some students stated that they had little knowledge about e-learning and some even agreed that they have problems with e-learning platforms and that it is a waste of their study time. On the contrary, the majority of HODs found the platforms easy to use and very useful. The negative attitude reflected by these few students needs to be further investigated. Both the students and HODs indicated high levels of satisfaction with the existing e-learning platforms. Both sets of respondents agreed that the classes were too large for e-learning to take place and according to literature this may be because of the lack of adequate learning resources such as internet access points and servers, and weak Wi-Fi.

The findings from students and HODs concur with findings from interviews with the IT Directors on attitudes and perceptions regarding e-learning. However, the two IT Directors brought new insights into the study, that of age and resistance to change.

The IT directors agreed on the fact that students showed more enthusiasm regarding the use and uptake of ICTs compared to lecturers, and that generally, older and more experienced lecturers had a negative attitude towards e-learning. As one of the IT Directors succinctly stated:

> *The biggest problem is people because if someone has been doing something which works, and you bring in technology they will ask you a question actually why should I go ahead and change it unless if you're telling me that it's not working, that's the biggest problem you find. If the university can actually change the mind-set of its people we would actually get to our solutions much faster. Agreed, people also need training (UZ).*

Generally, older and experienced lecturers were said to be less interested in the use of the platform.

> *I think it's a mind shift which needs to actually be given to people and, probably eliminates this exaggerated theme called experience, because experience is, to quite an extent, exaggerated (UZ)*

Students were generally aggressive in the use of the platforms.

> *The students are really aggressively utilizing internet which means, even that much of bandwidth is sufficient, but not adequate or is it adequate but not sufficient. When students are not around the bandwidth is sufficient (UZ).*

## 5.7 RESEARCH QUESTION 4: WHICH E-LEARNING STRATEGIES ARE BEING USED BY UNIVERSITIES IN ZIMBABWE?

The researcher sought to find out the implementation strategies that exist in Zimbabwean Universities. The students were asked to indicate their level of agreement regarding the strategies being used to implement e-learning at their

universities. The strategies included compulsory usage of e-learning, and introduction of e-learning to all faculties. The responses are shown in the Table 5.10.

**Table 5.10: Strategy towards e-learning implementation**

| Strategy towards e-learning implementation | Strongly agree | Agree | Neither | Disagree | Strongly disagree | N |
|---|---|---|---|---|---|---|
| It is compulsory to use the e-learning platform. | 18% | 46% | 8% | 8% | 20% | 280 |
| Some lecturers do not use the e-learning platform. | 48% | 40% | 3% | 3% | 6% | 280 |
| The e-learning platform was introduced across all university faculties. | 39% | 44% | 5% | 5% | 7% | 280 |
| I am aware of the university Strategy on e-learning. | 30% | 46% | 4% | 7% | 13% | 280 |

**It is compulsory to use the e-learning platform:** The findings show that 64% (18% strongly agreeing and 46% just agreeing) of respondents agreed that it was compulsory to use the e-learning platforms at their learning institution, 28% disagreed (8% disagreeing and 20% strongly disagreeing), and 8% were not sure. The findings could point to the absence of a clear policy on the use of e-learning platforms as the responses were not conclusive.

**Some lecturers do not use the e-learning platform:** The findings show that 88% of respondents generally agreed that some of their lecturers did not use the e-learning platforms (48% strongly agreeing and 40% agreeing), only 9% disagreed (3% disagreeing and 6% strongly disagreeing), and 3% were not sure. The findings could point to the fact that the problem of e-learning implementation in general could be due to the lack of use of e-learning platforms by lecturers.

**The e-learning platform was introduced across all university faculties:** The findings show that 83% (39% strongly agreeing and 44% agreeing) of respondents agreed that e-learning was introduced across all faculties, only 12% (5% disagreeing and 7% strongly disagreeing) disagreed, and 5% of the respondents were neutral. The findings may be pointing to the fact that most faculties were aware of the e-learning program and were utilizing it.

**I am aware of the university strategy on e-learning:** The findings show that 76% of respondents (30% strongly agreeing and 46% agreeing) were aware of the university strategy on e-learning and 20% (7% disagreeing and 13% strongly disagreeing) were not, and 4% of the respondents were not sure. The findings point to the fact that the universities under study were doing a good job in raising awareness of the universities' strategy on e-learning. Work still needs to be done to bring the 20% and the uncertain respondents on board.

The students were asked to comment on training on e-learning, whether there was training on the e-learning implementation strategies in the universities under consideration. The respondents were asked to indicate their level of agreement on the issues of training concerning e-learning (Table 5.11).

**Table 5.11: Training on e-learning**

| Training of users of e-learning | SA | A | N | D | SD | N |
|---|---|---|---|---|---|---|
| I was trained to use the e-learning platform. | 21% | 39% | 9% | 9% | 22% | 280 |
| The training was adequate. | 15% | 51% | 6% | 11% | 17% | 280 |
| The training should be continuous | 14% | 45% | 9% | 9% | 24% | 280 |

**I was trained to use the e-learning platform:** The findings show that 21% of respondents strongly agreed that they were trained and 39% just agreed that they were trained. It can be argued, therefore, that generally 60% of the students were trained to use the e-learning platform under discussion. A total of 31% of the respondents indicated that they were not trained, of which 22% strongly disagreed that they were trained and 9% just disagreeing that they were not trained, and 9% of the respondents were not sure of whether they were trained or not. The findings point to the fact that the institutions under study need to do more to train staff and students in the use of the existing e-learning platforms.

**The training was adequate:** 66% of the respondents generally agreed that the training was adequate (15% strongly agreeing and 51% just agreeing), 28% disagreed (11% strongly disagreeing and 17% disagreeing), and 6% of the respondents were neutral. The findings indicate that the adequacy of training could be an issue in the implementation of e-learning platforms.

**The e-learning platform was put on a trial before use:** The findings showed that 75% of respondents (40% strongly agreeing and 35% agreeing) agreed that the e-learning platform was put on a trial before use, 21% disagreed (9% disagreeing and 12% strongly disagreeing), and 4% were neutral. The findings indicated that some 25% of HODs were not in agreement with the way the trials of the platform were performed or the communication on the trial runs was executed, thus likely not diffusing to all the users. The need for effective communication cannot be overemphasized here.

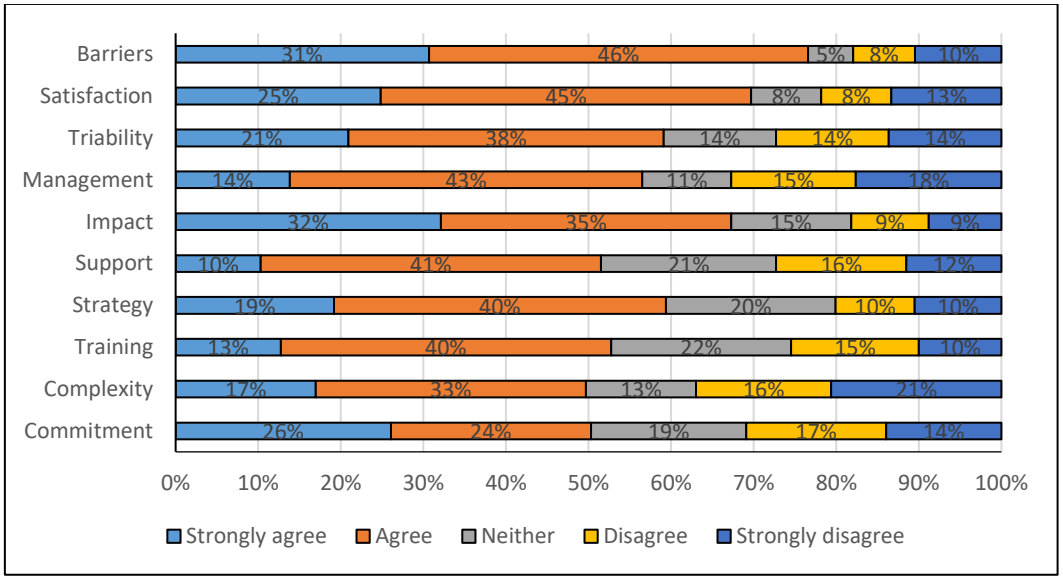
**We were given enough time to learn about this platform:** The findings show that 74% of respondents (29% strongly agreeing and 45% agreeing) agreed that they were given enough time to learn about this platform, 21% disagreed (9% disagreeing and 12% strongly disagreeing), and 5% of the respondents were neutral. The findings indicated that the trial period was fairly long and adequate for learning to take place, although more could have been done.

**The trial period was short:** The findings show that 66% of the respondents (61% strongly agreeing and 5% agreeing) agreed that the trial period was short, 28% disagreed (11% disagreeing and 17% strongly disagreeing), and 6% of the respondents were neutral. The findings indicate that the trial period which was allowed for the e-learning platform to run was generally too short; the training should be continuous.

**The training should be continuous:** The findings show that 59% of the respondents (14% strongly agreeing and 45% agreeing) were of the view that the training should be continuous, 33% disagreed (24% strongly disagreed and 9% just disagreed), and 8% were neutral. The findings point to the fact that over half of the respondents appreciated the value of continuous training and 32% generally did not see its value.

### 5.7.1 E-learning strategy from an HOD perspective

Figure 12 shows the HODs' response to the issue of strategy.




As discussed in the previous section, fifty nine percent (59%) of the HODs indicated that they were aware of the university strategy on e-learning. This number could be increased if deliberate efforts were made in marketing the e-learning strategy to all university employees.

### 5.7.2 E-learning strategy from IT directors' perspectives

The IT Directors from the two institutions were also asked to comment on the strategies used by their university regarding e-learning implementation. The participants were asked if they have an e-learning policy or strategy at their institutions. The IT Directors pointed to the fact that both universities had an ICT policy where the issue of ICTs such as the use of e-learning platform is vaguely expounded. In the two institutions the use of e-learning platforms is not enforced, lecturers are just encouraged to use the platforms since it is good for teaching and learning. The respondents were asked if they put the e-learning platform on trial before full implementation and respondents indicated that both institutions had pre-trials before implementation. The IT Directors were also asked to comment on training and e-learning services, and if users were trained before the platform was used. The IT Directors indicated that there was continuous training in the use of e-

learning related ICTs. The ZOU indicated that they seconded an ICT technician to all their regional centers for support and training.

The two IT Director respondents bemoaned the general negative attitude displayed by lecturers in the uptake of e-learning compared to students. Generally, older lecturers were reluctant to use the e-learning platforms compared to the younger generation of lecturers; again the issue of attitude emerged as the greater factor. Both respondents said they held workshops and seminars to train their lecturers. No training was earmarked for students. There was also peer-based training between lecturers.

### 5.7.3 Summary of the strategies of implementing e-learning

Based on the findings from the respondents, it can be deduced that these universities do not make it compulsory for students to use e-learning platforms. The research findings also indicate that the use of e-learning platforms was introduced across all university faculties. The majority of the respondents indicated that they were aware of the university strategy on e-learning. Interviews with the IT Directors revealed that one of the important aspects that should be seriously considered was the issue of making the organization agile. One of the directors explained that in a dynamic environment, the organization should be made agile so as to ensure that all the changes that take place at the institution are received, communicated and implemented timeously and successfully.

## 5.8 RESEARCH QUESTION 5: WHAT ARE THE MAJOR BARRIERS TO E-LEARNING PLATFORMS IMPLEMENTATION IN PUBLIC UNIVERSITIES IN ZIMBABWE?

The researcher sought to find out the barriers to e-learning implementation in state universities in Zimbabwe. The students were asked to indicate their level of agreement on the factors affecting the implementation of e-learning (Table 5.12).

**Table 5.12: Barriers to the implementation of e-learning**

| Barriers | Strongly agree | Agree | Neither | Disagree | Strongly disagree | N |
|---|---|---|---|---|---|---|
| Lecturers lack time to adopt and implement e-learning | 16% | 50% | 6% | 11% | 17% | 280 |
| As long as there is no policy on the use of e-learning platform I will not bother to use it | 18% | 43% | 6% | 13% | 20% | 280 |
| As long as I get e-learning material from the lecturers, I will not bother for notes on the platform | 15% | 41% | 11% | 12% | 21% | 280 |
| Rewards for participation in e-learning activities are key | 39% | 34% | 7% | 11% | 9% | 280 |
| Peer evaluation in e-learning is key | 22% | 44% | 6% | 9% | 19% | 280 |
| The university strategic plan and policy on e-learning should be clear and available to staff and students | 24% | 39% | 8% | 11% | 18% | 280 |
| Computers and ICT resources available to lecturers and students are inadequate and unreliable | 31% | 47% | 5% | 3% | 14% | 280 |
| The training on e-learning is badly timed and inadequate | 24% | 39% | 6% | 8% | 23% | 280 |

**Lecturers lack time to adopt and implement e-learning:** The findings show that 66% of respondents (16% strongly agreeing and 50% agreeing) agreed that lecturers lacked time to adopt and implement e-learning, 28% disagreed (11% disagreeing and 17% strongly disagreeing), and 6% of the respondents were neutral. The findings show that to some extent lecturers had inadequate time to implement e-learning; however, a number of respondents still felt that time alone was not an issue, and other issues about lectures could be affecting the implementation process.

**As long as there is no policy on the use of e-learning platform I will not bother to use it:** The findings show that 61% of respondents (18% strongly agreeing and 43% agreeing) agreed that as long as there was no policy on the use of the e-learning platform, they will not bother to use it, 33% disagreed (13% disagreeing and 20% strongly disagreeing), and 6% were neutral. The findings show that the issue of policy in implementation of e-learning was important. However, policy alone was not hindering the implementation of e-learning as shown by the number of respondents who disagreed with this assertion.

**As long as I get e-learning material from the lecturers, I will not bother looking for notes on the platform:** The findings show that 56% of respondents (15% strongly agreeing and 41% agreeing) agreed that as long as they get e-learning material from the lecturers they were not bothered to look for notes on the platform, 33% disagreed (12% disagreeing and 21% strongly disagreeing), and 11% were neutral. The findings showed that downloading material and distributing this to students did not encourage use of the platform by students.

**Rewards for participation in e-learning activities are key:** The findings show that 73% of respondents (39% strongly agreeing and 34% agreeing) agreed that rewards for participation in e-learning activities were key to e-learning utilization, 20% disagreed (11% disagreeing and 9% strongly disagreeing) and 7% of the respondents were neutral. The findings indicate that respondents needed to be rewarded for their use of the e-learning platform.

**Peer evaluation in e-learning is essential:** The findings show that 66% of respondents (22% strongly agreeing and 44% agreeing) agreed that peer evaluation in e-learning was a key to e-learning, 28% disagreed (9% disagreeing and 19% strongly disagreeing), and 6% were neutral. The findings point to the fact that learners need to be engaged in peer evaluation to make the process more interesting and collaborative.

**The university strategic plan and policy on e-learning should be clear and available to staff and students:** The findings show that 63% of respondents (24% strongly agreeing and 39% agreeing) agreed that the university strategic plan and policy on e-learning should be clear and available to staff and students, 29% disagreed (11% disagreeing and 18% strongly disagreeing), and 8% were neutral. The findings indicated that it was important for the institutions to make these documents available for users of the e-learning platforms.

**Computers and ICT resources available to lecturers and students are inadequate and unreliable:** The findings show that 78% of respondents (31% strongly agreeing and 47% agreeing) agreed that computers and ICT resources

available to lecturers and students were inadequate and unreliable, 17% disagreed (3% disagreeing and 14% strongly disagreeing) and 5% were neutral. The findings point to the fact that to a large extent, management were not providing adequate and reliable computers to both students and lecturers.

**The training on e-learning is badly timed and inadequate:** The findings show that 63% of respondents (24% strongly agreeing and 39% agreeing) agreed that the training on e-learning was badly timed and inadequate, 31% disagreed (8% disagreeing and 23% strongly disagreeing), and 6% were neutral. The findings indicated a need for well-planned and comprehensive e-learning training programs for both lecturers and students.

HODs as shown in Figure 5.12 above agreed with most of barriers to e-learning identified in the survey questions, such as inadequate ICT resources, lack of training, lack of rewards to motivate users, and lack of a clear policy and strategy on e-learning roll out.

IT Directors were asked to comment on the barriers to e-learning implementation. They identified the following as major hindrances to e-learning:

- **Culture**

Both directors identified culture as a major obstacle in the adoption of e-learning. They indicated that most lecturers were people from earlier generations who perceived adoption of technology as a luxury since they believe that they have been teaching for a long time and that the traditional methods work well. They ask themselves the questions: Why now? What has changed? What benefits does this technology bring that we cannot deliver as individuals? This resistance to change was cited as a major obstacle and both directors indicated that a lot has to be done by management to address this problem.

- **Institutional systems and processes**

Another obstacle identified by the Directors was the institutional processes as well as the systems that support the processes. This point was also highlighted by student respondents who indicated that some courses were still using the manual

submission of assignments. They indicated that the system are sometimes down so students find it difficult to use the system. The IT Director of ZOU highlighted the need to consider implementation of the e-learning platforms from a systems theory perspective. The systems theory calls for consideration of interdependency of systems as a way of understanding them better. In other words, issues of e-learning implementation would better be understood if a holistic analysis of the processes was carried out.

- **Lack of adequate resources**

This point was raised by both Directors. Both institutions lack financial backing to support their infrastructural needs so as to strengthen e-learning uptake. Slow internet connections, which hinder effective use of the e-learning platform, were also identified as a major barrier. The lack of adequate and appropriate hardware, software as well as networks to support uptake of e-learning were also identified as key barriers.

- **Lecturers' and students' attitudes**

The Directors reiterated that most university lecturers were either from the baby boomer generation or successors of the baby boomer generation. Some only started to use a computer in their 50s and most of these lecturers are very difficult to convince that e-learning can add value. They have a negative attitude towards ICT and this makes adoption of e-learning a problem. The IT Director at ZOU stated that these lecturers find it difficult to upload notes and assignments on the e-learning platform and they continue with the conventional method. Another point noted was that some lecturers lack the knowledge and skills to use the ICTs.

## 5.9 DESCRIPTIVE STATISTICS OF THE DATA

**Table 5.13: Kendall coefficient of concordance**

| Constructs | N | Kendall's Wa | Chi-Square | Df | Asymp. Sig. |
|---|---|---|---|---|---|
| Attitudes | 280 | 0.125 | 279.871 | 8 | 0.000 |
| Commitment | 280 | 0.082 | 45.693 | 2 | 0.000 |
| Complexity | 280 | 0.02 | 11.096 | 2 | 0.004 |
| Training | 280 | 0.006 | 3.62 | 2 | 0.164 |
| Strategy | 280 | 0.131 | 109.654 | 3 | 0.000 |

| | | | | | |
|---|---|---|---|---|---|
| Support | 280 | 0.111 | 154.94 | 5 | 0.000 |
| Impact | 279 | 0.018 | 30.575 | 6 | 0.000 |
| Management | 280 | 0.176 | 344.566 | 7 | 0.000 |
| Trialability | 280 | 0.01 | 2.891 | 1 | 0.089 |
| Satisfaction | 280 | 0.028 | 15.72 | 2 | 0.000 |
| Barriers | 280 | 0.046 | 89.638 | 7 | 0.000 |

Table 5.13 shows the results of the Kendall's coefficient of concordance. The Kendall's coefficient of concordance was used to indicate the degree of association of ordinal assessments made by multiple items that have been used to assess the constructs that affect the implementation of e-learning platforms as discussed in Chapter 2. Attribute agreement analysis was used to summarize the trend of responses indicated in the frequency tables. As a rule of thumb, the Kendall's coefficient values range from 0 to 1. The higher the value the stronger the association. All the calculated coefficients in this study ranged between 0 and 1 as shown in Table 5.13. The findings show that the views of students pertaining to e-learning varied and there was no adequate evidence to conclude that they were in strong agreement or disagreement on a given construct. However, strategy and attitude indicated a better association with coefficients of 0.13 and 0.12 respectively. It could, thus, be inferred from the analysis above that the responses of students varied across constructs but tended to converge more on issues to do with strategy and attitudes towards e-learning.

**Table 5.14: Reliability statistics (Guttman Split-Half Coefficient)**

| **Reliability Statistics** | | | |
|---|---|---|---|
| Cronbach's Alpha | Part 1 | Value | 0.858 |
| | | N of Items | 28a |
| | Part 2 | Value | 0.836 |
| | | N of Items | 28b |
| | Total N of Items | | 56 |
| Correlation Between Forms | | | 0.615 |
| Spearman-Brown Coefficient | Equal Length | | 0.762 |
| | Unequal Length | | 0.762 |
| Guttman Split-Half Coefficient | | | 0.761 |

Table 5.14 shows the results of the Guttman split-half method which was used to assess reliability (internal consistency). The analysis separated the items that were measured on a Likert scale into two equal halves and the Cronbach alpha coefficient

was then calculated per each half as indicated in the above output. A total of 56 items were used for reliability of assessment divided into two equal halves of 28 items each. The calculated Cronbach's coefficients (86% and 84%) suggested an excellent internal consistency as they were greater than 80% as shown in Table 5.16. Correlation between forms was strong enough (0.61) in suggesting reliability. The Guttman split-half coefficient was estimated to be 0.76 which confirms the Cronbach coefficient and indicates that there was evidence of internal consistency.

**Table 5.15: Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy**

| **KMO and Bartlett's Test** | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.831 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 11220.299 |
| | Df | 1540.000 |
| | Sig. | 0.000 |

Table 5.15 shows the results of the KMO test that provided the basis for the application of AFA to determine the constructs. In general, the statistic is a measure of the proportion of variance among variables that might be common variance. The lower the proportion, the more suited the data is to factor analysis. The calculated value fell in the meritorious category and therefore gave enough evidence for the application of AFA as the sample was adequate. Bartlett's Test of Sphericity estimated in the form of a chi-square value with a corresponding probability value significant at 95% level of significance indicated from the equality of variances in the sample that the sample was derived from a normal population.

## 5.10 CONFIRMATORY FACTOR RESULTS

Validity of the collected responses was investigated using CFA since it is a special form of factor analysis used in social research. This enabled the researcher to assess if the nature of the constructs (attitudes, commitment, complexity, training, strategy, support, impact, management, trialability, satisfaction and barriers) were consistent. The underlying hypothesis suggested there was no difference between the patterns observed in these constructs and the model specified. The model fit was assessed using the Chi-square and Root Mean Square Error of Approximation (RMSEA). The Chi-square probability value was significant at 95% level of

significance and the null hypothesis was not rejected in favor of the alternative hypothesis, suggesting that there was no difference in the patterns observed between the data and the model. In general, there was enough evidence of validity since the observed patterns confirmed the specified model (Table 5.16).

**Table 5.16: Confirmatory factor results**

| **Optimization method** | **NLMINB** | **Model test baseline model:** | **NLMINB** |
|---|---|---|---|
| Number of free parameters | 139.000 | Minimum Function Test Statistic | 9304.668 |
| Number of observations | 280.000 | Degrees of freedom | 903.000 |
| Estimator | ML | P-value | 0.000 |
| Model Fit Test Statistic | 6961.177 | User model versus baseline model: | |
| Degrees of freedom | 807.000 | Comparative Fit Index (CFI) | 0.268 |
| P-value (Chi-square) | 0.000 | Tucker-Lewis Index (TLI) | 0.180 |
| Log likelihood and Information Criteria: | | Number of free parameters | 139.000 |
| log likelihood user model (H0) | -19296.499 | Akaike (AIC) | 38870.997 |
| log likelihood unrestricted model (H1) | -15815.910 | Bayesian (BIC) | 39376.233 |
| Root Mean Square Error of Approximation: | | Sample-size adjusted Bayesian (BIC) | 38935.473 |
| RMSEA | 0.165 | Standardized Root Mean Square Residual: | |
| 90 Percent Confidence Interval | 0.161 0.169 | SRMR | 0.113 |
| P-value RMSEA <= 0.05 | 0.000 | | |
| Parameter estimates: | | | |
| Information | Expected | | |
| Information saturated (h1) model | Structured | | |
| Standard errors | Standard | | |

## 5.11 EXPLANATORY FACTOR ANALYSIS

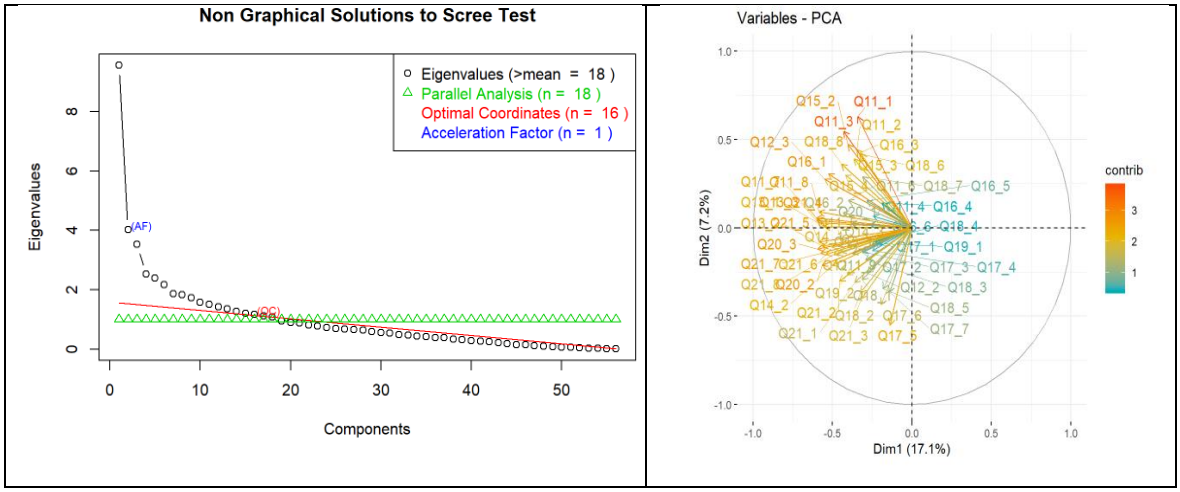



**Figure 5.13**: Explanatory factor analysis

Figure 5.13 shows the results of a non-graphical solution scree plot analysis that determined how many components must be extracted to select proper constructs. Sixteen factors were determined as the maximum number of factors that could be extracted. The variable PCA plot shows the contribution of each item, with items with higher contribution being indicated in red with long arrows as shown in Figure 5.13. The first three factors had variances (eigenvalues) that were greater than 1. The eigenvalues change less markedly when more than 6 factors are used. In this case, 4–6 factors appeared to explain most of the variability in the data. The percentage of variability explained by factor 1 is 0.1732 or 17.3%. The scree plot shows that the first four factors account for most of the total variability in data. The remaining factors account for a very small proportion of the variability and are likely unimportant. The major constructs were built based on the items with the highest contributions across the selected number of components.

## 5.12 STRUCTURE MATRIX

After determining the number of factors (step 1), the analysis was repeated using the maximum likelihood method. Then the loading pattern to determine the factor that had the most influence on each variable was examined (Structure Matrix). Loadings close to -1 or 1 indicated that the factor strongly influences the variable. Loadings close to 0 indicate that the factor had a weak influence on the variable. There was a possibility of some factors having multiple loadings. The loadings of

the items were selected based on the major constructs of the study namely attitudes, commitment, complexity, training, management, trialability, satisfaction and barriers to the use of e-learning platforms. Barriers to the effective use of e-learning platform as a construct had 9 items with the highest loadings (greater than 0.75). Commitment only comprised two selected items with loadings also greater than 0.90, and complexity of e-learning platform was made up of 3 items with loading greater than 0.80. Furthermore, training on the use of e-learning platforms in the two educational institutions recorded loadings greater than 0.4 which was then used as the cut-off or threshold point. Strategy and support were the only items which were constructed based on single items with the recommended loadings. The decline in item loadings was realized under impact and management as their loadings were very close to the threshold (0.40); impact was made up of five items while management was made up of eight items. Trialability and satisfaction with the use and absorption of e-learning platforms were both constructed based on two items which indicated to have better loadings according to the selection criteria or threshold. Barriers to the use of e-learning platforms were constructed from six factor loadings with the highest and recommended scores. Aggregated scores were then calculated per each construct and factor analysis was conducted based on the aggregated scores of the major constructs of the study (Table 5.17).

**Table 5.17: Structure matrix with factor loadings**

| Construct | Explanation (items /Questions) | Item | Contribution |
|---|---|---|---|
| **Attitudes** | E-learning has transformed institutions of higher learning | Q11_1 | 0.88 |
| | E-learning has transformed institutions of higher learning | Q11_2 | 0.81 |
| | E-learning is an impediment to my learning. | Q11_3 | 0.68 |
| | I use e-learning platform to check for assignments, notes and other communication from lecturer. | Q11_4 | 0.97 |
| | Our e-learning platform is user-friendly, and it makes our work easier | Q11_5 | 0.94 |
| | I prefer contact sessions with my lecturers to e-learning | Q11_6 | 0.95 |
| | The class sizes are too large for e-learning to take place | Q11_7 | 0.73 |
| | I have very little knowledge on e-learning | Q11_8 | 0.92 |
| | I have problems with e-learning, and it is a waste of my study time | Q11_9 | 0.96 |
| **Commitment** | I make an effort to use the e-learning platform. | Q12_1 | 0.93 |
| | I teach others to use the e-learning platform. | Q12_2 | 0.97 |
| **Complexity** | The system has easy to follow instructions | Q13_1 | 0.7 |
| | Our e-learning platform is straight forward and easy to use. | Q13_2 | 0.92 |

| | | | |
|---|---|---|---|
| | I have serious problems to use the platforms. | Q13_3 | 0.8 |
| **Training** | I was trained to use the e-learning platform. | Q14_1 | 0.97 |
| | The training was adequate. | Q14_2 | 0.41 |
| **Strategy** | It is compulsory to use the e-learning platform. | Q15_2 | 0.51 |
| **Support** | The IT department is always available to assist me if I have problems with the platform. | Q16_6 | 0.41 |
| **Impact** | The system has improved the way lecturers teach and learners learn. | Q17_1 | 0.51 |
| | The e-learning platform has brought efficiency in teaching and learning. | Q17_2 | 0.41 |
| | The platform has made online registration easy | Q17_5 | 0.52 |
| | The platform is integrated (information on fees, library registration, administrative circulars is available) | Q17_6 | 0.48 |
| | All of my friends use this platform | Q17_7 | 0.52 |
| **Management** | The university staff is committed to the use of ICTs. | Q18_1 | 0.43 |
| | The university ICT infrastructure is continuously improving | Q18_2 | 0.49 |
| | ICT laboratories are equipped with computers. | Q18_3 | 0.55 |
| | The internet is fast enough and the bandwidth is good | Q18_4 | 0.48 |
| | The Wi-Fi is always accessible. | Q18_5 | 0.52 |
| | The university assists students to acquire ICT equipment | Q18_6 | 0.75 |
| | There is back up in the case of electricity outages | Q18_7 | 0.96 |
| | Internet connection points are adequate | Q18_8 | 0.52 |
| **Trialability** | The e-learning platform was put on a trial before use. | Q19_1 | 0.88 |
| | We were given enough time to learn about this platform | Q19_2 | 0.82 |
| **Satisfaction** | The e-learning platform is reliable and good. | Q20_1 | 0.86 |
| | The e-learning platform has user instructions | Q20_2 | 0.89 |
| | I can no longer learn without this e-learning platform | Q20_3 | 0.74 |
| **Barriers** | Lecturers lack time to adopt and implement e-learning | Q21_1 | 0.85 |
| | As long as there is no policy on the use of e-learning platform I will not bother to use it | Q21_2 | 0.76 |
| | As long as I get e-learning material from the lecturers, I will not bother looking for notes on the platform | Q21_3 | 0.8 |
| | Peer evaluation in e-learning is key | Q21_5 | 0.9 |
| | The university strategic plan and policy on e-learning should be clear and available to staff and students | Q21_6 | 0.78 |
| | Computers and ICT resources available to lecturers and students are inadequate and unreliable | Q21_7 | 0.92 |
| | The training on e-learning is badly timed and inadequate | Q21_8 | 0.86 |

The constructs' scores are summarized in Figure 5.14. On average the highest factor loadings were recorded under commitment (0.950), attitude (0.871) and trialability (0.85), while strategy, impact and support were very close to the threshold 0.40. Most of the constructs recorded favourable loadings between 0.50 and 0.70. Most of the imbalances in factor loadings of the constructs were as a result of

elimination of the other items with inferior loadings and therefore some of the themes remained with a minimum of 1 or 2 items.

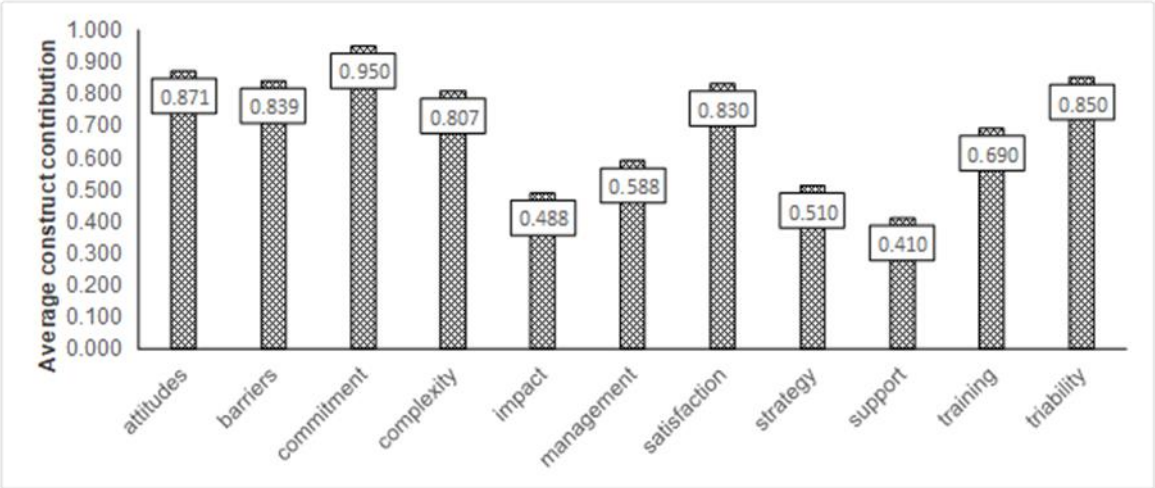



**Figure 5.14: Summary of the factor loadings**

## 5.13 ANALYSIS BASED ON AGGREGATED SCORES FROM THE EXPLANATORY FACTOR ANALYSIS

The descriptive statistics (mean, variance, skewness, kurtosis, minimum and maximum) to summarize the constructs were derived from the aggregated scores (Table 5.18). All the descriptive statistics were based on 280 sample size except impact with n=279 because of non-response errors. The highest maximum aggregated score (38) was recorded under attitudes while the lowest maximum score (5) was observed under strategy and support. Remaining constructs recorded maximum aggregated scores between 10 and 35. Attitudes, management, and barriers to the use of e-learning platforms had calculated mean aggregated scores above 15 compared to other constructs in the study. Much variability corresponded to the highest means; constructs with highest means also had the highest variability compared to other constructs. The distribution shape of the calculated aggregated scores was then examined using skewness and kurtosis, this being essential in determining the principle of normality. All the constructs calculated skewness values were positive indicating that the tail of the distribution is on the right while most kurtosis statistics were negative indicating that the outlier of the distributions was less extreme than that of a normal distribution.

**Table 5.18: Descriptive statistics**

| Constructs | N | Min | Max | Sum | Mean | | Variance | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Statistic | Std. Error | | Statistic | Statistic |
| Attitudes | 280 | 9 | 38 | 5827 | 20.8107 | 0.37615 | 39.616 | 0.491 | -0.438 |
| Commitment | 280 | 2 | 10 | 1628 | 5.8143 | 0.13626 | 5.198 | 0.269 | -0.885 |
| Complexity | 280 | 3 | 15 | 2110 | 7.5357 | 0.17446 | 8.522 | 0.505 | -0.528 |
| Training | 280 | 2 | 10 | 1493 | 5.3321 | 0.14168 | 5.62 | 0.503 | -0.772 |
| Strategy | 280 | 1 | 5 | 504 | 1.8 | 0.06328 | 1.121 | 1.739 | 2.695 |
| Support | 280 | 1 | 5 | 690 | 2.4643 | 0.07687 | 1.655 | 0.853 | -0.451 |
| Impact | 279 | 5 | 24 | 3526 | 12.638 | 0.27177 | 20.606 | 0.479 | -0.532 |
| Management | 280 | 8 | 31 | 5132 | 18.3286 | 0.33688 | 31.777 | 0.089 | -0.783 |
| Trialability | 280 | 2 | 10 | 1254 | 4.4786 | 0.11855 | 3.935 | 0.629 | -0.379 |
| Satisfaction | 280 | 3 | 15 | 1992 | 7.1143 | 0.17754 | 8.826 | 0.546 | -0.601 |
| Barriers | 280 | 7 | 35 | 5119 | 18.2821 | 0.35166 | 34.626 | 0.295 | -0.206 |

Attitude had the highest mean (aggregate scores) meaning that the construct has more factors that were significant. Variability high means were not the same but varied from negative to positive.

## 5.14 CORRELATION MATRIX

The correlation coefficients as shown in Table 5.19 indicate the strength of the relationships between the constructs. If two constructs are correlated, it means that there exists a definable relationship. Significant correlations are indicated by stars, two stars meaning that the constructs are significantly correlated at 0.001 and one star meaning significant correlation at 0.05. Most of the calculated correlation coefficients were positive and significant indicating that when one construct goes up the other construct also behaves in the same direction, while negative correlations indicated that when one construct moves up or down the other construct moves in the opposite direction. Attitudes to the use of e-learning platforms or facilities significantly influenced most of the constructs namely commitment, complexity, training, strategy, support, management and trialability as the correlation coefficients were significant at 0.001. Very few constructs were not significantly correlated namely, strategy and commitment, strategy and training, strategy and commitment, strategy and training, support and commitment, support and complexity, support and training. Furthermore, only impact and strategy as well as

trialability and strategy were negatively correlated. In general, significant correlations existed between the major constructs which were used to assess the use of e-learning platforms.

**Table 5.19: Correlation matrix**

| | Attitudes | commitment | complexity | training | strategy | support | impact | management | trialability | satisfaction | barriers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Attitudes** | 1.000 | | | | | | | | | | |
| **Commitment** | 0.304** | 1.000 | | | | | | | | | |
| **Complexity** | 0.528** | 0.363** | 1.000 | | | | | | | | |
| **Training** | 0.319** | 0.279** | 0.460** | 1.000 | | | | | | | |
| **Strategy** | 0.360** | 0.081 | 0.318** | 0.098 | 1.000 | | | | | | |
| **Support** | 0.175** | 0.058 | 0.051 | 0.029 | 0.158** | 1.000 | | | | | |
| **Impact** | 0.025 | 0.175** | 0.140* | 0.175** | 0-0.027 | 0.280** | 1.000 | | | | |
| **Management** | 0.345** | 0.067 | 0.254** | 0.194** | 0.161** | 0.279** | 0.459** | 1.000 | | | |
| **Trialability** | 0.421** | 0.109 | 0.272** | 0.221** | -0.031 | 0.049 | 0.122* | 0.302** | 1.000 | | |
| **Satisfaction** | 0.563** | 0.205** | 0.445** | 0.309** | 0.144* | 0.076 | 0.106 | 0.337** | 0.398** | 1.000 | |
| **Barriers** | 0.434** | 0.557** | 0.724** | 0.575** | 0.171** | 0.075 | 0.258** | 0.320** | 0.362** | 0.557** | 1.000 |

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

A one sample t-test was conducted to test the differences in mean score of continuous-level (interval or ratio), normally distributed aggregated score of the established constructs. It was used to compare the mean of a single sample: students expressing their varied views about e-learning platforms in universities. The test was based on the null hypothesis that the views of students are the same in all the constructs. In the table above the corresponding probability values of all the calculated t-values of all constructs are less than 0.05, this entails that the null hypothesis was rejected in favour of the alternative hypothesis and the conclusion was that the views of students across constructs was different (Table 5.20).

**Table 5.20: Hypothesis testing**

| | T | Df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| **Attitudes** | 55.326 | 279 | 0.000 | 20.811 | 20.070 | 21.551 |
| **Commitment** | 42.672 | 279 | 0.000 | 5.814 | 5.546 | 6.083 |
| **Complexity** | 43.195 | 279 | 0.000 | 7.536 | 7.192 | 7.879 |
| **Training** | 37.635 | 279 | 0.000 | 5.332 | 5.053 | 5.611 |
| **Strategy** | 28.446 | 279 | 0.000 | 1.800 | 1.675 | 1.925 |
| **Support** | 32.057 | 279 | 0.000 | 2.464 | 2.313 | 2.616 |
| **Impact** | 46.503 | 278 | 0.000 | 12.638 | 12.103 | 13.173 |
| **Management** | 54.407 | 279 | 0.000 | 18.329 | 17.665 | 18.992 |
| **Trialability** | 37.779 | 279 | 0.000 | 4.479 | 4.245 | 4.712 |
| **Satisfaction** | 40.072 | 279 | 0.000 | 7.114 | 6.765 | 7.464 |
| **Barriers** | 51.988 | 279 | 0.000 | 18.282 | 17.590 | 18.974 |

## 5.15 LINEAR MODEL

The overall relationship between the attitudes of students was summarized using a general linear model (Table 5.21). Attitude of students was regarded as the dependent variable which depends on commitment, complexity, training, strategy, support, impact, management, trialability, satisfaction and barriers. The model estimated intercept coefficient was 4.19879, and the estimates of most of the independent variables were positives between 0 and 1 except impact and barriers which indicated a negative impact on the attitude of students. The coefficient t-value measured the standard deviations of coefficient estimates from 0. As a rule of

thumb, it is expected to be far away from zero as the decision will lead to the rejection of the null hypothesis. As indicated in the above table, the t-statistic values are relatively far away from zero and are large relative to the standard error, which could indicate a relationship exists. In general, t-values were also used to compute p-values. All the computed t-values were less than the standard measure 0.05, and this implies a strong significant relationship between the dependent variable and independent variables. The relationship can be summarized as follows:

$$attitudes = 4.19879 + 0.65728 * commitment + 0.70447 * complexity + 0.28357 * training + 1.16886 * strategy + 0.46502 * support - 0.21533 * impact + 0.17359 * management + 0.73528 * triability + 0.75493 * satisfaction - 0.35139 * barriers$$

**Table 5.21: Linear model**

| Attitude Model | Estimate | Std. Error | t-value | Pr(>\|t\|) | Sig. |
|---|---|---|---|---|---|
| **(Intercept)** | 4.19879 | 1.19503 | 3.514 | 0.001 | *** |
| **Commitment** | 0.65728 | 0.1369 | 4.801 | 0.000 | *** |
| **Complexity** | 0.70447 | 0.1316 | 5.353 | 0.000 | *** |
| **Training** | 0.28357 | 0.13051 | 2.173 | 0.031 | * |
| **Strategy** | 1.16886 | 0.26066 | 4.484 | 0.000 | *** |
| **Support** | 0.46502 | 0.20994 | 2.215 | 0.028 | * |
| **Impact** | -0.21533 | 0.06593 | -3.266 | 0.001 | ** |
| **Management** | 0.17359 | 0.05599 | 3.101 | 0.002 | ** |
| **Trialability** | 0.73528 | 0.14464 | 5.083 | 0.000 | *** |
| **Satisfaction** | 0.75493 | 0.10846 | 6.961 | 0.000 | *** |
| **Barriers** | -0.35139 | 0.08397 | -4.185 | 0.000 | *** |

# CHAPTER 6: DISCUSSION

## 6.1 INTRODUCTION

The purpose of this chapter is to discuss the findings that were presented in the preceding chapter. In research, a discussion is necessary to explain the meaning or implications of the findings that have been presented. The discussion will be in line with the objectives of the study.

## 6.2 DEMOGRAPHICS

As indicated by the findings, the overall response rate was above 75% which, as suggested by Adams, Dove and Leedy (1984), is an adequate response rate that is able to present sufficient findings for any study. It was noted among the student population that there were more male students than female students studying at the two public universities. This showed that more male students make it to university than their female counterparts. Of note was that most university students fall in the 21 to 30 years age group.

In addition, the demographics indicated that there were older HODs compared to younger ones at the two public universities. The respondents indicated that older lecturers were most unlikely to accept change brought about by e-learning. The results also showed that most of the student respondents attended schools in rural areas where there was inadequate ICT infrastructure. This had a bearing in the way the students responded to questions. According to Clark and Mayer (2016), the background of an individual can make it difficult to adapt to technological changes easily; thus, it is advisable that rural schools should be equipped in terms of technology and other ICT related services. The results also indicated that most student respondents started to use e-learning platforms only when they reached university. Therefore, it is advisable for better preparedness, that students start to use e-learning platforms in particular and ICTs in general as early as kindergarten or primary school so that they develop the required skills before they enrol for higher education. Social safety nets should be put in place to support female learners especially in the early days of university education. Implementation of programs

such as peer education, gender and masculinity could go a long way in reducing the vulnerability of this group.

## 6.3 TO IDENTIFY E-LEARNING PLATFORMS, RESOURCES, AND INFRASTRUCTURE THAT EXIST IN PUBLIC UNIVERSITIES IN ZIMBABWE

Research findings implied that the UZ and ZOU use an open-source learning management system called Claroline as their e-learning platforms. The two public universities, after customizing the open-source learning management systems, named them as TSIME (UZ), and MYVISTA (ZOU). This practice of customising the learning platforms by giving the platforms local names was supported by Chitanana (2008) who states that such a practice creates a spirit of ownership of the LMS among users. This was also evidenced by the fact that when both students and HODs were asked to name the e-learning platform that they were using all the respondents recalled the names of their e-learning platforms, TSIME or MYVISTA. This is in line with Chitanana (2008) who states that one advantage of giving e-learning platforms local names is that users can easily recall the local names when asked. This type of identification is important as it informs the level of uptake of technologies in the teaching and learning ecosystem.

Generally, in the two universities, the state of infrastructure was described as poor and in a state of disrepair. Most of the equipment being used was old and obsolete. The UZ IT Director argued that it is not correct to call it infrastructure but consumables. According to the UZ ICT Director, it is difficult to replace these consumables because of shortage of money especially foreign currency. Connectivity was poor and the bandwidth, though adequate, was affected by poor national infrastructure. Wi-Fi coverage at the two institutions was said to be modest. These results are consistent with findings from studies on the state of internet connectivity in public universities conducted by Govender and Chitanana (2016). The data collected from this study showed limited development of e-learning infrastructure in universities. The laboratories were generally ill-equipped, and students had to bring their own laptops to augment what the university was making available to them, which improved the computer to student ratio.

## 6.4 TO ESTABLISH THE EXTENT TO WHICH E-LEARNING PLATFORMS HAVE BEEN IMPLEMENTED IN THE PROCESSES OF TEACHING AND LEARNING IN ZIMBABWEAN PUBLIC UNIVERSITIES

One of the objectives of the study was to establish the extent to which e-learning platforms have been implemented in the process of teaching and learning in Zimbabwean universities. The research findings indicated that e-learning platforms have been implemented to a great extent as most of the students indicated that they make an effort to use the e-learning platforms. They were interested and wished to know more about such platforms. All the courses they were studying had an online component. Students had access to computers at faculty level which they used to upload assignments and interact with their teachers and peers. Lecturers were making use of smart boards in teaching. The research findings also indicated that lecturers and HODs were now making use of e-learning platforms in marking and posting assignments. Further, most of the respondents indicated that they were committed to using ICTs. Research findings indicated that there were concerted efforts to improve ICT infrastructure by management to support the deployment of technology in the teaching and learning process.

The research findings indicated that there was financial support for the procurement of ICTs and related software as a way of transforming teaching and learning. The only challenge which was cited was the unavailability of foreign currency as most of the ICT equipment was imported. Students were playing a major role by bringing their own computers to augment university ICT provisions. One of the issues that emerged was that some lecturers, especially the older ones, did not trust e-learning as an alternative to face-to-face teaching and other traditional modes of teaching.

In order to investigate the extent to which e-learning platforms have been implemented, the researcher asked the participants about the impact of e-learning processes. Research findings indicate that e-learning has impacted positively on the learning processes as this was evidenced by the majority of the respondents citing that the system had improved the way lecturers teach and learners learn. With 50% of assignments now being submitted online, efficiency had improved, and

registration was easy through online registration. Some of the respondents indicated that failure to use the platform would result in poor grades or total failure as most of the notes and course content were available online.

## 6.5 TO ANALYSE THE KEY E-LEARNING ATTITUDES AND PERCEPTIONS EXPRESSED BY LECTURERS, STUDENTS AND ADMINISTRATORS THAT AFFECT THE LEVEL OF UPTAKE OF E-LEARNING INNOVATIONS SUCH AS LMS IN PUBLIC UNIVERSITIES

The study sought to analyse the key e-learning attitudes and perceptions expressed by lecturers, students and administrators that affect the level of uptake of e-learning innovations. To a large extent the results show that e-learning has transformed the two institutions of higher learning in Zimbabwe that were the subject of study, as this was indicated by most of the respondents who noted that e-learning had transformed the way they learned and taught. This finding concurs with a study by Majoni (2014) who observed that e-learning has changed the way universities function and that before e-learning, dissemination of information within the university was difficult. This point is also supported by Aparicio, Bacao and Oliveira (2016) who indicate that the way universities function nowadays has been greatly improved through innovation in technology in the sense that universities have now gone paperless in terms of operations.

However, some of the student respondents stated that e-learning was an impediment to their learning. They indicated that they have little knowledge of e-learning, they had problems with e-learning, and that it wasted their study time. These could be frustrations from users not trained on the system. Some of the respondents also agreed that the classes were too large for e-learning to take place and according to literature this may be because of the lack of adequate learning resources such as internet access points and servers and weak Wi-Fi.

The points raised above are confirmed by Davies (1995) in the TAM model, a product of the behaviourist theory, which says that the propensity to use technology is affected by one's attitude and attitude is a factor of two variables, perceived usefulness and perceived ease of use (Park 2009). The internal factors that this

study found included training and a lack of rewards and these are the same factors identified in the TAM model as perceived usefulness of a technology. The negative attitude perceived by some students who described the e-learning platform as an impediment is confirmed by Davis, Bagozzi, and Warshaw (1989) who defined perceived usefulness as the proposed user's subjective probability that using a computer system will increase their job performance in an organization. Thus, according to TAM, and indeed through these findings, attitude is a key factor in e-learning uptake.

## 6.6 TO IDENTIFY E-LEARNING IMPLEMENTATION STRATEGIES THAT EXIST IN ZIMBABWEAN UNIVERSITIES

The study aimed to identify the e-learning implementation strategies that exist in Zimbabwean universities. The results indicate that one of the strategies that exist in Zimbabwean universities to accelerate implementation and usage of e-learning platforms was making it compulsory to use e-learning platforms for everyone by ensuring that course content and assignments were posted online. This point is supported by Axelsonn (2017) who states that the only approach that makes people appreciate certain things is to make them compulsory. Chitanana *et al.* (2008) conducted a study on the state of e-learning at Universities in Zimbabwe and recommended that all e-learning platforms should be made compulsory for everyone in the university because individuals are reluctant to use e-learning platforms if it is not compulsory to use them. This was supported by a study by Leem (2016) who noted that sometimes implementation processes were unsuccessful because authorities leave room for individuals to adopt to technology or not. Making e-learning processes compulsory is one of the effective ways of implementing e-learning.

Another strategy that was found to be helpful is that of training students on how to use e-learning platforms. However, results indicate that most students were not trained for the e-learning platforms. This concurs with findings by Aparicio, Bacao and Oliveira (2016), who stated that training is one of the most effective ways of implementing technology in learning processes. Kisanga and Ireson (2015) conducted a study in Tanzania and found that engaging students in e-learning

training was an effective way to implement e-learning in the education sector in Tanzania. AlHamad (2020) also supported this when he stated that as a first step an institution should identify training needs that can be met with e-learning and then assess how far these training needs are aligned to what the institution needs. Management should make sure that the training is adequate and is done on a continuous basis. As indicated by Chitanana (2012), training is necessary whenever there is change so that individuals can quickly adapt to situations. This shows that one of the most important strategies in the implementation of e-learning is the well-coordinated and continuous training of students and lecturers on how to use e-learning platforms.

One of the major findings from this study is that the respondents highlighted that the organization should be made agile if e-learning is to be effectively adopted. The respondents explained that complex environments which are dynamic require agile processes and therefore the institutions should be receptive to change. This finding is in line with Vovides *et al.* (2007) who observed that one of the e-learning implementation strategies is making an environment suitable for change. According to these authors, educational sectors should be able to make learning environments suitable for change in order for the change process to be implemented successfully. One of the aspects in which the two universities were doing well was the fact that most of the respondents were aware of the strategy for e-learning and this, according to AlHamad (2020), is a key milestone in the implementation of e-learning in the teaching and learning ecosystem. Of note was the existence of an e-learning policy in the two institutions, yet another important milestone in the e-learning value chain. What was lacking was the rollout strategy and clarity in the policies and the fact that some of the respondents were not aware of its existence. The two institutions, however, did not have incentives for the use of e-learning platforms; this should be revisited as Salmon (2014b) in a study on e-learning implementation noted that incorporating rewards associated with use of e-learning platforms had a positive effect in the uptake of such technologies. The two institutions were supporting learners in the procurement of ICT gargets as a strategy for ensuring use of the platforms.

## 6.7 TO ANALYSE THE MAJOR BARRIERS TO E-LEARNING PLATFORMS IMPLEMENTATION IN PUBLIC UNIVERSITIES IN ZIMBABWE

The research findings indicated that lecturers lack time to adopt and implement e-learning as indicated by many respondents. The research findings reflected that the absence of an e-learning policy is also a barrier as most of the students agreed to the assertion that as long as there is no policy on e-learning platform usage, they will not bother to use it. The research findings also indicate that if lecturers continue to give notes to the students and if there are no rewards for participation, they will not use e-learning. The issue of reward also applied to lecturers. This finding is in line with Salmon (2005) who argued that the reason why most lecturers in universities do not embrace innovative teaching methods is that these are never tied to promotion and tenureship. Lecturers would rather spend time publishing rather than improving or infusing new teaching methods. Thus, it is critical that management considers the issue of rewards to support the successful uptake of e-learning.

Further, the research findings indicated that inadequate timing of the training and inadequate training on e-learning activities is also a barrier. This finding affirms what has been observed by various authors (Sanchez and Hueros 2010; Zhao and Bryant 2006) who stated that technical support is very important in the use and adoption of learning management systems and that failure to provide it results in frustration. Cheok and Wong (2015) further explain that training must consider the user's specific job performance needs and their job satisfaction; it must convince the users that the new system is worthwhile. The training should be continuous and should make sense. Cheok and Wong (2015) explain that universities must create conditions in which educators can continue to grow and learn as professionals using the e-learning platform. The unavailability of a strategic plan and policy that is clear to both staff and students is also a barrier as most of the respondents strongly agreed that the university strategic plan and policy on e-learning should be clear and available to staff and students. The study findings also reflected that resource unavailability is a barrier as most of the respondents agreed that computers and ICT resources available to lecturers and students are inadequate and unreliable.

Other factors that were identified by the respondents include culture, lack of adequate resources, attitudes, and beliefs. These findings are in line with Keengwe, Onchwari and Wachira (2008) who observed that although the Government of Zimbabwe is committed to implementing ICT in education, the process is hindered by several barriers. The barriers are categorized as external (first order) or internal (second order) (Keengwe, Onchwari and Wachira 2008). According to Snoeyink and Ertmer (2001), first order barriers include lack of equipment, unreliability of equipment, lack of technical support and other resource-related issues. Second-order barriers include both school level factors, such as organizational culture and teacher level factors, such as beliefs about teaching and technology and openness to change.

The study found that lack of infrastructure and resources was a barrier. This is supported by Chitanana (2012) and various authors who point out that Zimbabwe is a developing country that lacks the resources and appropriate infrastructure for implementing ICT in education. The development of the ICT infrastructure in a country is dependent on the availability of a reliable electricity supply. Using up-to-date hardware and software resources is a key feature in the diffusion of technology (Gulbahar 2007), but a rare experience in educational institutions. High-speed internet connection and broad band are also among the prerequisites for integrating ICT into the teaching-learning situation. But unfortunately, internet access is very poor.

A lack of resources was also identified as a problem. It emerged in the study that the UZ was using the Bring Your Own Device (BOYD) policy where students were allowed to bring their own devices to augment the devices that were already there, but not all students have the capacity to buy their own devices. This finding supports findings by Mumtaz (2000) who argues that effective implementation of technology in education systems involves substantial funding which is very hard to manage in developing countries like Zimbabwe, where many people are living below the international poverty line. ICT-supported hardware, software, internet, audio visual aids, teaching aids and other accessories demand huge funds. Mumtaz (2000) stated that many scholars proposed that the lack of funds to obtain the necessary hardware and software is one of the reasons teachers do not use technology in their

classes. Afshari *et al.* (2009) state that efficient and effective use of technology depends on the availability of hardware and software and the equity of access to resources by teachers, students and administrative staff. These costs are in most cases inflated and cannot be provided by most developing countries, including Zimbabwe.

Attitude of both lecturer and student was identified as one of the major barriers to e-learning. This finding aligns with findings by Almusalam (2001) who stated that teachers' attitudes have been found to be major predictors of the use of new technologies in instructional settings. Mumtaz (2000) also states that teachers' beliefs about teaching and learning with ICT are central to integration. To be successful in computer use and integration, teachers need ''to engage in conceptual change regarding their beliefs about the nature of learning, the role of the student, and their role as teacher'' (Niederhauser, Salem and Fields 1999: 157). Thus, the successful use of ICT in classrooms largely depends on teachers' attitudes and beliefs relating to these. Kluever *et al.* (1994) found that attitudes towards computers affect teachers' use of computers in the classroom and the likelihood of their benefiting from training. Less technologically capable teachers who possess positive attitudes towards ICT require less effort and encouragement to learn the skills necessary for the implementation of ICT in their design activities into the classroom. Therefore, teachers who have positive attitudes towards ICT will be disposed positively towards using it in the classroom (Moseley and Higgins, 1999). Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were, therefore, less likely to accept and adapt to technology than those with positive attitudes. They concluded that changing individuals' negative attitudes is essential for increasing their computer skills. Therefore, if teachers want to successfully use technology in their classes, they need to possess positive attitudes to the use of technology. Such attitudes are developed when teachers are sufficiently comfortable with technology and are knowledgeable about its use (Afshari *et al.* 2009).

Another barrier to e-learning adoption identified was lack of knowledge and skills by the lecturers. It emerged that some lectures belong to the baby boomer generation and some started using the computer only in their 50s. These lecturers tend to lack

the required skills and knowledge to use the new technologies. This finding agrees with findings by numerous authors. According to Pelgrum (2001), the success of educational innovations depends largely on the skills and knowledge of teachers. Teachers' lack of knowledge and skills is one of the main hindrances regarding the use of ICT in education both for the developed and underdeveloped countries (Mamun and Tapan 2009; Pelgrum 2001; Ihmeideh, 2009; Williams 1995). Integrating technology in the curriculum requires knowledge of the subject area, an understanding of how students learn, and a level of technical expertise (Morgan 1996). Moreover, it was noted from this study that the lecturers' belief in their computer competence was the greatest predictor of their use of computers in the classroom. Therefore, lack of knowledge regarding the use of ICT and lack of skill on ICT tools and software have also limited the use of ICT tools in the teaching-learning situation in Zimbabwe.

## 6.8 E-LEARNING IMPLEMENTATION FRAMEWORK /MODEL

The study recommends the following model in the implementation of e-learning platforms in teaching and learning ecosystems in public universities in Zimbabwe. This framework is adapted from Omwenga, Waema and Wagacha (2004):

- **Stage 1** Carry out needs and cost benefit analysis.
  This is the consultation stage where all stakeholders must be engaged. Students, lecturers, and university administrators should be engaged for their buy-in. Parents who support the learners materially must also be consulted. Industry, especially those that sale ICTs, must be engaged. Those who provide spectrum must be consulted. Internet service providers should also show commitment in providing affordable broadband. There is a need to compare with best practice.
- **Stage 2** Evaluate current status.
  Establish whether the existing infrastructure and skillset is adequate to drive e-leaning implementation. Budget for the required line items. Training of students and lecturers is key at this stage. Discuss whether the platform should be proprietary or open source. There is a need to discuss backup services i.e., the IT department must be able to give the required support.
- **Stage 3** Establish the fit.

Establish the fit between course content and technology which involves questions such as: Is technology able to deliver the entire course content? Is the course content available to migrate the teaching into an online platform? Establish a committee that evaluates existing content and produces new relevant content.

- **Stage 4** Develop an implementation strategy.
  Make decisions on the rollout of e-learning. Decide which modules can be taught 100% online and which faculties can have blended learning. Establish strategies for user awareness. A committee should be established and its findings should be presented to the university Senate for discussion and adoption.
- **Stage 5** Implementation.
  Implement as per recommendations from stage 4.
- **Stage 6** Validation.
  Carry out a validation exercise after a semester.
- **Stage 7** Review.
  Based on the results obtained in stage 6, sustain the strategy or fine-tune and solve the problems identified. There might be a need to go back to stage 1 as a way of solving problems.
- **Stage 8** Rollout.
  If results obtained in each stage are positive, rollout the implementation.

- Stage 9 Monitoring and Evaluation
  Deploy Monitoring and Evaluation strategies

## 6.9 CHAPTER SUMMARY

This chapter discussed the major findings of the study. The chapter also proposed an e-learning implementation framework based on the research findings. The following chapter will present conclusions and recommendations of the study.

# CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

## 7.1 INTRODUCTION

Results from the research instruments were presented and analyzed in the preceding chapters. The purpose of this chapter is to present conclusions and recommendations based on the findings of the study. The chapter begins by presenting a summary of what was discussed in every chapter and then concludes by presenting areas for further research.

## 7.2 CHAPTER SUMMARIES

Chapter 1 was an introduction to the study. The chapter introduced this research on critical analysis of the implementation of e-learning platforms in public universities in Zimbabwe. Chapter 1 as an introduction to the research gave an overview of the whole study. The main topics were the background of the study and a brief explanation of the impact of technologies such as augmented/virtual learning, wearable computing, mobile applications, cloud computing, social media, big data processing, learning machines, and most recently artificial intelligence and the evolution of the concept of e-learning. The chapter covered the statement of the problem, research objectives, research questions, significance of the study, and provided an overview of limitations and delimitations of the study and organization of the research report.

Chapter 2 was a literature review. In this chapter the researcher reviewed a number of papers related to the study including the historical perspective of e-learning. It also covered learning tools and emerging cutting-edge technologies. E-learning implementation success and failures were surveyed in this chapter. E-Learning, course contents and activities as well as students' interaction in collaborative learning environments were discussed. Theories in line with the study were discussed.

Chapter 3 was part of literature review, and focused on education and ICT infrastructure in Zimbabwe. This part of the literature review discussed the issues of

e-learning and education in Zimbabwe. The chapter reviewed the historical background of the Zimbabwean education ecosystem and how it affects the prevailing systems and policies. The chapter unpacked issues to do with the status of ICTs and examined initiatives taken by the government of Zimbabwe in enhancing e-learning in both the early days of child education and at the tertiary level. The chapter concluded by providing an overview of the state of ICTs in the two public universities under study.

Chapter 4 gave an overview of the research methodologies. The chapter discussed the philosophical foundations of research and their related assumptions. It unpacked topics which included research assumption, research philosophies, epistemological assumptions, ontological assumptions, axiological assumption, research design and methodological choice that underpinned this research which included quantitative and qualitative research methods. It also covered sampling which consisted of population under study, sampling and sample size. A discussion of data collection instruments such as questionnaires and recorded face-to-face in-depth interviews was also proffered in this chapter.

Chapter 5 presented and analyzed the collected data in line with key research questions and objectives. Data was analyzed and presented through tables, charts and graphs and summary analysis.

Chapter 6 discussed the findings that were presented in Chapter 5 by briefly explaining the meaning of each research objective against its outcome.

## 7.3 CONCLUSIONS OF THE RESEARCH

This study was designed to accomplish the research objectives and this section presents the key conclusions of the study in relation to each research objective. The conclusions were as laid out below.

### 7.3.1 Demographics of the respondents

The research findings indicated that in both universities there were approximately twice as many male students as female students. This proportion was also clearly reflected in the student admissions figures. The majority of student respondents were in the 21-to-30-year age group. Most of the students who responded were studying IT related courses. For HODs, 84% of respondents were male and 16% were female, with 82% being above the age of 40. Further, fifty five percent (55%) of the HOD respondents had been in their current position for more than four years. The two IT Directors were over 40 years and had been with their organizations for more than ten years. The two, had been in the current posts for more than five years.

### 7.3.2 E-learning platforms, resources, and infrastructure that exist in public universities in Zimbabwe

It was concluded that there were two e-learning platforms at the UZ which were called Tsime and e-mhare. It was further established that the Tsime e-learning platform was used by lecturers for posting notes and course content for students to access. Students were able to use the same platform to send their assignments to their respective lecturers. It was also concluded that ZOU had one e-learning platform which they called My-Vista which was used by both lecturers and students for posting assignments and submitting assignments respectively. Synchronous e-learning was not prevalent in the two institutions under study due to connectivity problems. The major e-learning infrastructure identified in the two institutions included the generic hardware, software and support systems. These were however outdated and out of sync with technological advancements.

### 7.3.3 Barriers to e-learning implementation in public universities in Zimbabwe

The major findings of the study were that public universities in Zimbabwe have made great strides in implementing e-learning platforms in the teaching and learning ecosystem. The research, however, noted certain factors that were affecting the effective rollout of e-learning in the two public institutions under study. Major barriers

to the implementation of e-learning platforms were identified as: inadequate ICT infrastructure, shortage of foreign currency to upgrade the hardware and software, digital skills gap and general attitude and resistance to change. The study revealed that generally, students were more prepared to use technology than their lecturers. In general, younger lecturers expressed more enthusiasm to infuse technology into the teaching and learning value chain compared to their older counterparts. Other findings were that most lecturers practicing in universities had not undergone basic training on pedagogy and webagogy; lecturers had not produced enough content to migrate 100% of their course content and delivery to online platforms; some students and lecturers still did not trust online learning and preferred blended learning as an alternative. The study further established and concluded that although there were policies on e-learning implementation in the two public universities , monitoring and evaluation mechanisms were not robust and rollout plans were absent.

### 7.3.4 Key e-learning attitudes and perceptions expressed by lecturers, students and administrators that affect the level of uptake of e-learning innovations such as LMS in public universities

It was concluded that e-learning had transformed the way students learn and lecturers teach. Some students and lecturers had positive attitudes while some had negative attitudes towards e-learning platforms. Although most respondents acknowledged that e-learning was good, several students still felt it was an impediment to learning. Such an attitude could be attributed to issues to do with either change management or the frustration associated with poor internet connectivity and unavailability of modern computer hardware and software. Further, it was concluded that students use e-learning platforms to check for assignments, notes and other communication from lecturers. However, while the results showed that most e-learning platforms were user-friendly and made their work much easier, a lot of work needed to be done to reduce the number of users who perceive them as difficult to work with.

It was further concluded that an average number of students prefer blended learning. Moreover, it was concluded that students and lecturers perceive classes

to be too large for e-learning to take place properly. In addition, most of the students indicated that they had little knowledge of e-learning platforms. Older lecturers were generally identified as having a negative attitude towards technology-based learning compared to the lecturers belonging to the younger generation. The content posted on the e-learning platform by lecturers was inadequate to cover all modules.

### 7.3.5 The extent to which-learning platforms have been implemented in the processes of teaching and learning in Zimbabwean public universities

Generally, it was observed that e-learning implementation level was average in the two universities as quite a sizable number of students and lecturers still preferred face-to-face interactions. E-learning usage differed across faculties and departments. The two universities do not have a harmonized approach of delivering e-learning across faculties. E-learning remains an optional method of delivering teaching and administrative services to students. The university staff was however committed to the use of ICTs despite these challenges. Of note was that the internet service was not fast enough and the bandwidth not good enough to support fully fledged online learning on and off campus. The study established that although the two universities had provided for adequate power backup in the case of electricity outages, the internet connection points were not adequate during semester peak periods. The study further established that most lecturers still did not use e-learning platforms to teach, revealing that there are more complex issues that still need to be addressed in order to improve the uptake of e-learning platforms in the teaching and learning process.

### 7.3.6 E-learning implementation strategies that exists in Zimbabwean universities

The two institutions did not have clear strategies on e-learning implementation. However, the results revealed that making it compulsory to use e-learning platforms for everyone, introducing e-learning across the university and faculties, executing a trial run of the system, incorporating e-learning implementation into the strategic plans, rewarding users, and providing systematic training would accelerate the implementation of e-learning platforms in the teaching and learning process.

## 7.4 RECOMMENDATIONS

1. The relevant authorities in public universities should come up with a clear policy on the use of ICTs in teaching and learning. This policy should be accessible to all stakeholders. The policy should be the first step in the creation of a conducive online teaching and learning environment.

2. Central Government should consider assisting universities improve their ICT infrastructure through subsidies and direct financial support.

3. Universities should come together and lobby government for a free internet operating licence that runs on a dedicated free spectrum.

4. Public universities should consider sharing their e-learning platforms so as to achieve economies of scale in the importation of ICT equipment and systems development.

5. Universities should consider giving lecturers monetary and non-monetary incentives for producing e-learning content.

6. Universities should consider developing training programs that improve the uptake of e-learning by students and lecturers.

7. User buy-in in the utilization of e-learning platforms should be sought through surveys and stakeholder engagements before implementation.

8. Government through the regulator POTRAZ should enforce infrastructure sharing among Internet Service Providers operating at learning institutions so as to lower internet costs.

9. Universities should consider capacity building of their lecturers so as to align their skills to the evolving teaching and learning ecosystem.

10. Universities should strive to reward lecturers through the granting of tenure to lecturers who go the extra mile in implementing e-learning in the teaching process.

11. Government should consider coming up with a policy that makes it mandatory for university lecturers to undertake teacher training/pedagogy before practicing.

12. Universities should consider the establishment of fully fledged digital transformation technical hubs where, among other things, e-learning content is developed. These should be staffed by fulltime professors.

## 7.5 Areas for further study

Going forward, academics should take an interest in researching the impact of COVID-19 on e-learning, cybersecurity, and online content development. Such research is likely to unpack contemporary e-learning issues that can inform the development of e-learning policy and strategy in institutions of higher education in Zimbabwe.

# REFERENCES


Adams, L.W., Dove, L.E. and Leedy, D.L. 1984. Public attitudes toward urban wetlands for stormwater control and wildlife enhancement. *Wildlife Society Bulletin* 12(3): 299-303.

Afshari, M., Bakar, K.A., Su Luan, W., Samah, B.A. and Fooi, F.S. 2009. Factors affecting teachers' use of information and communication technology. *International Journal of Instruction*, 2(1): 77-104.

Aggelidis, V.P. and Chatzoglou, P.D. 2012. Hospital information systems: Measuring 101 end-user computing satisfaction (EUCS). *Journal of Biomedical Informatics*, 45(3): 566-579.

Ajzen, I. and Davies, F. 1989. *The theory of planned behavior: organization behavior and human decision processes*. Cambridge, MA: Academic Press.

Akaslan, D. and Law, E.L.C. 2001. E-learning in the science of electricity in higher education in Turkey in terms of environment and energy. *Electrical Engineering*, 577(56): 32312.

Alexander, S. 2001. E-learning developments and experiences. *Education and Training*, 43(4/5): 240-248.

Alexandra, B. and Saunders, M. 2015. Why the epistemologies of trust researchers matter. *Journal of Trust Research*, 5(2): 153-169.

AlHamad, A.Q.M. 2020. Acceptance of E-learning among university students in UAE: A practical study. *International Journal of Electrical & Computer Engineering,* 10(4).

Almusalam, S.N. 2001. Factors related to the use of computer technologies for professional tasks by business and administration teachers at Saudi technical colleges. Doctoral dissertation. Ohio State University.

Anderson, L.W. and Krathwohl, D.R. 2001. *Kerangka landasan untuk pembelajaran, pengajaran, dan asesmen*. Yogyakarta: Pustaka Pelajar.

Angioha, P.U., Omang, T.A., Ishie, E.U. and Iji, M.E. 2020. Employee stressors and wellbeing of healthcare workers in government owned hospitals in Calabar, Nigeria. *Journal of Public Administration*, 2(4): p.20

Ansong, E., Boateng, R., Boateng, S.L. and Anderson, A.B. 2017. The nature of E-learning adoption by stakeholders of a university in Africa. *E-Learning and Digital Media*, 14(4): 226-243.

Aparicio, M., Bacao, F. and Oliveira, T. 2016. An e-learning theoretical framework. *Educational Technology & Society*, 19(1): 292-307.

Asad, M.M., Hussain, N., Wadho, M., Khand, Z.H. and Churi, P.P. 2020. Integration of e-learning technologies for interactive teaching and learning process: An empirical study on higher education institutes of Pakistan. *Journal of Applied Research in Higher Education*, 13(3): 649-663.

Ashcroft, S. and Pereira, C. 2003. *Practical statistics for the biological sciences.* London: Palgrave Macmillian.

Axelsonn R. 2017. Organizing integrated care in a university hospital: application of a conceptual framework. *International Journal of Integrative Care*, 14(2).

Bação, F., Lobo, V. and Painho, M. 2004. Geo-self-organizing map (Geo-SOM) for building and exploring homogeneous regions. In: Egenhofer, M.J., Freksa, C. and Miller, H.J. (eds). *Geographic Information Science. GIScience. Lecture Notes in Computer Science*, vol 3234. Berlin: Springer.

Bagozzi, R.P. 2007. The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the Association for Information Systems*, 8: 244-254.

Ball, D. and Levy, Y. 2008. Emerging educational technology: Assessing the factors that influence instructors' acceptance in information systems and other classrooms. *Journal of Information Systems Education*, 19: 431-444.

Bandura, A. 2009. Cultivate self-efficacy for personal and organizational effectiveness. In Locke, E.A. *Handbook of principles of organization behavior*, 2nd ed. New York: Wiley, 179-200.

Benbasat, I. and Barki, H. 2007. Quo vadis TAM? *Journal of the Association for Information Systems*, 8(4): 211-218.

Bloom, B.S. 1956. Learning for mastery. Instruction and curriculum. Regional Education Laboratory for the Carolinas and Virginia, Topical Papers and Reprints, Number 1. *Evaluation Comment*, 1(2): 2.

Bonga, W.G. and Sithole, R. 2020. Problematic infrastructure factors affecting development in the 21st Century for Zimbabwe. *World Journal of Economics and Finance*, 6(1): 140-149.

Bora, U.J. and Ahmed, M. 2013. E-learning using cloud computing. *International Journal of Science and Modern Engineering,* 1(2): 9-12.

Boyce, C. and Neale, P. 2006. *Conducting in-depth interviews: A guide for designing and conducting in-depth interviews for evaluation input, monitoring and evaluation* Watertown, MA: Pathfinder International.

Bukaliya, R. and Mubika, A.K. 2012. Factors militating against the introduction of computer education in secondary schools. *Journal of Education and Instructional Studies in the World*, 2(3): 56-68.

Carr, W. 1994. *Becoming critical: Education, knowledge and action research*. London: Falmer Press.

Cheok, M.L. and Wong, S.L. 2015. Predictors of e-learning satisfaction in teaching and learning for school teachers. A literature review. *International Journal of Instruction*, 8(1): 75-90.

Chimhangwa, K. 2012. Zimbabwe urged to invest in research. *The Standard*, 14 August.

Chimusoro, S. 2013. The role of ICT in Zimbabwean education. *Daily News*, 13 July 2013: 1-15.

Chiome, C. 2013. *School leadership in a hyper-turbulent environment*. Saarbrucken: Lambert Academic Publishers.

Chirume, S. and Thondhlana, S. 2019. The use of Zimbabwe Open University's MyVista Platform in e-communication, accessing and uploading learning materials, and assessing students' work. *African Educational Research Journal*, 7(1): 1-13.

Chitanana, L. 2012. A constructivist approach to the design and delivery of an online professional development course: A case of the iEarn online course. *International Journal of Instruction*, 5(1): 23-48.

Chitanana, L., Makaza, D. and Madzima, K. 2008. The current state of e-learning at universities in Zimbabwe: Opportunities and challenges. *International Journal of Education and Development*, 4(2): 5-15.

Chomsky, N. 1959. Review of B.F. Skinner's *Verbal behavior*. In: Jakobovits, L.A. and Miron, M.S. eds. *Readings in the psychology of language,* 1967. Upper Saddle River, NJ: Prentice-Hall, 142-143.

Clark, R.C. and Mayer, R.E. 2016. *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. New York, NY: John Wiley.

Clark, R.E. 1983. Reconsidering research on learning from media. *Review of Educational Research*, 53(4): 445-459.

Clarke, D.J. 2002. E-learning: Big bang or steady evolution. *Learning Technologies*, 7.

Cooper, R.B. and Zmud, R.W. 1990. Information technology implementation research: A technological diffusion approach. *Management Science*, 36(2): 123-139.

Cope, B. and Kalantzis, M. 2015. The things you do to know: An introduction to the pedagogy of multiliteracies. In: Cope B. and Kalantzis M. (eds). *A pedagogy of multiliteracies*. London: Palgrave Macmillan.

Costa, C., Alvelos, H. and Teixeira, L. 2012. The use of Moodle e-learning platform: a study in a Portuguese University. *Procedia Technology*, 5: 334-343.

Creswell, J.W. 2009. *Research design: qualitative, quantitative, and mixed methods approaches.* 3rd ed. Thousand Oaks: Sage.

Creswell, J.W. 2013. Steps in conducting a scholarly mixed methods study. Available: https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1047&context=dberspeakers (Accessed 14 August 2019).

Cronje, J.C. 2016. Towards a new definition of blended learning. *The Electronic Journal of e-Learning*, 18(2): 114-121.

Dang, T.C. and Foster, J. 2015. Implementing e-learning in a Vietnamese university: Towards a configurational approach. *Current Issues in Language Planning*, 14(1): 52-72.

Daugherty, M. and Funke, B.L. 1998. University faculty and student perceptions of web-based instruction. *Journal of Distance Education*, 13(1): 21-39.

Davis, F.D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3): 319-340.

De Medio, C., Limongelli, C., Sciarrone, F. and Temperini, M. 2020. MoodleREC: A recommendation system for creating courses using the moodle e-learning platform. *Computers in Human Behavior*, 104: 106168.

Donou-Adonsou, F. 2019. Technology, education, and economic growth in sub-Saharan Africa. *Telecommunications Policy*, 43(4): 353-360.

Evans, N.D. and Le Roux, J. 2015. Modelling the acceptance and use of electronic learning at the University of Zululand. *South African Journal of Libraries and Information Science*, 81(2).

Fabry, D.L. and Higgs, J.R. 1997. Barriers to the effective use of technology in education: Current status. *Journal of Educational Computing Research*, 17(4): 385.

Finch, W.H. and French, B.F. 2018. *Educational and Psychological Measurement*. Abingdon-on-Thames, Oxfordshire, England, Routledge.

Gadzirayi C.T., Bongo P.P., Ruyimbe B., Bhukuvhani C. and Mucheri T. 2016. *Diagnostic study on status of STEM in Zimbabwe*. Bindura, Zimbabwe: Bindura

Garrison, R. and Anderson, T. 2011. *E-learning in the 21st century: A framework for research and practice*. 2nd ed. London: Routledge Falmer.

Garwe, C. 2014. *Quality assurance challenges and opportunities faced by private Universities in Zimbabwe*. Zimbabwe Council for Higher Education.

Geer, J.G. 1988. What do open-ended questions measure? *Public Opinion Quarterly*, 52(3): 365–371.

Ghavifekr, S. and Rosdy, W.A.W. 2015. Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, 1(2): 175-191.

Golafshani, N. 2003. Understanding reliability and validity in qualitative research. *The Qualitative Report*, 8(4): 597-607.

Govender, D.W. and Chitanana, L. 2016. Perception of information and communications technology (ICT) for instructional delivery at a university: From technophobic to technologically savvy. *African Journal of Information Systems*, 8(2).

Graue, C. 2015. Qualitative data analysis. *International Journal of Sales, Retailing & Marketing*, 4(9): 5-14.

Greenagel, F.L. 2002. The illusion of e-learning: Why we are missing out on the promise of technology. League white papers. Phoenix, AZ: League for Innovation in the Community College. Available: https://www.league.org/sites/default/files/private_data/imported/occasional_papers/0802.html

Gulbahar, Y. 2007. Technology planning: A roadmap to successful technology integration in schools. *Computers & Education*, 49(4): 943-956.

Gutiérrez, M., Gregorio-Godoy, P., Pérez del Pulgar, G. and Munoz, L. 2017. A new improved and extended version of the multicell bacterial simulator group. *ACS Synthetic Biology*, 6(8): 1496-1508.

Gvaramadze, I. 2012. Developing generic competences in online virtual education programmes at the university of Deusto. *Campus-Wide Information Systems*, 29(1).

Harrington, D. 2009. *Confirmatory factor analysis*. Oxford: Oxford University Press. doi: 10.1093/acprof:oso/9780195339888.001.0001.

Harrison, A.W. and Rainer, R.K. 1992. The influence of individual differences on skill in end-user computing. *Journal of Management Information Systems*, 9(1): 93-111.

Hudson, P. 2015. Exploring links between pedagogical knowledge practices and student outcomes in STEM education for primary school. *Australian Journal of Teacher Education*, 40(6): 134-147.

Hwang, G.J. and Wu, P.H. 2014. Applications, impacts and trends of mobile technology-enhanced learning: A review of 2008–2012 publications in selected SSCI journals. *International Journal of Mobile Learning and Organisation*, 8(2): 83-95.

Ihmeideh, F.M. 2009. Barriers to the use of technology in Jordanian pre-school settings. *Technology, Pedagogy and Education*, 18(3): 325-341.

Izmerli, Ö, U. and Kurt, A.A. 2001. Basic competencies of instructional technologists. *Procedia Social and Behavioral Sciences*, 1: 998-1002.

Kalantzis, M. and Cope, B. 2010. The teacher as designer: Pedagogy in the new media age. *E-Learning and Digital Media*, 7(3): 200–222. https://doi.org/10.2304/elea.2010.7.3.200.

Kanyongo, G.Y., 2005. Zimbabwe's public education system reforms: Successes and challenges. *International Education Journal*, 6(1): 65-74.

Kasse, J. and Balunywa, W. 2013. *An assessment of e-learning utilization by a section of Ugandan universities: Challenges, success factors and way forward.* International Conference on ICT for Africa, Harare, Zimbabwe, 20-23 February.

Keengwe, J., Onchwari, G. and Wachira, P.2008. Computer technology integration and student learning: Barriers and promise. *Journal of Science Education and Technology,* 17(6): 560-565.

Khairova, V. and Egamberdieva, M.N. 2016. Communicatively developing technology of speech activation of Tatar schools` teachers. *International Journal of Environmental & Science Education*, 11(4): 443-451.

Kisanga, D. and Ireson, G. 2015. Barriers and strategies on adoption of e-learning in Tanzanian higher learning institutions: Lessons for adopters. *International Journal of Education and Development using Information and Communication Technology*, 11(2): 126–137.

Kluever, R.C., Lam, T.C., Hoffman, E.R., Green, K.E. and Swearingen, D.L. 1994. The computer attitude scale: Assessing changes in teachers' attitudes toward computers. *Journal of Educational Computing Research*, 11(3): 251-261.

Konyana, S. and Konyana, E.G. 2013. Computerization of rural schools in Zimbabwe: challenges and opportunities for sustainable development: The case of Chipinge district, south-east Zimbabwe. *African Journal of Teacher Education*, 3(2).

Kop, R. and Fournier, H. 2010. New dimensions to self-directed learning in an open networked learning environment. *International Journal of Self-Directed Learning*, 7(2): 2-20.

Korpelainen, E. 2011.Theories of ICT system implementation and adoption: A critical review. Helsinki: Aalto University. Available: http://lib.tkk.fi/SCIENCE_TECHNOLOGY/2011/isbn9789526041506.pdf (Accessed 29 July 2016).

Lapiņa, I., Caune, J., Gaile-Sarkane, E., Borkus, I. and Ozoliņš, M., 2015, July. Development of managers competence model in dynamic environment. In

Proceedings of the 19th World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI 2015) (Vol. 2, pp. 219-224).

Le, P.B. and Lei, H 2008. The mediating role of trust in stimulating the relationship between transformational leadership and knowledge sharing processes. *Journal of Knowledge Management*, 22(3): 521-537.

Lee J.W and Becker, K. 2012. Causal relationship between information communications technology and economic growth in European countries. *Journal of Euromarketing*, 21(1): 25-35.

Leem, J.H., 2016. Teaching and learning strategies for flipped learning in higher education: A case study. *Journal of Educational Technology*, 32(1): 165-199.

Legendre, P. 2005. Species associations: The Kendall coefficient of concordance revisited, *Journal of Agricultural, Biological, and Environmental Statistics*, 10(2): 226-245. doi: 10.1198/108571105X46642.

Loveless, A., 2011. Technology, pedagogy and education: reflections on the accomplishment of what teachers know, do and believe in a digital age. *Technology, Pedagogy and Education*, 20(3): 301-316.

Majoni, C. 2014. Challenges facing university education in Zimbabwe. *Greener Journal of Education and Training Studies*, 2(1): 20-24.

Makokha, G. and Mutisya, D. 2016. Status of e-learning in public universities in Kenya. *The International Review of Research in Open and Distributed Learning*, 17(3).

Mamun, A. and Tapan, S.M. 2009. Using ICT in teaching-learning at the polytechnic institutes of Bangladesh: Constraints and limitations. *Teacher's World Journal of Education and Research*, 33-34: 207-217.

Maxfield, M.G. and Babbie, E.R. 2014. Research methods for criminal justice and criminology. Stamford, CT: Cengage Learning.

Mayes, T. and De Freitas, S. 2004. *Review of e-learning theories, frameworks and models*. London: Joint Information Systems Committee.

Mayes, T. and de Freitas, S. 2007. Learning and e-learning: The role of theory. In: Beetham, H. and Sharp, R. eds. *Rethinking pedagogy for a digital age: Designing and delivering e-learning.* Abingdon: Routledge.

McConnell, D. 2018. E-learning in Chinese higher education: the view from inside. *Higher Education*, 75(6): 1031-1045.

Mena-Guacas, A.F. 2020. Interaction through mobile technology in short-term university courses. *Heliyon*, 6(2), p.e03287.

Ministry of Finance and Economic Development (2015). National Budget Statement. Available at: https://www.parlzim.gov.zw (Accessed: 9 January 2019).

Ministry of Finance and Economic Development. 2018. National Budget Statement. Available at: https://www.parlzim.gov.zw (Accessed: 9 January 2019).

Ministry of Higher and Tertiary Education (2018). The doctrine for the modernization and industrialization of Zimbabwe through education, science and technology development to achieve Vision 2030. Available: http://www.mhtestd.gov.zw/ (Accessed 15 July 2019).

Ministry of ICT Courier Services. 2016. Zimbabwe National ICT Policy. Available at http://www.ictministry.gov.zw/ (Accessed 9 August 2020)

Mitev, N.N. and March, A.E. 1998. Small businesses and information technology: Risk, planning and change. *Journal of Small Business and Enterprise Development*, 5(3): 228-245.

Mohamed, J.M. and Willis, O. 2014. Strategic model of implementing e-learning. *International Journal of Scientific and Technology Research*, 3(5): 235-236.

Morgan T. 1996. Using technology to enhance learning: Changing the chunks. *Learning and Leading with Technology*, 23(5): 49-51.

Moseley, D. and Higgins, S. 1999. *Ways forward with ICT: Effective pedagogy using information and communications technology for literacy and numeracy in primary schools*. London: Teacher Training Agency.

Mulwa, A.S., Kyalo, D.N., Matula, D.P. and Ndaita, J. 2015. *Bridging the digital divide in secondary schools in Kenya: A critical analysis of personal characteristics of principals, teachers and students on readiness to adopt e-learning in secondary schools in Kitui County*. Kenyatta University. Kenya. Available: http://ir-library.ku.ac.ke/handle/123456789/12755

Mumtaz, S. 2000. Factors affecting teachers' use of information and communications technology: A review of the literature. *Journal of Information Technology for Teacher Education*, 9(3): 319-342.

Musiyandaka, D., Ranga, G. and Kiwa, J.F. 2013. An analysis of factors influencing success of ICT4D projects: a case study of the Schools Computerisation Programme in Mashonaland West Province, Zimbabwe. *The Journal of Community Informatics*, 9(4): 1-4.

Nemoto, T. and Beglar, D. 2014. Likert-scale questionnaires. In: Sonda, N. and Krause, A. eds. *ALT2013 Conference Proceedings*. Tokyo: JALT, 1-8.

Niederhauser, D.S., Salem, D.J. and Fields, M. 1999. Exploring teaching, learning, and instructional reform in an introductory technology course. *Journal of Technology and Teacher Education*, 7(2): 153-172.

Okocha, F.O. and Adibi, A.V. 2020. Mobile banking adoption by business executives in Nigeria. *African Journal of Science, Technology, Innovation and Development*, 12(7): 847-854.

Omwenga, E., Waema, T. and Wagacha, P. 2004. A model for introducing and implementing e-learning for delivery of educational content within the African context. *African Journal of Sciences and Technology*, 5(1): 35-48.

Pelgrum, W.J. 2001. Obstacles to the integration of ICT in education: Results from a worldwide educational assessment. *Computers & Education,* 37: 163-178.

Picciano, A.G. 2017. Theories and frameworks for online education: Seeking an integrated model. *Online Learning*, 21(3): 166-190.

Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) (2018). Abridged Postal & Telecommunications. Sector Performance Report. Available https://potraz.gv.zw (Accessed 15 March 2019).

Radhakrishna, R.B. 2007. Tips for developing and testing questionnaires/instruments. *Journal of Extension*, 45(1).

Rahim, A., Ali, S., Ali, S. and Fayyaz, H. 2020. Online education during Covid-19 Pandemic: an experience of Riphah International University Faculty of Health and Medical Sciences. *Pakistan Armed Forces Medical Journal*, 70(2): 506-512.

Rizvi, Y.S. and Nabi, A. 2021. Transformation of learning from real to virtual: an exploratory-descriptive analysis of issues and challenges. *Journal of Research in Innovative Teaching & Learning,* 14(1): 5-17.

Rogers, P.C., Graham, C.R. and Mayes, C.T. 2007. Cultural competence and instructional design: Exploration research into the delivery of online instruction cross-culturally. *Educational Technology, Research and Development*, 55(2): 197-217.

Romiszowski, A.J. 2007. How's the e-learning baby? Factors leading to success or failure of an educational technology innovation. *Educational Technology*, 44(1): 5-27.

Ruhode, E., Owei, V. and Maumbe, B.M. 2008. Arguing for the enhancement of public service efficiency and effectiveness through e-government: The case of Zimbabwe. In: *IST-Africa Conference Proceedings*. Windhoek, Namibia. 7-9 May 2008, 1-13.

Salmon, G. 2002. *E-tivities: the key to active online learning*. London, Taylor & Francis.

Salmon, G. 2005. Flying not flapping: A strategic framework for e-learning and pedagogical innovation in higher education institutions. *ALT-j Research in Learning Technology*, 13(3): 201-218.

Salmon, G. 200b. *E-moderating: the key to teaching and learning online*. 2nd ed. London: Routledge.

Salmon, G. 2014b. Learning innovation: A framework for transformation. *European Journal of Open, Distance and E-Learning*, 17(2): 219-235.

Salmon, P. 2014a. Application of blended learning in accounting: A comparative analysis of different degrees in higher education. *Revista De Education*, 360: 461-482.

Sanchez, R.A. and Hueros, A.D. 2010. Motivational factors that influence the acceptance of Moodle using TAM. *Computers in Human Behavior*, 26(6): 1632-1640.

Sangrà, A., Vlachopoulos, D. and Cabrera, N. 2012. Building an inclusive definition of e-learning: An approach to the conceptual framework. *The International Review of Research in Open and Distributed Learning*, 13(2): 145-159.

Saunders, M., Lewis, P. and Thornhill, A. 2009. *Research methods for business students.* 5th ed. London: Pearson Education.

Schade, A. 2015. Pilot testing: Getting it right (before) the first time. Available: https://www.nngroup.com/articles/pilot-testing/

Sharjeel, M.Y., Haider, S. and Aslam, M. 2020. Pragmatic perspectives of Hofstede's organizational dimensions in the context of ICT-based culture: evidence from public universities in Pakistan. *International Journal of Distance Education and E-Learning*, 6(1): 130-148.

Schreiber, J.B. 2006. Reporting structural equation modeling and confirmatory factor analysis results: A review. *Journal of Educational Research,* 99(6): 323-338. doi: 10.3200/JOER.99.6.323-338

Salkind, N. (d. 2012. Coefficient of concordance In: *Encyclopedia of Research Design*. doi: 10.4135/9781412961288.n55

Sharifov, M. and Mustafa, A.S., 2020. Review of prevailing trends, barriers and future perspectives. *The Online Journal of New Horizons in Education*, July, 10(3).

Sheets, D.J., Bradley, D.B. and Hendricks, J. (eds). *Enduring questions in gerontology*. New York: Springer.

Shizha, E. and Kariwo, M.T. 2011. Impact of colonialism on education. In: Shizha E. and Kariwo M.T. eds. *Education and development in Zimbabwe.* SensePublishers, 13-26. https://doi.org/10.1007/978-94-6091-606-9_2

Siemens, G. 2017. Connectivism. Foundations of learning and instructional design technology. *International Journal of Instructional Technology and Distance Learning*, *2*(1). http://www.elearnspace.org/Articles/connectivism.htm

Simon, M.K. and Goes, J. 2013. Assumption, limitations, delimitations, and scope of the study. Why, when, and how to conduct interviews and focus groups in pharmacy research. *Currents in Pharmacy Teaching and Learning*, 8(4): 509-516.

Siritongtha, J. and Paul, K. 2006. More labour market flexibility for more innovation? Evidence from employer-employee linked micro data. *Research Policy*, 45(5): 941-950.

Snoeyink, R. and Ertmer, P. 2001. Thrust into technology: How veteran teachers respond. *Journal of Educational Technology Systems*, 30(1): 85.

Southern African Regional Universities Association (SARUA). 2010. Rebuilding higher education in Zimbabwe: Implications for regional collaboration. *SARUA Leadership Dialogue Series*, 2(1).

Sun, P.C., Tsai, R.J., Finger, G., Chen, Y.Y. and Yeh, D. 2008. What drives a successful e-learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50(4): 1183-1202.

Tarus, J.K., Gichoya, D. and Muumbo, A. 2015. Challenges of implementing e-learning in Kenya: A case of Kenyan public universities. *The International Review of Research in Open and Distributed Learning*, 16(1). DOI: https://doi.org/10.19173/irrodl.v16i1.1816

Teddlie, C. and Yu, F. 2007. Mixed methods sampling: A typology with examples. *Journal of Mixed Methods Research*, 1(1): 77-100.

Thomas, B., Miller, C., Packham, G. and Jones, W. 2011. Technology diffusion. In: Miller, C., Murphy, l and Thomas, B. eds. *Innovation and small business.* London: Bookboon.

Van Deursen, A., Van Dijk, J. and Helsper, E. 2014. Investigating outcomes of online engagement. *Media@LSE Working Paper Series*, 28.

Van Raaij, E.M. and Schepers, J.J.L. 2008. The acceptance and use of a virtual learning environment in China. *Computers and Education,* 50(3): 838-852.

Venkatesh, V. and Davis, H. 2013. Technology acceptance model 3 and a research agenda on interventions. *Decision Science*, 39(2): 273-312.

Vovides, Y., Sanchez-Alonso, S., Mitropoulou, V. and Nickmans, G. 2007. The use of e-learning course management systems to support learning strategies and to improve self-regulated learning*. Educational Research Review*, 2(1): 64-74.

Wang, H.Y., Liu, G.Z. and Hwang, G.J. 2017. Integrating socio-cultural contexts and location-based systems for ubiquitous language learning in museums: A state of the art review of 2009–2014. *British Journal of Educational Technology*, 48(2): 653-671.

Watkins, C. and Mortimore, P. 1999. Pedagogy: What do we know? In: Mortimore, P. (Ed.). *Understanding pedagogy and its impact on learning*. London: Paul Chapman.

Williams, B. 1995. Factors contributing to successful implementation of computer technology in schools. *Dissertation Abstracts International,* 56(8): 3092.

Xie, H. and Young, Z. 2018. Null effects of perceptual disfluency on learning outcomes in a text-based educational context: A meta-analysis. *Educational Psychology* Review, 30(3): 745-771.

Zengeya, M.A. 2008. Information and Communication Technology (ICT) Skills for Bachelor of Education Degree Students at the University of Zimbabwe:

Implications for University Policy on a Computer Course for Undergraduate Student Teachers. *Zimbabwe Journal of Educational Research,* 20(3). DOI: 10.4314/zjer.v20i3.44061

Zimbabwe Ministry of Information Communication Technology (2016). Zimbabwe National Policy for ICT. Available http://www.veritaszim.net/C (Accessed 10 August 2019).

Zimbabwe National Statistics Agency (2015). Population Projection Thematic Report 2015. Available http://www.zimstat.co.zw/ (Accessed 10 June 2019).

Zimbabwe Council for Higher Education (ZIMCHE) (2020). Available http://www.zimche.ac.zw/ (Accessed 10 August 2020).

# ANNEXURES

## ANNEXURE 1: LETTER OF INFORMATION


**LETTER OF INFORMATION**

**Title of the Research Study:** A critical analysis of the implementation of e-learning platforms at selected Public universities in Zimbabwe.

**Principal Investigator/s/researcher:**

MUNYANYI RICHARD
MBA (MSU) Z'*bwe*, MTech, (DUT) SA, BScEd (UZ) Z'*bwe*,
Dip Ed (UZ) Z'*bwe*

**Co-Investigator/s/supervisor/s**: Professor Balkaran Rishdaw (PhD Management, KZN)

**Brief Introduction and Purpose of the Study:**
This study seeks to investigate the extent to which e-learning has been adopted and implemented in three leading Zimbabwean universities namely, University of Zimbabwe (UZ) and the Zimbabwe Open University (ZOU) in teaching and learning activities. From the findings, the researcher seeks to develop an e-learning implementation model for universities.
The objectives of this research are to:

1 establish the extent e-learning has been implemented in Zimbabwean state universities;
2 identify e-learning implementation strategies that exist in Zimbabwean universities;
3 evaluate challenges associated with e-learning implementation;
4 proffer remedies that can be used to overcome the challenges of e-learning;
5 analyse perceptions expressed by university stake holders towards e-learning;
6 establish the value obtained from e-learning use by state universities in Zimbabwe and

7 establish the views of university staff on the use of technology in teaching and learning.

**Outline of the Procedures:**
The researcher will use quantitative and qualitative methods for data collection. A letter of consent will be sent by the researcher to both respondents and participants requesting them to take part in the study. The study will make use of questionnaires to collect quantitative data and in-depth interviews to collect qualitative data so as to get deeper into the phenomenon of e-learning implementation in public universities in Zimbabwe. Questionnaires will be distributed to students and HODs by the research assistant stationed at each university. The research assistants will randomly distribute the questionnaires and collect them after the lecture (for students) and after a day for HODs. Completed questionnaires should be returned by the research assistant to the researcher by November 2018.Indepth interviews will be conducted in November 2018.The researcher will visit participants(Vice Chancellors, IT Directors and Directors of teaching and learning committees where applicable) to secure interview dates by 30 of November 2018.The researcher will take this opportunity to leave interview guideline semi structured questions so that participants familiarize with the questions in the comfort of their work place 20-40 minutes face-to-face interviews will be conducted in January 2019 with the university administrators namely Vice Chancellors, IT Directors and Directors of teaching and learning committees where applicable. Semi structured interview questions will be used to guide the interview and the sessions would be recorded by an audio tape.
This study shall use concurrent design because of constraints in time and that it is faster than sequential design as universities have periods where they are closed for business. The research shall specifically use concurrent triangulation as e-learning implementation would be studied from the angle of administrators, students and lecturers. The data collected will then be analyzed using qualitative analysis (university administrators) and quantitative techniques (students and lecturers) and combined to come up with deeper interpretations and meanings. Field testing and the Cronbach Alpha test would be used to guarantee validity and reliability of the questions.

**Risks or Discomforts to the Participant:**
There are no anticipated risks from taking part in this research.

**Benefits:**
The results of this study will be communicated to you and may be useful in strategic planning for your institution. The researcher will also benefit by way of publications and attainment of a D-Tech from Durban University of technology (DUT). The results may also be useful in policy formulation by relevant stakeholders.

**Reason/s why the Participant May Be Withdrawn from the Study:**
Participation in this research is absolutely voluntary. If you choose not to participate or withdraw from the study at any time, there will be no penalty.

**Remuneration:** No remuneration will be paid to participants.

**Costs of the Study:** No cost will be incurred by participants

**Confidentiality:**
Confidentiality will be upheld by ensuring that in writing the report, the researcher will not use real names of all research participants and location. Fictitious names will be adopted if it adds value to the publication. All data will be safely kept by DUT. Passwords will be used to secure data.

**Research-related Injury:** Not applicable

**Persons to Contact in the Event of Any Problems or queries**

Please contact the researcher Bindura University of Science Education P Bag 1020, Bindura Zimbabwe Cell phone (+263778194650) Email; rmunyanyi@buse.ac.zw, registryrgmsi@gmail.com my supervisor Durban University of Technology PO Box 1334 Durban,4000 South Africa.Tel +27 31 373 5130 / 082 845 5001662 or the Institutional Research Ethics Administrator Directorate for research and Post Graduate Support Durban university of Technology PO Box 1334 Durban,4000 South Africa. Tel +27 31 373 2375. Complaints can be reported to the Acting Director: Research and Postgraduate Support, Prof C E Napier, P.O BOX 1334 Durban 400 +27 313732577or carinn@dut.ac.za

**ANNEXURE 2: CONSENT FORM**

**CONSENT**

**Statement of Agreement to Participate in the Research Study:** A critical analysis of the implementation of e-Learning platforms within public universities in Zimbabwe.

- I hereby confirm that I have been informed by the researcher, Munyanyi Richard, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____ _____ _____ _____

**Full Name of Participant** **Date** **Time** **Signature / Right Thumbprint**

I, Richard Munyanyi herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Munyanyi Richard
**Full Name of Researcher** **Date** **Date** **Signature**

_____ _____ _____

**Full Name of Witness (If applicable) Date Signature**

_____ _____

_____**Full Name of Legal Guardian (If applicable) Date Signature**

## ANNEXURE 3: REQUEST TO CARRY OUT A STUDY AT ZIMBABWE OPEN UNIVERSITY

Faculty of Management Sciences
Department of Public Management & Economics
PO BOX 1334 Durban, 4000
South Africa

The Registrar
Zimbabwe Open University
PO BOX 8306
Harare, Zimbabwe

26 February 2019

Dear Sir/ Madam

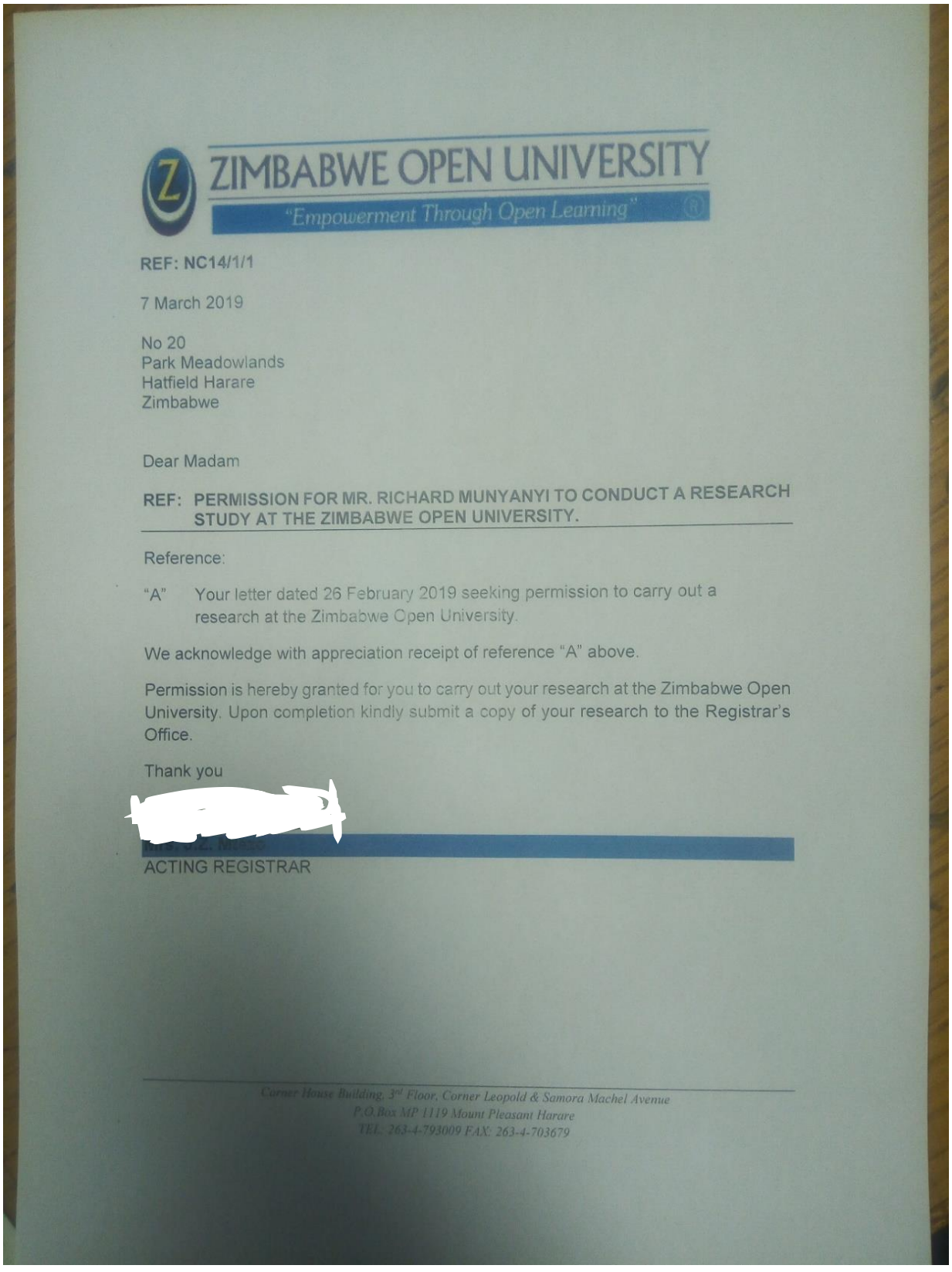
REF: REQUEST TO CARRY OUT A STUDY AT THE ZIMBABWE OPEN UNIVERSITY

My name is Richard Munyanyi a PhD student at Durban University of Technology. My topic reads "a critical analysis of the implementation of E- learning platforms in public universities in Zimbabwe". The study targets 3 state universities namely National University of Science and Technology, Zimbabwe Open Universities and the University of Zimbabwe.

The researcher intends to carry out in-depth interviews with Vice Chancellors, IT Directors and Heads of departments to solicit their views on E- learning implementation using structured questions and recorded interviews. Further, questionnaires will be distributed to students and Heads of Departments to solicit their views on e-learning implementation. Consent will be sought with each participant. The results of the research would be made known to your Institution before publication. Further, the results will be very useful to you as it will inform policy and strategies in Higher education management.

In view of the foregoing, permission is being sought to allow the researcher to conduct this research at your esteemed institution. Please find attached a clearance letter from the gatekeeper (Ministry of Higher and Tertiary Education, Science and Technology Development) granting permission to the researcher to carry out this study.

**ANNEXURE 4: PERMISSION LETTER TO CONDUCT RESEARCH AT ZIMBABWE OPEN UNIVERSITY**



ZIMBABWE OPEN UNIVERSITY

"Empowerment Through Open Learning"

REF: NC14/1/1

7 March 2019

No 20
Park Meadowlands
Hatfield Harare
Zimbabwe

Dear Madam

REF: PERMISSION FOR MR. RICHARD MUNYANYI TO CONDUCT A RESEARCH STUDY AT THE ZIMBABWE OPEN UNIVERSITY.

Reference:

"A" Your letter dated 26 February 2019 seeking permission to carry out a research at the Zimbabwe Open University.

We acknowledge with appreciation receipt of reference "A" above.

Permission is hereby granted for you to carry out your research at the Zimbabwe Open University. Upon completion kindly submit a copy of your research to the Registrar's Office.

Thank you

[redacted]

ACTING REGISTRAR

Corner House Building, 3rd Floor, Corner Leopold & Samora Machel Avenue
P.O.Box MP 1119 Mount Pleasant Harare
TEL: 263-4-793009 FAX: 263-4-703679

## ANNEXURE 5: UNIVERSITY OF ZIMBABWE LETTER OF AUTHORITY TO CONDUCT RESEARCH

P O Box MP 167
Mount Pleasant
Harare, Zimbabwe
General Line: +263-4-303211 Ext 11105
Direct Line: +263-4-303284
Fax: +263-4- 308941
e-mail: registrar@admin.uz.ac.zw
website: www.uz.ac.zw

**From the Registrar**
Dr N A Mutongoreni

**UNIVERSITY OF ZIMBABWE**

1 March 2019

Mr R. Munyanyi
No. 20 Park Meadowlands
Hatfield
**HARARE**

Dear Sir

**RE: APPLICATION FOR AUTHORITY TO CARRY OUT A RESEARCH AT THE UNIVERSITY OF ZIMBABWE**

Your letter dated 26 February 2019 on the above issue refers.

I am pleased to advise that your application for permission to carryout a research at the University of Zimbabwe on E-learning was approved. You are therefore advised to make appointments first with the people whom you need assistance from.

Yours faithfully

**DR N.A. MUTONGORENI**

**REGISTRAR**

/et

## ANNEXURE 6: ETHICAL CLEARANCE LETTER


Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

17 February 2021

Mr R Munyanyi
No 20 Parkmeadolands
Hatfield
Harare
Zimbabwe

Dear Mr Munyanyi

**A critical analysis of the implementation of e-learning platforms at selected public/state universities in Zimbabwe.**
**Ethical Clearance number: IREC 061/18**

The Institutional Research Ethics Committee acknowledges receipt of your Safety Monitoring and Annual Recertification report.

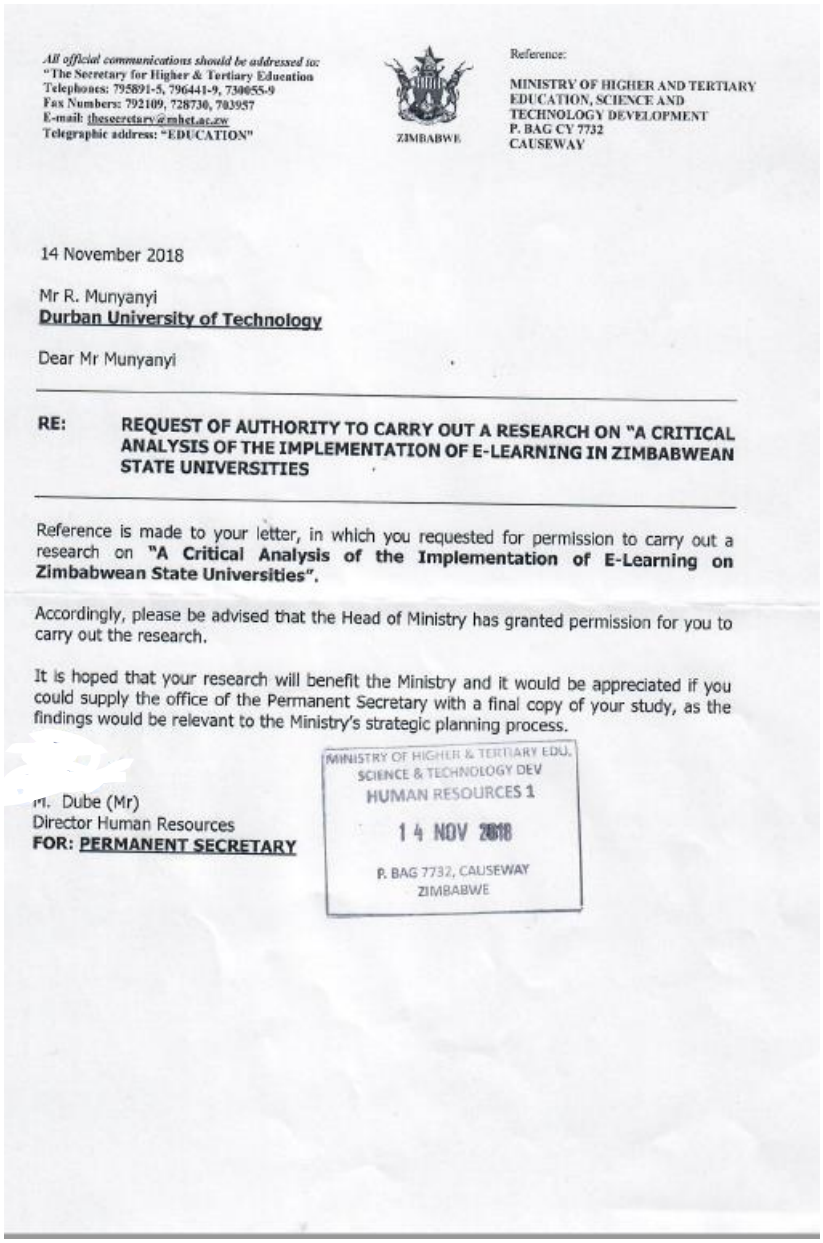
I am pleased to inform you that the study has been approved to continue.

Please note that ethical approval has been extended till **19 October 2021**, if the research is not complete within this time, you will be required to apply for recertification three months before the expiry date.

Yours Sincerely

_____
Professor J K Adam
Chairperson: IREC

## ANNEXURE 7: REQUEST LETTER TO CONDUCT RESEARCH IN ZIMBABWE MINISTRY OF HIGHER AND TERTIARY EDUCATION



*All official communications should be addressed to:*
"The Secretary for Higher & Tertiary Education
Telephones: 795891-5, 796441-9, 730055-9
Fax Numbers: 792109, 728730, 703957
E-mail: thesecretary@mhet.ac.zw
Telegraphic address: "EDUCATION"

ZIMBABWE

Reference:

MINISTRY OF HIGHER AND TERTIARY EDUCATION, SCIENCE AND TECHNOLOGY DEVELOPMENT
P. BAG CY 7732
CAUSEWAY

14 November 2018

Mr R. Munyanyi
**Durban University of Technology**

Dear Mr Munyanyi

**RE: REQUEST OF AUTHORITY TO CARRY OUT A RESEARCH ON "A CRITICAL ANALYSIS OF THE IMPLEMENTATION OF E-LEARNING IN ZIMBABWEAN STATE UNIVERSITIES**

Reference is made to your letter, in which you requested for permission to carry out a research on **"A Critical Analysis of the Implementation of E-Learning on Zimbabwean State Universities".**

Accordingly, please be advised that the Head of Ministry has granted permission for you to carry out the research.

It is hoped that your research will benefit the Ministry and it would be appreciated if you could supply the office of the Permanent Secretary with a final copy of your study, as the findings would be relevant to the Ministry's strategic planning process.

M. Dube (Mr)
Director Human Resources
**FOR: PERMANENT SECRETARY**

MINISTRY OF HIGHER & TERTIARY EDU, SCIENCE & TECHNOLOGY DEV
HUMAN RESOURCES 1
14 NOV 2018
P. BAG 7732, CAUSEWAY
ZIMBABWE

**ANNEXURE 8: STUDENT QUESTIONNAIRE**

# Student Questionnaire

## Dear Sir/Madam

**Kindly participate in this research by completing this anonymous questionnaire. To get an insight into this study, I have attached the letters of consent and information which should be signed and read respectively before participating in this research. By completing this questionnaire you are consenting to take part. Do not write your name or any other information which might be used to identify you.**

---

**Section A Background and Demographics**

1. **Gender** 1. Male ☐
2. Female ☐

2. **Age** 1. Below 20 ☐
2. 21-30 ☐
3. 31 – 40 ☐
4. Over 40 ☐

3. **Marital Status** 1. Married ☐
2. Divorced ☐
3. Single ☐
4. Widowed ☐

4. **Which level are you?** Part 1 ☐
Part 2 ☐
Part 3 ☐
Part 4 ☐

5. **Which program are you doing?**

Sciences ☐
IT ☐
Social Sciences ☐
Arts ☐

Other *(Please indicate)* .....

6. **Which school did you attend for :**

**a)Your primary education?**

1. Rural Boarding ☐
2. Rural Day ☐
3. Urban Boarding ☐
4. Urban Day ☐

Other *(Please indicate)* .....

**b**) **Your Secondary education**

1. Rural Boarding ☐
2. Rural Day ☐
3. Urban Boarding ☐
4. Urban Day ☐

Other *(Please indicate)* .....

7. **At what level did you start using computers for learning**

1. Primary y Education ☐
2. Secondary Education ☐
3. First Year University ☐

Other *(Please indicate)* .....

8. **Do you own a Laptop or computer?**

1. Yes ☐
2. No. ☐

9. **Do you have internet connection at home?**

1. Yes ☐
2. No ☐

10. **a)Name the e-learning platforms you are familiar with**

1.....
2.....
3.....
4.....

b) **Which one are you using at this institution .....**

**Section B**

**Attitudes/towards e-learning implementation**

**11.To what extent do you agree /disagree with following attitudes expressed towards e-learning at your institution.**

| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
|---|---|---|---|---|---|
| 1. E-learning has transformed our institution | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. E-learning has changed the way I learn. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. E-learning is an impediment to my learning. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. I use the e-learning platform to check for assignments, notes and other communication from the lecturer. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. Our e-learning platform is user-friendly and it makes our work easier | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6.I prefer face-to-face sessions with my lecturer opposed to online courses | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| 7.The class sizes are too large for e-learning to take place | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8.I have very little knowledge on e-learning | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9.I have problems with e-learning and it is a waste of my study time | ☐ | ☐ | ☐ | ☐ | ☐ |

10**) Any other issue you may want to raise on attitudes on e-learning and its implementation**

**……**
**……**
**……**

| **Commitment to the use of e-learning platform**<br><br>**12.To what extent do you agree/disagree with the following statements as they relate to your institution** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. I make an effort to use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. I teach others to use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. I am interested and wish to know how the e-learning platform can enhance my learning. | ☐ | ☐ | ☐ | ☐ | ☐ |

4**) Any other issue you may want to raise on commitment to the use of e-learning platform**

**……**
**……**
**……**

| **Complexity of the e-learning platforms**<br><br>**13.To what extent do you agree/disagree with following e-learning platform issues as they relate to your institution** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The system has easy to follow instructions | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Our e-learning platform is straight forward and easy to use. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. I have serious problems to use the platform. | ☐ | ☐ | ☐ | ☐ | ☐ |

**1) Any other issue you may want to raise on the complexity of the e-learning platform**

**……**

**……**

**……**

| **Training of users of e-learning platforms**<br><br>**14.Indicate which of the following statements are applicable to e-learning training at your institution** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. I was trained to use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. The training was adequate. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. The training should be continuous. | ☐ | ☐ | ☐ | ☐ | ☐ |

**2) Any other issue you may want to raise on the training of users**

**on the e-learning platform.**

……
……
……

| **Strategy towards e-learning Implementation**<br><br>**15.In your opinion which of the following statements are applicable to the situation in your institution** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. It is compulsory to use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Some lecturers do not use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. The e-learning platform was introduced across all university faculties. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. I am aware of the university strategy on e-learning. | ☐ | ☐ | ☐ | ☐ | ☐ |

5) **Any other issue you may want to raise on e-learning**

**implementation strategies**

……
……
……

| **Support and use of ICT resources by students**<br><br>**16. Indicate your opinion on the following statements as they relate to you institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The IT department is always available to assist me if I have problems with the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. All courses I take have online components | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. My lecturers encourage me to use internet resources to support my learning | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. I have access to computers in my faculty | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. Lecturers use the smart board to teach in class | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. The computers and internet resources I use support student to student and lecturer to student interactions | ☐ | ☐ | ☐ | ☐ | ☐ |

7**) Any other issue you may want to raise on support and use of ICT resources by students.**

……
……
……
……

**Impact of e-learning**

17.**To what extent do you agree with the following statements made towards e-learning and their related platforms at your institution.**

| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
|---|---|---|---|---|---|
| 1. The system has improved the way lecturers teach and learners learn. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. The e-learning platform has brought efficiency in teaching and learning. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. 50% of assignments are submitted online using the platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. You fail if you cannot use the e-learning platform | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. The platform has made online registration easy | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. The platform is integrated (information on fees, library registration, administrative circulars is available). | ☐ | ☐ | ☐ | ☐ | ☐ |

7) **Any other issue you may want to raise on the impact of**

**e-learning on administrative, teaching and learning processes.**

**……**
**……**
**……**

| **Management Commitment on e-learning use and implementation**<br><br>**18.To what extent do you agree/disagree with the following as they relate to your institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The university staff is committed to the use of ICTs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. The university ICT Infrastructure is continuously improving. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. ICT laboratories are equipped with computers. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. The internet is fast enough and the bandwidth is good. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. The Wi-Fi is always accessible. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. The university assists students to acquire ICT equipment | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. There is back up in the case of electricity outages. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. Internet connection points are adequate | ☐ | ☐ | ☐ | ☐ | ☐ |

**9) Any other issue you may want to raise on management commitment to e-learning use and implementation.**

**……**
**……**
**……**

| **Trialability**<br><br>**19.To what extent do you agree/disagree with the following as they relate to your institution:** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The e-learning platform was put on a trial before use. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. We were given enough time to learn about this platform | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. The trial period was short | ☐ | ☐ | ☐ | ☐ | ☐ |

4) **Any other issue you may want to raise on e-learning trialability**

**……**
**……**
**……**

| **Satisfaction**<br><br>**20.To what extent do you agree/disagree with the following on e-Learning issues** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The e-learning platform is reliable and good. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. The e-learning platform has user Instructions | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. I can no longer learn without this e-learning platform | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| 4. The platform makes me get better grades | ☐ | ☐ | ☐ | ☐ | ☐ |

5**) Any other issue you may want to raise on**

**e-learning satisfaction**

**……**
**……**
**……**
**……**
.

| **Barriers to e-learning implementation**<br>**21. Indicate your opinion on the following statements as they relate to your institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. Lecturers lack time to adopt and implement e-learning | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. As long as there is no policy on the use of e-learning platform I will not bother to use it | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. as long as I get e-learning material from the lecturer, I will not bother looking up for notes on the platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. Rewards for participation in e-learning activities are key | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. Peer evaluation in e-learning is key. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| 6. the university strategic plan and policy on e-learning should be clear and available to staff and students | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. Computers and ICT resources available to lecturers and students are inadequate and unreliable | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. The training on e-learning is badly timed and inadequate | ☐ | ☐ | ☐ | ☐ | ☐ |

**9) Any other issue you may want to raise on barriers to e-learning platforms Implementation**

**.....**
**.....**
**.....**

**ANNEXURE 9: HOD QUESTIONNAIRE**

## Head of Department Questionnaire

**Dear Sir/Madam**

**Kindly participate in this research by completing this anonymous questionnaire. To get an insight into this study, I have attached the letters of consent and information which should be signed and read respectively before participating in this research. By completing this questionnaire you are consenting to take part. Do not write your name or any other information which might be used to identify you.**

---

### Section A: Demographics and Background Information

8. **Gender** 1. Male ☐
2. Female ☐

9. **Age** 1. Below 20 ☐
2. 21-30 ☐
3. 31 – 40 ☐
4. Over 40 ☐

10. **Marital Status** 1. Married ☐
2. Divorced ☐
3. Single ☐
4. Widowed ☐

11. **a)How many modules do you teach in a semester……**

**b) List them:**

**1……**

**2……**

**3……**

**4……**

12. **Which faculty do you belong to** Sciences ☐
Education ☐
Social Sciences ☐
Arts ☐

**Other *(Please indicate)*** **.....**

13. **Which school did you attend for :**

**a)Your primary education?** 1. Rural Boarding ☐
2. Rural Day ☐
3. Urban Boarding ☐
4. Urban Day ☐

**Other *(Please indicate)*** **.....**

**b) Your Secondary education**

1. Rural Boarding ☐
2. Rural Day ☐
3. Urban Boarding ☐
4. Urban Day ☐

**Other *(Please indicate)*** **.....**

14. **At what level did you start Using computers for learning**

1. Primary Education ☐
2. Secondary Education ☐
3. First Year University ☐

**Other *(Please indicate)*** **.....**

**8. Do you own a Laptop or computer?** 1. Yes ☐
2. No. ☐

**9. Do you have internet connection at home?** 1. Yes ☐
2. No ☐

**10. a) Name any e-learning platform you know:**

……

……

……

**b) Which one is in use at this institution?**

**……**

**11. What is the average number of students you teach per course?**

1.<25 ☐

2. 26-50 ☐

3.50-100 ☐

4.101-150 ☐

**Other……**

**12. Do you have any teaching qualification** 1. [No learnt the job]

2. [Yes trained teacher] ☐

3. Other ☐

Specify……

**13 .Which department do you head……**

**14. How long have you been teaching in the university**

A.Less than 1 year ☐

B.1-5 years ☐

C.6-10 years ☐

D. above 10 years ☐

## Section B

| **Attitudes towards e-learning implementation**<br>**15.To what extent do you agree/disagree with the following attitudes Expressed towards e-learning at you institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. E-learning has transformed our institution | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. E-learning has changed the way I teach. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. E-learning is an impediment to my teaching. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. I use E-learning platform to check, post assignments, notes and other communication to students. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. Our e-learning platform is user-friendly and it makes our work easier | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6 .I prefer face-to-face lectures with my students as opposed to online learning | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. The class sizes are too large for e-learning to take place | ☐ | ☐ | ☐ | ☐ | ☐ |

**8) Any other issue you may want to raise on attitudes on e-learning.**

.....

.....

.....

.....

**University commitment to the use of e-learning platform**

**16.To what extent do you agree/disagree with the following statements**

| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
|---|---|---|---|---|---|
| 1. I make an effort to use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | | | | |
| 2. I teach others how to use the e-learning platform | | | | | |
| 3. I always seek to find out how the e-learning platform can enhance my teaching | ☐ | ☐ | ☐ | ☐ | ☐ |

**4) Any other issue you may want to raise on the Commitment to the use of e-**

**learning platform.**

**.....**

**.....**

**.....**

**.....**

| **Complexity of the university e-learning platforms**<br>**17. To what extent do you agree/disagree with the following Statements:** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The system has easy to follow instructions | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Our e-learning platform is straight forward and easy to use. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. I have serious problems to use the platform. | ☐ | ☐ | ☐ | ☐ | ☐ |

**3) Any other issue you may want to raise on e-learning complexity.**

**……**

**……**

**……**

**……**

| **Training**<br>**18.Indicate which of the following statements are applicable to e-learning training at your institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. I was trained to use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |

**3) Any other issue you may want to raise on e-learning platform training.**

……
……
……
……
……
……

| **Strategy towards e-leaning Implementation**<br>**19.In your opinion which of the following statements are applicable to your university.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. It is compulsory to use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Some lecturers do not use the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. The e-learning platform was introduced across all university faculties. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. I am aware of the university strategy on e-learning. | ☐ | ☐ | ☐ | ☐ | ☐ |

**4) Any other issue you may want to raise on e-learning implementation strategies**

……
……
……

| **Support and use of ICT resources by university lecturers**<br>**20.Indicate your opinion on the following as they relate to your Institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The IT department is always available to assist me if I have problems with the platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. All courses I teach have online components | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. I use power point to support my teaching | ☐ | ☐ | ☐ | ☐ | ☐ |

**4) Any other issue you may want to raise on support and use of ICT resources by lecturers.**

**.....**

**.....**

| **Impact of e-leaning**<br><br>**21.To what extent do you agree with the following statements made towards e-learning and their related platforms at your institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The system has improved the way lecturers teach and learners learn. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. The e-learning platform has brought efficiency in teaching and learning process. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. Most of the assignments are submitted online using the platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4.Students fail if they cannot use the learning platform | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5.The platform has made online registration easy | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. The platform is integrated (information on fees, library registration, and administrative circulars is available) | ☐ | ☐ | ☐ | ☐ | ☐ |

**7) Any other issue you may want to raise on the impact of e-learning.**

**……**

**……**

**……**

| **Management Commitment on e-learning use and implementation**<br>**22.To what extent do you agree/disagree with the following as they relate to your institution?** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The university staff is committed to the use of ICTs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. The university ICT Infrastructure is continuously improving. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. ICT laboratories are equipped with computers. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. The internet is fast enough and the bandwidth is good. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. The Wi-Fi is always accessible. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. The university assists students to acquire ICT equipment | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. There is backup in the case of electricity outages. | ☐ | ☐ | ☐ | ☐ | ☐ |

**9) Any other issue you may want to raise on management commitment on e-learning use and implementation**

……

……

| **Trialability**<br>**23. To what extent do you agree/disagree with the following:** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The e-learning platform was put on a trial before use. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. We were given enough time to learn about this platform | ☐ | ☐ | ☐ | ☐ | ☐ |

**3) Any other issue you may want to raise on e-learning platform Trialability**

**……**

**……**

| **Satisfaction**<br>**24 To what extent do you agree/disagree with the following as they relate to your institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. The platform is reliable and good. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. The platform has user Instructions | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| 3. I can no longer teach without this e-learning platform | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. the platform make my work Easier | ☐ | ☐ | ☐ | ☐ | ☐ |

**5) Any other issue you may want to raise on e-learning satisfaction**

**.....**

**.....**

| **Barriers to e-learning implementation**<br>**25.Indicate your opinion on the following statements as they relate to your institution.** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. Lecturers lack time to adopt and implement e-learning | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. As long as there is no policy on the use of e-learning platform I will continue using traditional methods of teaching. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. Production of e-learning material should contribute to promotion and tenure. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| 4. Rewards for participation in e-learning activities are key | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. Peer evaluation in e-learning is key. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. The university strategic plan and policy on e- learning should be clear and available to staff and students | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. Computers and ICT resources available to lecturers and students are inadequate and unreliable | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. The training on e-learning is badly timed and inadequate | ☐ | ☐ | ☐ | ☐ | ☐ |

**9) Any other issue you may want to raise on barriers to e-learning platforms**

**Implementation**

**……**

**……**

| **Teaching strategies**<br>**26.Whats your opinion on the following teaching issues:** | | | | | |
|---|---|---|---|---|---|
| | **Strongly agree** | **Agree** | **Neither** | **Disagree** | **Strongly disagree** |
| 1. I give students activities that make them learn by discovery. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Students should be given notes and attend all my lectures. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| 3. Students should lead in Learning, discussing issues should be allowed to collaborate on the e-learning platform. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. Lecturers should be replaced by this e-learning platform and play a facilitatory role. | ☐ | ☐ | ☐ | ☐ | ☐ |

**5) What other issues would you want to raise on teaching strategies**

.....

.....

.....

.....

**ANNEXURE 10: INTERVIEW GUIDE, IT DIRECTORS**

| Construct/issue | QUESTIONNAIRE QUESTION | INTERVIEW QUESTION |
|---|---|---|
| **Attitude** | **E-learning has transformed institutions of higher learning** | **If yes; How has e-learning changed the way you operate**<br>**If no; how is e-learning an impediment to teaching and learning** |
| | **The e-learning platform has a potential of changing the way universities operate** | **If yes ;to what extent have you infused e-leaning in teaching and learning**<br>**If no; highlight the challenges you have faced in incorporating e-learning in teaching and learning** |
| | **Our current e-learning platform is very user-friendly** | **If yes; Can you tell me the name of the e- learning facility currently in use at this University and how friendly it is**<br>**If no ;why is the e-learning platform not user-friendly** |
| **Commitment** | **We assisted all the lecturers in all departments with the e-learning system** | **If yes; how did you assist lecturers to incorporate and use e-leaning in their work**<br>**If no; what are the problems of the new system and why are you failing to assist lecturers.** |
| **Complexity** | **The e-learning platform is easy to use and learn and students can easily follow** | **If yes; is the e-learning platform simple and straight forward? Can students use it?**<br>**If no ;what is the problem with the current e-learning platform.** |
| **Training** | **I was trained to use the e-earning platform and I could understand the technical and functional features of the system** | **If yes; did you receive adequate training on the e-learning platform at this university**<br>**If no; what are the sticking issues on this system. what do you think should be done** |
| **Implementation** | **The implementation of e-learning at this** | **If yes; how was the e-learning platform** |

| | | |
|---|---|---|
| | **university was systematic and everybody was aware of the strategy** | **implemented, was everyone aware of university policy on the use of ICTs in teaching and learning**<br>**If no; were you satisfied with the level of education given to you about the e-learning platform** |
| **Support** | **The IT staff always assisted me every time I was stuck** | **If yes; How did you handle queries from users who needed help on the system**<br>**If no; what strategies can be put in place to ensure that e-learning users are supported?** |
| **Impact** | **The system has made teaching better** | **If yes; How has e-learning impacted on teaching?**<br>**If no; how can we make e-learning system improve teaching and learning** |
| | **The system has redefined pedagogy** | **If yes; how has e-learning changed teaching methods and methodology**<br>**If no; what strategies can be put in place to infuse e-learning in the traditional teaching methods without disruptions** |
| | **The system brings efficiency in teaching and learning** | **If yes; how has e-learning impacted on your efficiency**<br>**If no; what are the negative issues associated with e-learning** |
| | **Students have shown interest in assignments submitted on line** | **If yes; What percentage of students submit assignments using the e-learning platform**<br>**If no ;how can we make students interested in utilizing the e-learning platform** |
| **Management commitment** | **The Vice chancellor is committed in the use of ICTS as shown in the strategic plans** | **If yes; Is the use of ICTS captured in the university policy and strategic plan**<br>**If no;How do you think the vice chancellor can show commitment so that ICTs** |

| | | |
|---|---|---|
| | | **are infused in teaching and learning by the university community** |
| **Management support** | **The university prioritizes the use of Technology such as e-learning as shown by huge amount of money spent on ICT infrastructure, hardware and software.** | **If yes; In the past five years how has the university improved ICT infrastructure at this university**<br>**If no; What can the university do to ensure that there is an improvement in ICT infrastructure** |
| **Triability** | **The e-learning platform was put on trial before use** | **If yes; was the new system put on trial before use**<br>**If no what were the challenges with the system and how could they have been avoided** |
| | | |
| **Participation** | **All faculty members were allowed to comment on the new system** | **If yes; were all faculty members allowed to comment on the e-learning platform**<br>**If no; How did you incorporate users views on the system** |
| **Satisfaction** | **The e-learning system is very reliable and accurate** | **If yes; Is the e-learning platform reliable**<br><br>**If no; what challenges have been associated with e-learning** |

## ANNEXURE 11: EDITING CERTIFICATE (1)

**DR RICHARD STEELE**
BA, HDE, MTech(Hom)
**HOMEOPATH**
Registration No. A07309 HM
Practice No. 0807524
**Freelance academic editor**
**Associate member: Professional Editors' Guild, South Africa**

110 Cato Road
Glenwood, Durban 4001
031-201-6508/082-928-6208
Postal: P.O. Box 30043, Mayville 4058
Email: rsteele@vodamail.co.za

---

**EDITING CERTIFICATE**

Re: **Richard Munyanyi**
DUT PhD thesis: **A Critical Analysis of the Implementation of e-Learning Platforms at Selected Public/State Universities in Zimbabwe**

I confirm that I have edited this thesis for clarity, language and layout. I edited the references for layout and accuracy. I returned the document to the author with track changes so correct implementation of the changes and clarifications requested in the text and references is the responsibility of the author. I am a freelance editor specialising in proofreading and editing academic documents. My original tertiary degree which I obtained at the University of Cape Town was a B.A. with English as a major and I went on to complete an H.D.E. (P.G.) Sec. with English as my teaching subject. I obtained a distinction for my M.Tech. dissertation in the Department of Homoeopathy at Technikon Natal in 1999 (now the Durban University of Technology). I was a part-time lecturer in the Department of Homoeopathy at the Durban University of Technology for 13 years and supervised many masters degree dissertations during that period.

Dr Richard Steele
**18 February 2021**
*per email*

## ANNEXURE 12: EDITING CERTIFICATE (2)

**DR RICHARD STEELE**
BA HDE MTech(Hom)
**HOMEOPATH**
Registration No. A07309 HM
Practice No. 0807524
**Freelance academic editor**
**Associate member: Professional Editors' Guild, South Africa**

110 Cato Road
Glenwood, Durban 4001
031-201-6508/082-928-6208
Postal: P.O. Box 30043, Mayville 4058
Email: rsteele@vodamail.co.za

---

**EDITING CERTIFICATE**

Re: **RICHARD MUNYANYI**
For editing DUT PhD thesis references, and additional text: **A Critical Analysis of the Implementation of e-Learning Platforms at Selected Public/State Universities in Zimbabwe**

I confirm that I have edited this thesis and the references for clarity, language and layout, after it has been examined and changes have been made. I returned the document to the author with track changes so correct implementation of the changes and clarifications requested in the text and references is the responsibility of the author.

Dr Richard Steele
**2021-11-02**
*per email*

# ANNEXURE 13: PROOF OF REGISTRATION

**PROOF OF REGISTRATION**
**To Whom It May Concern**

05-Mar-2021

It is hereby confirmed that the under mentioned person is a registered student at DURBAN UNIVERSITY OF TECHNOLOGY.

| | | | |
|---|---|---|---|
| **Surname:** | MUNYANYI | **First Names:** | RICHARD |
| **Student Number:** | 21452181 | **Qualification:** | DPPMN1 D PHIL MAN SCIENCES (PUB ADM - PUB MAN) |
| **Registration Year:** | 2021 | **Offering Type:** | Durban Campus Full-time |
| **Block:** | POST-GRAD ANNUAL REGISTRATIONS | **Period of Study:** | Study period 4 |
| **Department:** | PUBLIC MNGT AND ECONOMICS | **Faculty:** | FACULTY OF MANAGEMENT SCIENCES |

| Subject | Description | PreReq/Exp | Block | Class Group | Offering Type | Exam Year | Exam Month | Cancel | Amount |
|---|---|---|---|---|---|---|---|---|---|
| | Registration Fees/Levies P0 POST-GRAD ANNUAL REGISTRATIONS | | | | | | | | 0.00 |
| RSPM641 | RESEARCH (4TH REGISTRATION) | | P0 | A | D1 | 2021 | 11 | N | 0.00 |
| | | | | | | | | Subtotal: | 0.00 |
| | | | | | | | | Total: | 0.00 |

* Subjects with Requisites will be cancelled if the requisite rules are not met in mid-year exams. Refer to Department handbook.

Outstanding Balance: 19300.00

**Please verify and rectify the above registration details with the Faculty Office to avoid academic and financial penalties before the dates published in the General handbook.**

Faculty Officer

**ANNEXURE 14: TURNITIN REPORT**

A Critical Analysis of the Implementation of e-Learning Platforms at Selected Public/State Universities in Zimbabwe

ORIGINALITY REPORT

| 19% | 16% | 8% | 12% |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |