A strategy to Motivate Continued Instructor Usage of Learning Management Systems (LMSs) in Higher Learning Institutions of Zimbabwe

by

Ndukuyenkosi Siwela

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Supervisor: Rudi Harmse

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Abstract

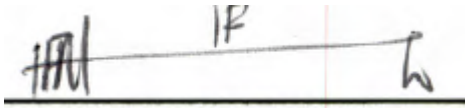
The purpose of this study was to develop a strategy to motivate continued usage of Learning Management Systems in higher learning institutions of Zimbabwe. A related goal was to identify unique challenges experienced by instructors in their use of LMSs. The use of LMSs is now global and has been fairly successful in developed countries even though past research shows that instructors tend to discontinue usage over a period of time. Whereas most LMSs research is carried in the context of the developed world, the candidate demonstrates that Vantankesh's IS Success Model and Davis' Technology Acceptance Model can be successfully replicated into the developing world on condition that local environment is taken into context. The results showed that LMSs in Zimbabwe higher learning institutions hold a promise of success even though challenges exist. The findings have wider implications on the need to invest in neccessary infrustructure and future predictions on learner interests. The study demonstrates that shared success can be achieved if the local conditions are taken into context when developing a strategy to motivate instructor continued LMS usage. The study holds the practical implication that institutions can motivate instructors to continue with usage of LMSs to deliver quality output in their daily duties

Keywords

LMSs (Learning Management Systems), TAM (Technology Acceptance Model), Instructor, e-learning, intention, perception, Usage.

Declaration

In accordance with Rule G5.6.3, I, Ndukuyenkosi Siwela (s218189141) hereby declare that the above-mentioned treatise is my own work and that it has not previously been submitted for assessment to another University or for another qualification.



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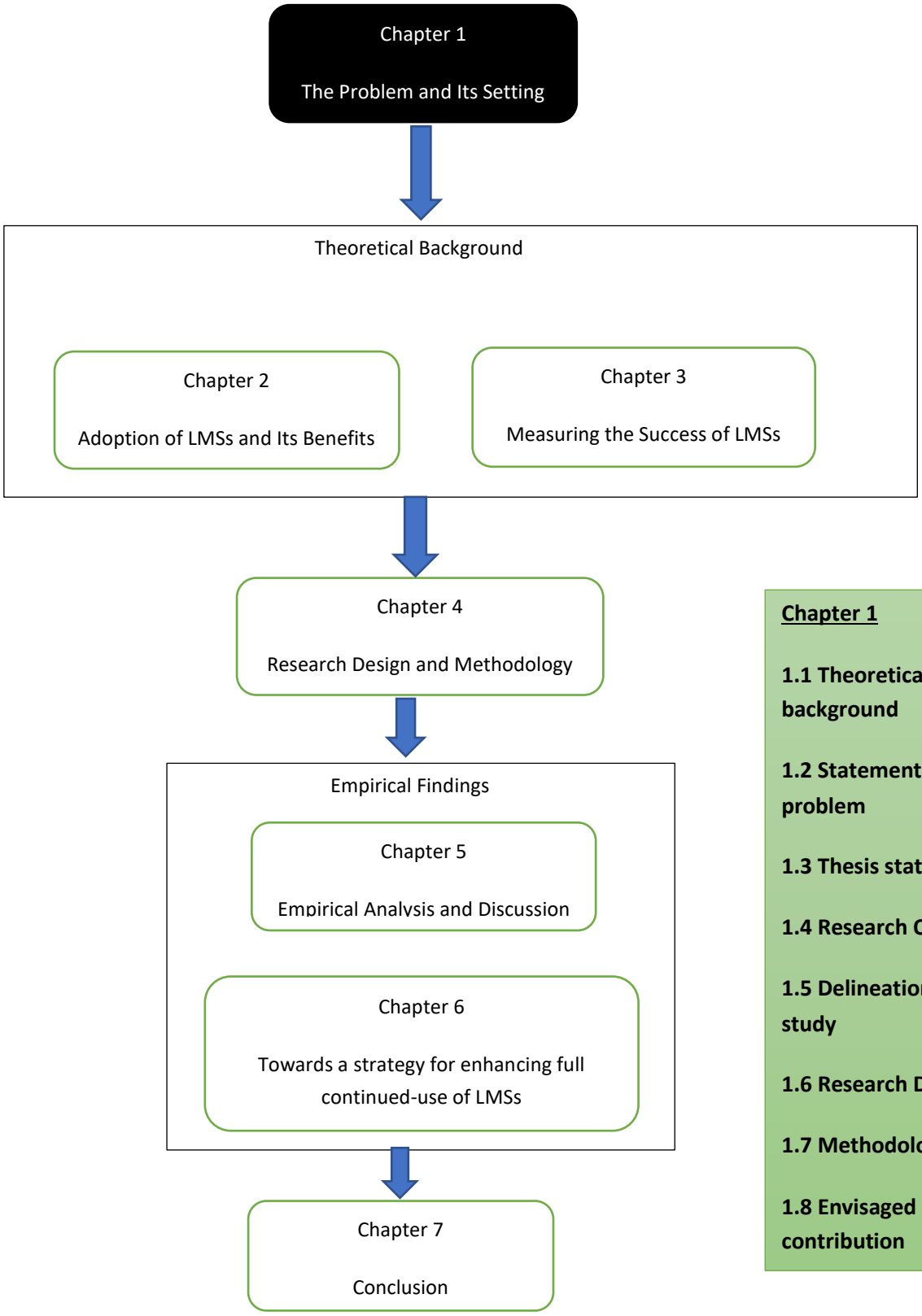
Chapter 1:

The Problem and Its Setting



Chapter 1

1.1 Theoretical background

1.2 Statement of the problem

1.3 Thesis statement

1.4 Research Objectives

1.5 Delineation of the study

1.6 Research Design

1.7 Methodology

1.8 Envisaged contribution

Theoretical Background

1.1 Introduction

Growing demand for tertiary education is compelling tertiary institutions to adopt innovative forms of teaching such as Learning Management Systems (LMSs) (Govindasamy, 2002); (Assareh & Bidokht, 2011). Half of the courses at the top 50 institutions of higher learning in developed economies are either delivered through blended learning or purely online (Ocak, 2011); (Bhuasiri, Xaymoungkhoun, Zo, Jeung, & Ciganek, 2012); (Ngai, 2007); (Taylor & Al-busaidi, 2013). Projections are that more than two thirds of the courses will be delivered purely online in the near future (Raaij & Schepers, 2008). If successfully implemented, LMSs can serve millions of learners in different locations simultaneously. This promise is yet to be fully realised (Lee, Hsieh, & Ma, 2011). This study investigates hindrances to post adoption continued-use of LMSs by instructors at tertiary institutions in the underdeveloped economies.

1.2 Basic Arguments for the project

E-learning tools are ideal in enabling today's education facilitation (Assareh & Bidokht, 2011) and through them, the global goal of education for all can be realised in a short space of time. Tertiary institutions can cope with rapid demand for higher education in different parts of the globe (Schoonenboom, 2014). Instructors are able to share the study material, assignments, tests and create guided discussion groups while leaners in different locations are able to access study material, participate in discussion groups, write tests, ask questions and follow the content delivery by the instructor (Harrati, Bouchrika, Tari, & Ladjailia, 2016). The steady increase of LMSs adoption and discontinued-use thereof has become a common concern across industries (Wei, Ito, Cohen, Brinton, & Jacobson, 2013) (Wang & Wang, 2009); (Lee et al., 2011). The causes of underutilisation and discontinued-use of the e-learning tools is still ambiguous and need to be investigated (Harrati et al., 2016) (Assareh & Bidokht, 2011); (Lee et al., 2011).

1.3 Current situation of e-learning

E-learning is 'the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration' (Al-harbi, 2011). Research on how to accelerate adoption and use of e-learning tools (Learning Management Systems) is now global (Al-harbi, 2011); (Schoonenboom, 2014). Institutional investment on learning management systems is also on the increase however, usage success is yet to be realised (Govindasamy, 2002); (Ismail, 2002); (Ocak, 2011); (Naveh, Tubin, & Pliskin, 2010); (Wang & Wang, 2009). At institutional level, adoption of LMs is increasing, while operational level instructors are implicated on system underutilization, with some abandoning the use of these systems altogether (Islam, 2014); (Wang & Wang, 2009); (Motaghian, Hassanzadeh, & Karimzadgan, 2013). Instructors are on the spot light as they are perceived to be the engines and drivers of implementation (Naveh et al., 2010); (Motaghian et al., 2013).

Studies investigating motivations behind continued-use of e-learning systems report multiple results coupled with different models. Previous findings show that technology adoption (acceptance) is influenced by perceived ease-of-use and perceived usefulness as postulated by technology acceptance model (TAM) (Davis, 1989); (Motaghian et al., 2013); (Taylor & Al-busaidi, 2013). Continued-use of technology is dependent on user satisfaction, user educational level, expectation and perceived performance confirmation (Hung, Chang, & Hwang, 2011) (Carlos, Chiu, & Jose, 2006). Most studies recommend that instructors' experiences be sought in order to uncover more direct variables of user satisfaction and continued-use of e-learning tools (Lyashenko & Malinina, 2015); (Islam, 2014); (Al-gahtani, 2016); (Bhuasiri et al., 2012); (Venkatesh, Davis, Venkatesh, & Davis, 2016).

1.4 Value of Theory and its Practical Application

According to Islam (2014) LMS are a future towards fulfilling the goals of e-learning. Their ability to meet the dynamics of global demand for education at a comparatively lower cost while accessible to millions of learners make them occupy a strategic position especially in the developing economies like Zimbabwe.
In this study, a combined effect of two theoretical models (D&M IS Success model and Technology Acceptance Model (TAM) by Davis) on instructors' acceptance and continued-use of LMSs are used as a basis of investigation and solution design. The TAM model evolved from the well-known Expectation Disconfirmation Theory (EDT) model by Oliver and Bearden in the mid1980s. The Expectation Disconfirmation Theory (EDT) by Oliver and Bearden (1985), was developed initially to predict consumer behaviour in the product market but has been successfully used to predict adoption of information technology (IT). Oliver and Bearden (1985) successfully argued that consumers form opinions on product use before and after consumption. If positive opinions are formed after use, consumers are likely to repurchase or continue using the product.

The original TAM by Davis (1989) discusses major variables of technology adoption though the model has widely been used on e-learning adoption. Davis (1989) postulated that two key constructs namely perceived usefulness and perceived ease-of-use are key variables that determine technology adoption. Most studies that have used the TAM confirm that perceived usefulness to be strongly correlated to technology adoption while causation exists between perceived usefulness and perceived ease-of-use. While TAM has been refined and modified into TAM2 and TAM3 and many other hybrid models, these two constructs seem to maintain a strong correlation with technology acceptance as postulated in the original TAM. This study seeks to contribute a strategy that retains instructor positive perceptions attested by continued and full use of LMSs at the selected two (2) universities in Zimbabwe. So far few studies have sought to develop and implement a continued-use strategy for institutions in under developed countries like Zimbabwe.

1.5 Problem Statement

The conventional way of teaching relied largely on direct contact sessions in class and on campus practice. The source of knowledge was the instructor and all communication were restricted to face to face encounters during class. Additionally, the method limited the students' access, participation and involvement in the learning process.

This method of teaching failed to serve a class of learners who could not be on campus as required by class schedules due to work commitments and geographical restrictions. LMSs were introduced to bring flexibility in the teaching and learning process. Through LMSs learning has become self-paced and geographical restrictions no longer exist. A study done by (Faham, Rezvanfar, Movahed Mohammadi, & Rajabi Nohooji, 2017), indicated that the use of LMSs yielded better learning outcomes due to their ability to serve both on campus and off campus learners equally without restrictions. The intended use of LMSs is not growing in tandem with massive institutional investments on these learning systems. According to Carlos et al. (2006) the continued full-scale instructor use of LMSs at universities in underdeveloped economies like Zimbabwe is yet to be realised mainly due to dissatisfaction of instructors among other factors (Chitanana & Madzima, 2008; Mbengo, 2014; Mtebe, 2016). There are very few studies that have been focused on developing a strategy to enhance sustained and consistent use of LMSs by instructors at institutions of higher learning in Zimbabwe (Mbengo, 2014).

1.6 Thesis Statement

An understanding of the challenges encountered by instructors in complementing the LMSs in Zimbabwe can inform the development of a suitable strategy that takes into account the unique work environmental challenges encountered by instructors in underdeveloped economies.

1.7 Research Objectives

1.7.1 Primary objective

To develop a practical strategy that Zimbabwean institutions can use to enhance continued-use of LMSs by instructors.

1.7.2 Secondary objectives (SO):

1. To understand the challenges that instructors often encounter when implementing the LMSs in higher learning institutions of Zimbabwe.
2. To determine the various implementation levels of LMSs in various institutions of Zimbabwe
3. To understand what is needed to develop such a strategy

1.8 Delineation

This study will only get opinions and feelings of lecturers/instructors in the aforementioned academic institutions. Opinions of students will not be sought.

1.9 Research process/ Research design

This project follows the design science research paradigm. According to Hevner, March, Park & Ram (2004), a design science research must have the following attributes and guidelines amongst others:

1. There has to be an outcome of an artefact. This could be a new model, instantiation or strategy being designed as a solution and contribution to the knowledge base and to solve the real-world work environment problem.
2. The contributed outcome (strategy) should be evaluated to test its novelty.
3. The problem identified should be relevant, practical and real in the day-to-day work environment.
4. Design science is a search process. A problem space has to be identified and a mechanism ratified to find a solution.
5. There must be a link between the solution to outcomes in the solution of the real-world problems. There must be a way of testing or proving that the proposed strategy or solution is correlated to the witnessed changes in the workplace.

1.10 Methodology

The solution to be contributed in this research is a strategy which will be evaluated by an expert review panel drawn from Midlands State University and National University of Science and Technology. According to Mintzberg (1987), a strategy is not just an intervention but is aimed at producing a practical novel solution. It consists of the following steps.

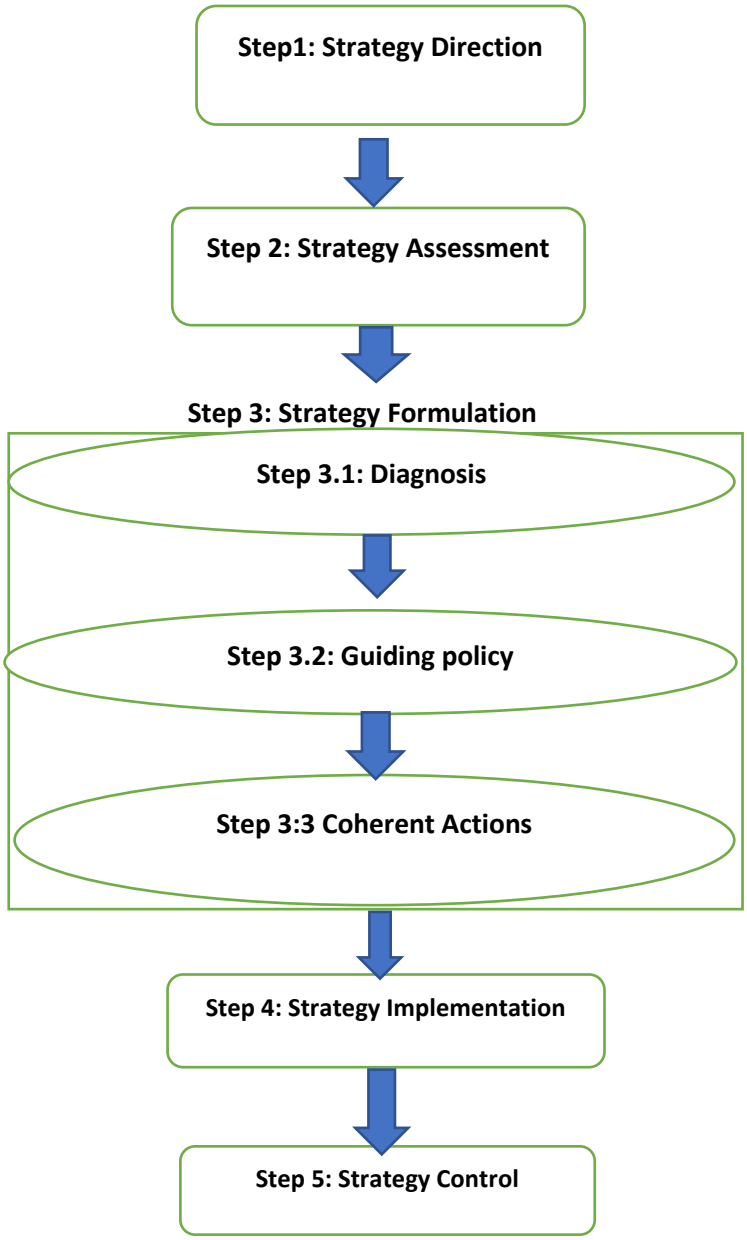


Figure 1.1: Strategy development steps

1.11 The envisaged strategy

According to Mintzberg (1987), a strategy is a set of principles used to guide the thought processes, decision making, and actions in order to accomplish a goal. It can be:

1. A pattern: consistency in behaviour.
2. A perspective: an ingrained way of how an organisation does things.
3. A position: as a means of locating an organisation in an "environment".

To address the primary research objective and specific objective 3, a literature review will be conducted to understand the environment and help define the objectives for a solution.

To gain extensive field knowledge and define the practical work environment problem, a literature review will be conducted. The review will also help define the objectives for a solution. The broad research objective will be

addressed. To address specific objectives 1 and 2, a survey will be carried out on the current use of LMSs by commerce faculty lecturers at MSU and NUST universities located in Gweru and Bulawayo, Zimbabwe. This will also record their experiences in implementing LMSs for their pedagogical practices. The questionnaire will be administered to instructors of both institutions.

To address specific objective 3, combined expert reviews will be conducted with carefully selected LMS gurus, the faculty heads as they understand the strategic direction of the institution and the lecturers who are the implementation drivers of the LMSs. Reasons for the functions and processes implemented will be solicited from these expert groups.

Based on the literature review, survey and expert interviews, the strategy will be developed and strictly applied across all faculties.

Table 1.1: Research process

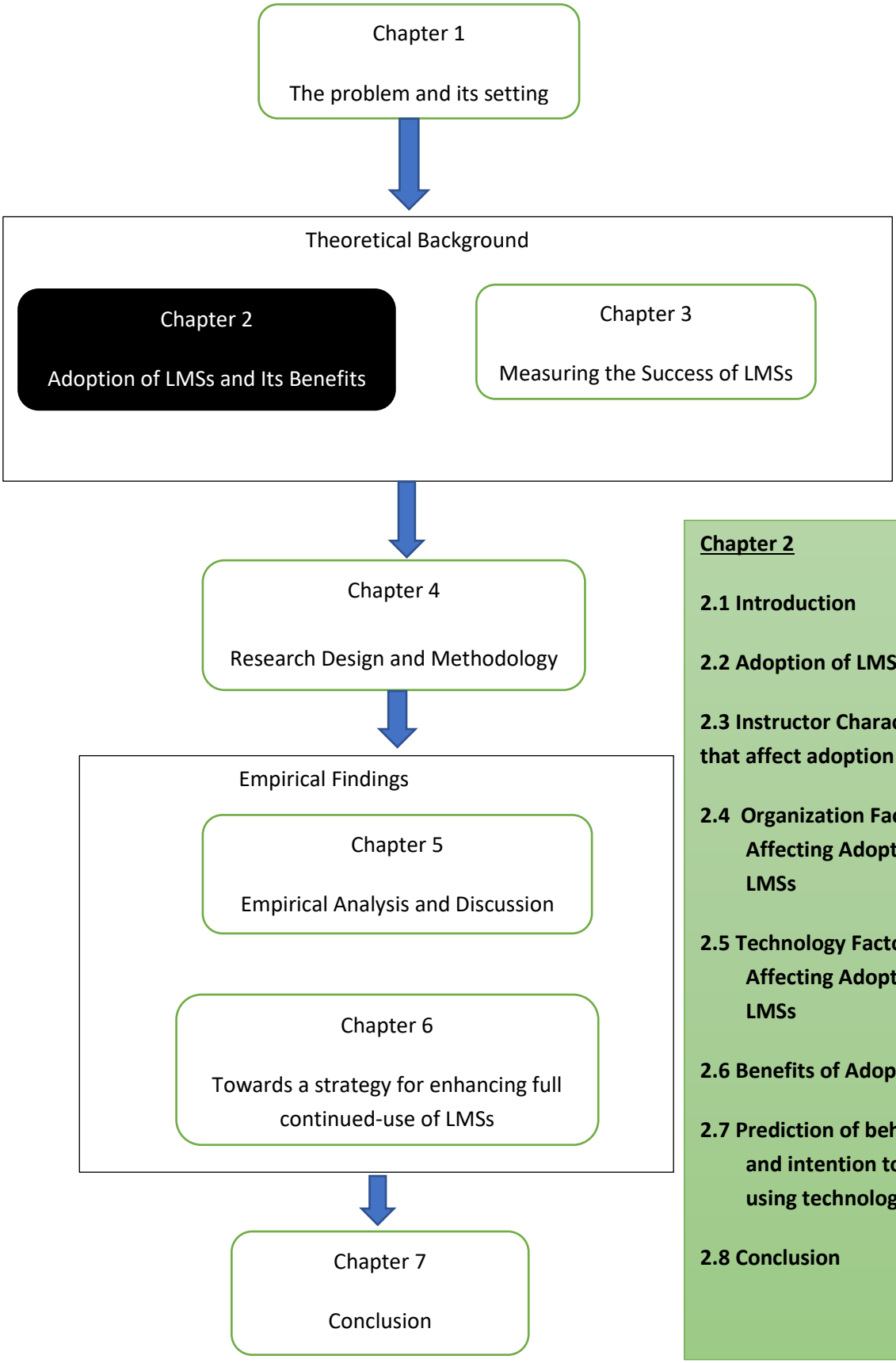
Stage	Project stage and content	Form of stage results
1	Background research on area of interest and subject.	Research area of concentration
2	Area of interest refined and practical industry problem identified.	Research Topic.
3	Research proposal with a clear problem statement, research objectives and methodology.	Acceptable standard project proposal
4	Review of literature and further problem analysis	Clear cut methodology, including instruments, steps, data analysis methods
5	Collect, analyse and interpret raw Data.	Refined problem and well defined instruments of data collection
6	Develop the model or solution to the initial problem identified	Research results and suggested solution to the problem identified (model/Strategy/Framework)
7	First submission	Complete Thesis write up.
8	Incorporate assessors input and submit the final thesis	Reviewed document with input from internal and external assessors. Final submission.

Ethical considerations

All the information gathered from the instructors will be treated with all confidentiality and permission will be sought from the institutions to seek participation from their stuff.

Chapter 2:

Adoption of Learning Management Systems (LMSs) and Its Benefits



Chapter 2

2.1 Introduction

2.2 Adoption of LMSs

2.3 Instructor Characteristics that affect adoption of LMSs

2.4 Organization Factors Affecting Adoption of LMSs

2.5 Technology Factors Affecting Adoption of LMSs

2.6 Benefits of Adopting LMSs

2.7 Prediction of behaviour and intention to continue using technology

2.8 Conclusion

2.1 Introduction

The Internet and technology penetration in different parts of the globe has influenced access and sharing of information worldwide (Almarashdeh, 2016). In Korea, technology penetration is extremely high, and learning is highly influenced by mobile technology (Domingo & Garganté, 2016). Internet penetration in different parts of the globe varies from as low as 6% in Africa to 80% in North America (Ismail, 2002). The advent of Internet has seen education being transformed through the blending of technology to traditional methods of teaching. According to Carlos, Chiu and Jose (2006), the top 50 institutions offer almost two thirds of their learning blended or strictly online. There can be no dispute that technology has infiltrated the field of education and there is a paradigm shift in the manner in which learning services are delivered. To further enhance learning through the capabilities of technology, higher learning institutions have been on the trajectory of adopting and using LMSs for pedagogical purposes.

The previous chapter discussed the widespread adoption of learning management systems by institutions of higher learning worldwide. The chapter concluded with a concern that instructors do not couple this trend with expected results especially in the developing economies due to underutilisation and discontinued-use of LMSs.

This chapter further discusses the adoption and use of Learning Management Systems (LMS) in tertiary institutions. The discussion is mainly centred on factors and variables that determine the intention to use and the actual use of technology and LMSs in particular. The chapter first discusses the trends of LMSs institutional adoption at global level and further discusses, acceptance, challenges and use of LMSS by instructors. In conclusion, the chapter reviews key theories that have been applied successfully in predicting human behaviour especially in relation to technology adoption and use at higher level institutions.

2.1.1 Learning Management Systems

According to Cigdem and Topcu (2015), a LMS is a software application that can be used to administer course offerings in an institution. With this software, the instructor can administer, document, track, report and deliver training to students. LMSs are different from virtual learning, distance learning, digital learning and many others. LMSs are relatively a new concept that utilises the online platform to allow users to share information and collaborate online (Ocak, 2011). It uses the Internet as a medium to support education and learning. The adoption and use of LMSs is perceived to be much broader than a mere delivery of training online but instead, it is the managing of the education process. These systems are synonymous with the use of the web inside and outside the classroom (Islam, 2014). The LMSs are housed within the institution to coordinate and manage the process of learning in and outside classroom. Virtual learning and the concept of LMSs overarch but virtual learning can be interpreted as a small component of LMSs (Ngai, 2007). Virtual learning is the “environment” provided through a LMSs which utilises virtual reality technologies to facilitate learning.

2.2 Adoption of LMSs

2.2.1 The global adoption of learning management systems

As previously defined, the LMSs are information systems specifically designed and developed to manage all learning activities offered by an institution. These LMSs come with various course administration tools and enabling functionalities such as discussion boards, forum, chat, online grade posting, online exam, file sharing, management of assignments, syllabi, schedules, announcements and course plans (Al-busaidi, 2010; Al-gahtani, 2016; Raaij & Schepers, 2008).

In the UK alone, 95% of the institutions have effectively adopted Learning Management Systems (LMSs) as the learners have become savvy of technology across the globe (Carlos et al., 2006; Lee et al., 2011). The USA institutions are also leading in implementing and using LMSs, as it is reportedly stated that 90% of their universities and colleges have adopted LMSs (Ocak, 2011).

About a decade ago, the gulf countries through collaboration and coordination of the Gulf Cooperation Council (GCC) introduced comprehensive ICT in education reforms that were aimed at transforming the manner in which education is delivered (Said, 2004). In the UAE, about 45% of all the investment in the market is channelled to e-learning. Countries like Oman, Qatar and Saudi Arabia have also developed their own tailored home-grown e-learning platforms and frameworks to manage learning (Motaghian et al., 2013). One example is Sultan Qaboos university in Oman which has adopted LMSs to manage teaching and learning.

Africa is no exception with South Africa in the forefront as the most developed economy and leading institutions. Leading institutions like University of Cape town, Wits, University of Pretoria and University of South Africa (UNISA) have various professional courses purely offered online (Evans & Roux, 2016). These institutions long adopted online LMSs platforms like WebCT, Moodle and internally developed portals for academic coordination.

Despite the worldwide acknowledgement of the good that technology brings and the advantages of using LMSs in teaching/learning, each country faces its unique challenges in adoption, implementation and use (Schoonenboom, 2014). Lyashenko and Malinina (2015) postulate that even the most technologically capable countries do face difficult challenges in the LMS acceptance and use. Al-harbi (2011); Harrati, Bouchrika, Tari, and Ladjailia (2016); Hung, Chang, and Hwang (2011); Wei, Ito, Cohen, Brinton, and Jacobson (2013) agree that successful use of LMSs lies not on resources available for exploitation nor abundance of technology, rather on planning and careful development of “strategies” that motivate teachers and students to fully utilise the LMS platforms. Instructors are cited as the engines of LMSs implementation. Their acceptance and use of LMSs encourages students to also follow on the utilisation of the systems. There are few studies on slow adoption and use of LMSs is Zimbabwe. Mtebe (2016) asserts that there is need for more studies on enhancing consistent use of LMSs by instructors. This research

seeks to develop a strategy that can be used in Zimbabwean institutions to motivate continued-use of LMSs for teaching purposes.

2.2.2 Institutional adoption of LMSs

The adoption of LMSs by institutions is now global (Al-busaidi, 2010; Al-gahtani, 2016; Evans and Roux, 2016; Halonen, Acton, Golden & Conboy, 2009; Motaghian et al., 2013; Venkatesh et al., 2016). The intentional use of electronic instruments such as computer, television and including the delivery of content via Internet, intranet, audio and other mediums for learning is now widely accepted in public and private institutions (Bhuasiri et al., 2012). LMSs come with several functionalities and applications like virtual communities of practice, wiki, forums or 3D virtual world which enable interaction and create a class environment online (Fakhoury & Aubert, 2017; Lin & Wang, 2012; Parkes, Stein, & Reading, 2015; Porter, Graham, Bodily, & Sandberg, 2016; Yilmaz, 2017). According to Cavus and Zabadi, (2014), the innovation and implementation of Learning Management Systems (LMSs) such as Moodle, WebCT, Atutor at universities is proving to be valuable in strengthening online and blended learning.

To cater for both on campus and distance learners, higher learning institutions complement and supplant in-class teaching by investing in LMSs (Bhuasiri et al., 2012; Ismail, 2002; Ngai, 2007). For course and knowledge management to be a success, prudence and correct use of the LMSs is mandatory (Al-busaidi, 2010; Al-gahtani, 2016; Raaij & Schepers, 2008). Many institutions are still having difficulties in delivering e-learning programs (Hsieh & Cho, 2011; Michael et al., 2018; Teo, 2010). This is witnessed by a mismatch between the rising trend in LMS institutional adoption and diminishing marginal rate of teaching staff who use LMSs (Findik & Kunçay, 2009; Flavián, Guinalíu, & Gurrea, 2006; Halonen et al., 2009). Successful implementation and management of LMSs is based mainly on instructor attitude. LMSs are an arm of e-learning that enables institutions to blend technology and traditional methods of teaching in order to enhance learning.

2.2.3 Instructors adoption of LMSs

Instructors, IT infrastructure and institution support affect LMS adoption and implementation (Al-busaidi, 2010). Findik and Kunçay (2009) postulates that instructors have more influence on successful implementation and use of LMSs. Institutions that adopt LMSs for teaching, should consider instructors behavioural intention to use such systems. A number of studies (Al-busaidi and Al-shihi, 2010; Lee et al., 2011; Raaij and Schepers, 2008; Wang and Wang, 2009) agree that institutions need to find-out causes of instructors' behavioural intention to use LMSs. According to Taylor & Al-busaidi (2013); Udo, Bagchi & Kirs (2010) the instructor's perceptions, feelings, behaviour and intentions to use the LMSs need to be understood to further identify the influencing factors. Research models have been proposed and contributed based on Belief Factors, Application Characteristics, and Individual, Social and Technological dimensions to identify the effects of key variables on behavioural intentions of users.

Halonen et al. (2009) asserts that Instructor's decision to continue using the system is one of the success indicators of LMS implementation. The identification of factors affecting instructors' intention to continue using the LMSs is

valuable to institutions and all stakeholders (Chang & Cheung, 2001). Attitude of instructors has a direct effect on learning outcomes, thus it must be considered whenever there is an evaluation on use and effectiveness of LMSs (Al-gahtani, 2016; Assareh & Bidokht, 2011).

According to Taherdoost (2018), Instructors are a critical determinant of successful implementation, management and continuous improvement of LMS. Instructor attitude must be investigated in order to influence success in the implementation of LMSs in higher education. Studies concentrating on students' acceptance (Dold, 2016; Laflen & Smith, 2017; Raaij & Schepers, 2008) of LMSs have now reached a certain level of maturity. Various studies previously referenced agree that Technological, System and Application characteristics, as well as Individual instructor dimensions should be considered when measuring success of technology adoption and usage (Govindasamy, 2002).

There are tangible benefits that have caused higher learning institutions to house the LMSs. Should there be an intentional use of LMSs by instructors, benefits will not only accrue to the institutions but also to the learners who represent the community in interaction with learning institutions. Below is a comprehensive summary of instructor characteristics that affect adoption and usage of LMSs.

2.3 Instructor characteristics that affect adoption of LMSs

A number of studies investigated technology and LMSs acceptance by instructors. Carlos et al. (2006); Ismail (2002); Ngai (2007) and Wei et al. (2013) argued that what influences the acceptance of technology by instructors is their characteristics. These characteristics range from traditionalist, trialist, reformist, extent of computing skills and level of training needs. Studies such as Assareh and Bidokht (2011); and Findik & Kunçay (2009) investigated instructor characteristics, technology effects and organisational factors as influencers of acceptance and use of LMSs by instructors.

2.3.1 Self-Efficacy

Findik and Kunçay (2009) and Motaghian et al. (2013) are among the few studies that discussed the instructor characteristics, acceptance and use. One of the key instructor characteristic is "self-efficacy". According to Almarashdeh (2016), self-efficacy is the individual's own self-assessment on their ability to complete tasks using IT systems. A number of studies have found a strong correlation between self-efficacy, perceived ease-of-use, perceived usefulness and technology acceptance (Chang and Cheung, 2001; Flavián et al., 2006; Halonen et al., 2009; Udo et al. 2010). Instructors who quickly get comfortable with using a certain technology are more inclined to further explore new functionalities because they perceive ease-of-use. Instructors form intentions to continue using technology once they find it useful in performing their tasks.

2.3.2 Attitude

According to Govindasamy (2002), attitude influences acceptance of technology by instructors. A positive attitude towards teaching technology result in positive learning outcomes. Attitude is determined by experience in using certain technology. Individuals with negative experience in trying a new technology tend to form negative perception and attitude resulting in the rejection of technology.

2.3.3 Teaching style

Instructor teaching style also influences perception and attitude towards a technology. Cigdem and Topcu (2015) divided the teaching styles into facilitator, delegator, expert, formal authority and demonstrator. Instructors who use facilitation style are likely to easily adopt and use teaching technology as it may be congruent to their style of coordinating learning. Any attempt to develop an effective strategy to encourage full use of LMSs should take into account the prevalent institutional culture of teaching and the individual instructor styles of teaching. Schoonenboom (2014) postulate that instructors with an interactive style of teaching are more inclined to accept and use technology for teaching. Interactive style of teaching and personal innovativeness have a big significance in shaping the attitude of an individual towards accepting technology.

2.3.4 Personal Innovativeness

Studies done by Benson and Kolsaker (2015) and Schoonenboom (2014) reveal that instructors who are technologically adventurers will most likely accept new technologies and attempt using it for their duties. Some studies link age group to inclination towards using new technologies. Instructors who are relatively young are more likely to be innovative and are quick to embrace change compared to their older counterparts. The insinuation is that instructors who are too senior in terms of years and service in the institutions are more traditional and harder to embrace change. More insight should be sought if indeed there is a correlation between personal innovativeness and age group. Acceptance and use of technology by instructors cannot only be limited to individual characteristics of instructors, but also organisational and technological. These also significantly form opinions and attitude of instructors towards the use of LMSs.

2.4 Organization Factors Affecting Adoption of LMSs

Many theories in the field of business management do agree that organisational factors have a huge significance on individual behaviour, productivity and motivation. Organisational leaders have a task everywhere to create conducive work environment for employees to work at their full potential. A study by Kim, Chan, and Baum (2006) classified organisational factors to be motivators and DE motivators. According to Herzbeg et al. (1959), the greatest motivator is the work itself. No study has been done to ascertain if institutions have of late redefined job

descriptions and specifications after the intrusion of LMSs. Promotion and incentives of employees who are self-starters and innovative do play a leading in enticing instructors to use technology (Kim et al., 2006).

Herzberg's two factor theory is borrowed from motivational theories and analysis of employee behaviour in the work place. Herzberg argued that two class factors (motivational and hygiene) influence worker productivity in the work place. He defined hygiene factors as "those elements in the work place whose presence does not necessarily motivate but their absence causes dissatisfaction and demotivation" (Herzbeg et al., 1959). He defined motivational factors as those elements which create commitment of employees and win their efforts .

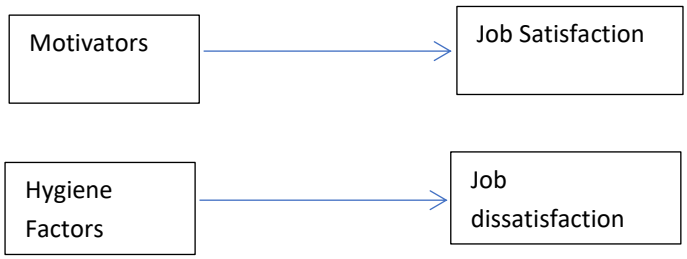


Figure 2.1: Motivational Theory (Herzbeg et al. 1959)

An intelligent application of the Herzberg's two factor theory in coming up with a strategy to win the instructor's commitment and efforts on fully using the LMSs will yield positive outcomes for institutions and education in general.

2.5 Technology Factors Affecting Adoption of LMSs

According to Chang and Cheung (2001), technology factors are the functions and characteristics of an information system. Kim et al. (2006) cited three features of an information system that define the technology factors namely; system quality, information quality and service support quality. System functions should be valuable and useful to the user. The user should be able to perform their duties fairly well (using the system) for it to be judged useful. System usefulness should be complemented by system ease-of-use. Users who find a system to be useful to their duties and also easy to use are more likely to perceive it as enjoyable and may form intentions to continue using the system.

A number of studies passively touch the influence and significance of technology characteristics in influencing acceptance and use by instructors. The characteristics of a system define its quality. Functionality, accessibility, reliability, response and security are major characteristics that define the quality part of the system. In an academic institution, every instructor would want a secure system that can only be accessed by authenticated

users while it retains different levels of information access. Al-busaidi (2010) summarised the 3 key factors that influence perceived ease-of-use and perceived usefulness of a system as indicated in the table below.

Table 2.1: Summary of Factors Affecting LMSs Adoption

Instructor Factors	Organisational factors	Technology factors
• Self-efficacy	• Motivations	• Service quality
• Attitude towards LMS	• Technology alignment	• Information quality
• Experience	• Training	• System quality
• Teaching style	• Organisational support	
• Personal innovativeness	• Technical support	

2.6 Benefits of adopting LMSs

There is consensus in the academia that teaching technology comes with a host of benefits. The institutions that are more advanced in the implementation and of LMSs confirm that the following benefits exist when LMSs are utilised in tertiary institutions.

2.6.1 Cost efficient

The adoption and use of LMSs enables the institution to administer courses in a cost-effective manner. Learners can be served and at the same time in their various geographical locations. Institutions are also use of LMSs by instructors motivates learners to adopt and use the same tools much more effectively. The learning process becomes self-paced and facilitation becomes easy.

Institutions can accrue various benefits from implementing the LMSs. It brings about a huge degree of student institution independence and increases job retention. The management of instructors, courses, students and other users is achievable through testing capabilities, generation of reports, transcripts and notification to students.

WebCT, Moodle, Atutor and many others are prominent LMSs that are popular in institutions across the globe. These tools offer instructors the ability to give online quizzes, surveys, lessons and assignments. Collaborative class products for students are also available while other users can have their own blogs and wikis. Far advanced are some of the features of LMSs, such as the automated grading process and able to admit more than twice the number of students they would if they are to stick to traditional teaching methods without increasing the course administration costs (Porter et al., 2016).

2.6.2 Enhances efficiency

Course administration becomes easy, as communication is made much easier by the tools of LMSs. The instructor is able to effectively communicate to a group of learners at any time. The administration, tracking, recording and reporting of the course is much easily handled by the use of LMSs in an institution.

2.6.3 Enables self-paced learning

According to Cheng and Huang (2013); Flavián et al. (2006); Halonen et al. (2009); Motaghian et al. (2013); Ocak (2011); Taherdoost (2018) and Udo et al. (2010), LMSs use enables and motivates learners to discover knowledge by themselves while enabling instructors to easily facilitate learning. Use of LMSs effectively gives ability to teach beyond classroom (community engagement capability) and track student performance by both communities and instructors. The table summarises the differences between the traditional method of learning and e-learning through the use of LMSs.

Table 2.2: Traditional versus LMS Tools

TRADITIONAL INSTRUCTION	**INSTRUCTION THROUGH LMSs**
• Activities are classroom confined	• Learners and instructors can meet, discuss and do assessments in and outside class using LMSs
• Instructor is the source of knowledge	• Instructor is the facilitator. Learning is student centred.
• Learning is on campus	• Learning can be on campus and off-campus.
• Communication between instructor and learner is in class	• Communication is done verbally and electronically
• Learning is not flexible	• LMSs complement traditional teaching and can supplant it.

2.7 Prediction of behaviour and intention to continue using technology

Various theories of technology acceptance and human behaviour have been developed over the years that capture constructs that can well predict instructor behaviour and thereby shape the strategy development in ensuring continued full use of LMSs. According to Shannon and Weaver (1964), in order to establish the rationale of the individual's actions, there is need to reason from cause to effect. The following theories articulate the principles underpinning the individual behaviour and how the intention to perform certain actions by individual actions is formed. They help in understanding why individual instructors would behave in a certain manner towards the use of LMSs.

2.7.1 Theory of reasoned action (TRA)

This model was developed by Ajzen & Fishbein (2014). In this theory, human behaviour is predicted by studying three components, mainly; Intention (decision to do or not to do something), social norms and attitudes. These three components are evaluated by assessing their stability over time and consistency in terms of time, context and action. These three components of the TRA have been contextualised and applied successfully in technology adoption in various studies (Davis, 1989; Oliver & Bearden, 1985). A range of studies have been conducted on trying to understand user intention and attitude for the successful implementation of LMSs (Cigdem & Topcu, 2015).

2.7.2 Theory of planned behaviour (TPB)

The TRA model a new variable "perceived behavioural control" added. Variables that influence planned behaviour include resources available, opportunities and skills. The perceived behavioural control is the added variable of this theory and has direct influence of actual behaviour and behavioural intention. William (2003) postulates that the theory considers the element of "voluntariness" on the part of an individual regarding the use technology. Some studies cite lack of resources and lack of skills in order to successfully implement LMSs. Studies reveal that continuous thorough training and support is needed to sustain the uptake of LMSs by users.

2.7.3 Theory of interpersonal behaviour

This theory sought to tackle the human behaviour affected by social and emotional factors. The subjective norm of the TRA is contained in the social factors construct. This theory mainly articulates that social factors tend to shape the individual's behaviour. It cites social beliefs, attitudes and personal beliefs as variables that are influenced by the individual characteristics. According to Chang & Cheung (2001) the main challenge of this theory is its complexity and lack of how to evaluate the effectiveness of its variables.

2.7.4 Technology Acceptance Model (TAM)

This model is a direct descendent of the TRA. This theory rates among the top models that are widely cited on the topics of technology acceptance. It is explained by three key variables namely attitude towards use, perceived ease-of-use and perceived usefulness. This theory has directly given birth to many other theories such as TAM2 and UTAUT. The three key variables of TAM tend to affect the behavioural intention and the actual use of a particular technology namely 1. Perceived usefulness 2. Perceived ease-of-use 3. Attitude towards use. These 3

constructs have a direct influence on behavioural intention to use a system, of which intention leads to actual use of the system (Davis, 1989). Below is a graphical presentation of the Original Technology Acceptance Model.

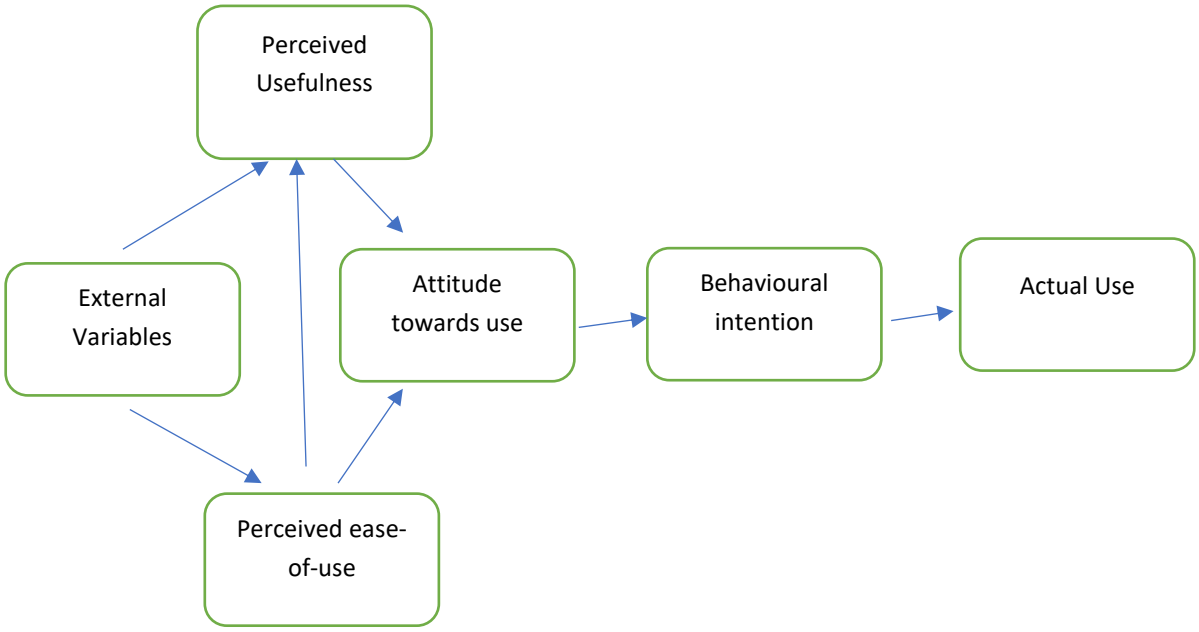


Figure 2.2: Technology Acceptance Model (Davis, 1989)

The TAM was presented as a universal model, however, a study by Chang and Cheung, (2001) argues that this model can be contextualised to functional level of adoption regarding use and intention to use. Al-busaidi, (2010) postulates that some functions in the system are easy to use in performing the daily duties while some are perceived to be difficult. Users would use more of the easy to use functions and less of the difficult to use functions. The same would also apply to the useful functions. These principles would be valuable in developing a practical motivational strategy for instructor use.

2.8 Conclusion

The acceptance and use of LMSs at both institutional and individual user level has been a subject of research for the past decade. Internet penetration throughout the globe has opened avenues even for educational institutions to blend traditional teaching with use of technology. Tertiary institutions have sought a more systematic and structured way of teaching using technologies that can be housed within institutions to manage learning. The quality and effectiveness of these technologies (LMSs) should be assessed and evaluated against the goals of the institution and those of e-learning. The adoption, acceptance and use of technology has so far been well captured and successfully applied and tested across industries by two theory models.

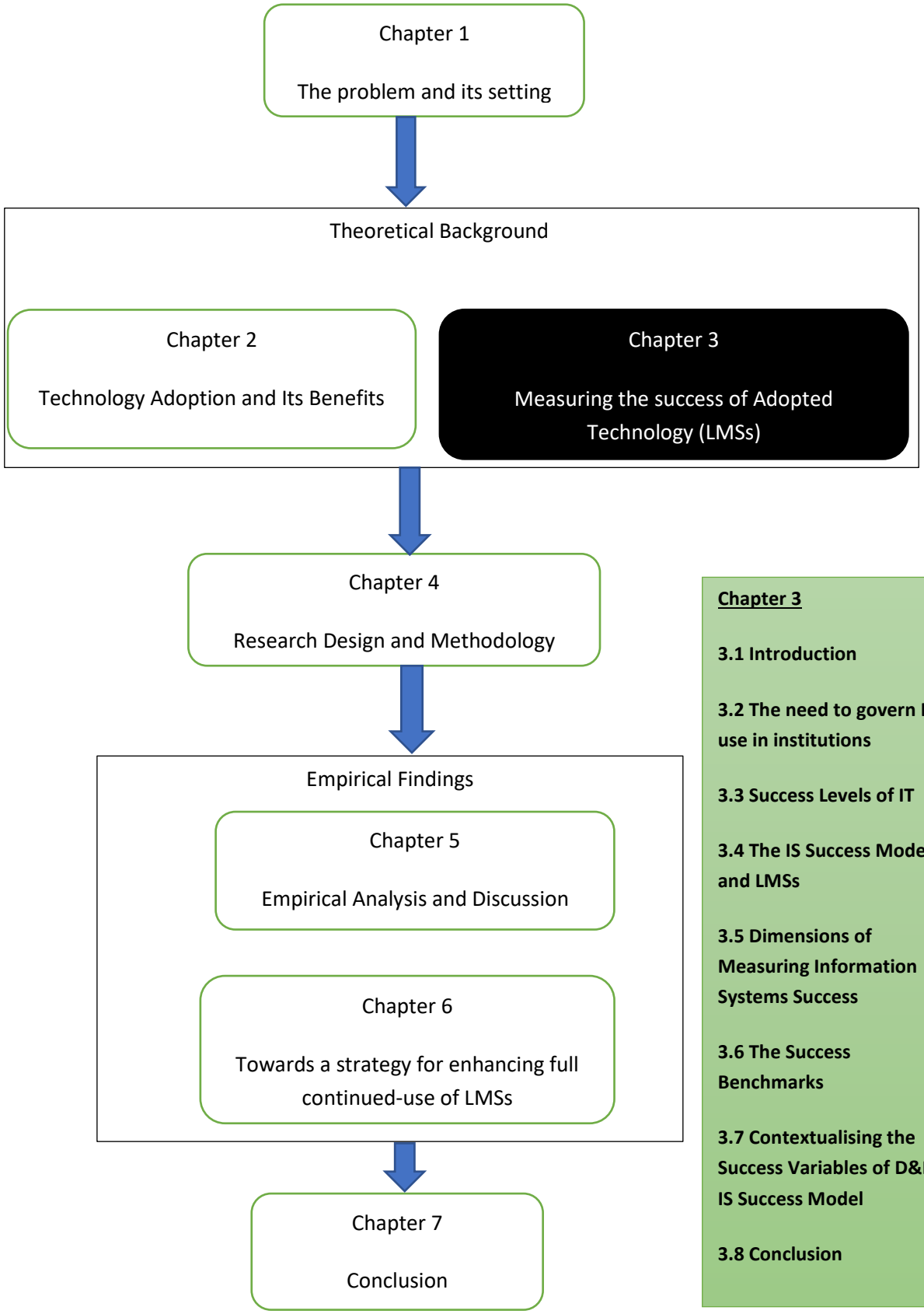
The TAM by Davis and D & M's IS success model have so far triggered much research on Information systems adoption, acceptance and use (Al-gahtani, 2016). The successful evaluation and testing of these models practically

and theoretical proves their robustness. Like the Siamese twins, TAM and IS success model are joined at the heart of measuring and enhancing the information systems success across fields, including the field of education which has not been spared by the infiltrations of technology. Oliver and Bearden (1985); Venkatesh et al., (2016) and Davis (1989) and many other researchers have contributed immensely towards adoption and use of technology in many spheres. According to Ocak (2011), Davis's 1989 technology acceptance model (TAM) is a widely used model in the IS literature. In his TAM, Davis (1989) postulates that attitude, intention and the actual use of technology system is determined by two factors namely perceived usefulness (PU) and perceived ease-of-use (PEOU).

In the past decade plus, the education sector has borrowed and successfully applied the principles of these two theories. For many researchers, the two models have influenced the future direction of research regarding the adoption and use of e-learning valuable insights on how to evaluate an adopted information system which could be useful in the formulating of a strategy to enhance continued-use of LMSs in particular. After the adoption of LMSs by institution, it is critical to measure the success of these teaching tools. The IS success model has provided comprehensive and valuable insights on how to evaluate an adopted information system which could be useful in the formulating of a strategy to enhance continued-use of LMSs.

CHAPTER 3

Measuring the Success of Learning Management Systems



Chapter 3

3.1 Introduction

3.2 The need to govern IT use in institutions

3.3 Success Levels of IT

3.4 The IS Success Model and LMSs

3.5 Dimensions of Measuring Information Systems Success

3.6 The Success Benchmarks

3.7 Contextualising the Success Variables of D&M IS Success Model

3.8 Conclusion

3.1 Introduction

According to Azadeh (2015), the measurement of LMSs effectiveness should not be isolated from the governance and management of information technology in the institution as a whole. The value and efficacy of LMSs management actions and LMSs investments should be guided by the goal of teaching and learning (Al-busaidi, 2010; Al-busaidi & Al-shihi, 2010; Al-gahtani, 2016; Evans & Roux, 2016; Raaij & Schepers, 2008; Venkatesh et al., 2016; Wang & Wang, 2009). Strong IT governance and strategic alignment between IT and institution should be at the centre on any IT investment including LMSs. Mtebe (2016) in his research done at the National University of Science and Technology in Zimbabwe concluded that the adoption and use of LMSs is extremely unstructured. The institution has no governance structure to implement, train and monitor progress on use.

The previous chapter discussed the adoption and use of learning management systems. The chapter highlighted that adoption of LMSs is at both institutional and individual instructor level. Technology acceptance model was discussed as the underpinning theory of adoption with its constructs discussed in the context of LMSs adoption and use.

This chapter discusses how the success in adoption and use of LMSs in tertiary institutions can be measured. The discussion is informed and guided by D&M IS success model which states that success dimensions should be considered in isolation and comprehensively. The ability to measure success of an information system is central in designing a practical strategy that can improve uptake and continuous use of IS in general and LMSs in particular. As articulated by Udo, Bagchi, and Kirs (2010) in their study of customer's e-service perception and intention, the underlying factor in measuring information systems success is the customer expectations against the service offered.

3.2 The Need to Govern Information Technology (IT) in Higher Learning Institutions

According to Wise (2006), LMS governance would achieve alignment of policy, procedures and governance structures involving the LMS with institutional strategic directions on teaching and learning. IT governance is the processes that ensures the effective use of IT resources in enabling the organisation to achieve its goals (Africa, 2013). Most institutions invest in enabling technology such as LMSs without any comprehensive understanding of the importance of setting up IT governance structures and the management of such investments. Sound knowledge of IT governance is now mandatory mainly because the ISs have become the couriers and servers of all the information in any institution (Wise, 2006).

In universities, student records dating decades ago have been translated from paper to electronic format and kept in the information systems databases. These same systems containing student and institutional records have incorporated more important functions of managing learning. IT investment in a learning institution needs proper oversite and governance since learning is the primary business of any university. The rapid increase in the expectations of users and the sophistication of the intended recipients of e-learning is making the usage measurement of LMSs success to be difficult.

IT governance in institutions will make it possible to measure quality perception (perceived usefulness) by individual instructors given their differences in behaviour, attitudes and skills. IT governance is a structured mechanism that creates the ability to measure the impact of individual computer skills (Perceived ease-of-use) towards intention to use and actual use of the LMSs amongst other factors (Wise, 2006).

Studies such as (Azadeh, 2015; Chang & Cheung, 2001; Dishaw, Strong, & Bandy, 2004; Findik & Kunçay, 2009; Flavián et al., 2006; Holsapple & Lee-post, 2006; Kim et al., 2006; Udo et al., 2010; William, 2003) reveal that it is important to set up formal structures that encourage voluntary continuous use of technology in the work place. Chang and Cheung (2001) noted that individuals may discontinue the use of technology after using it for a time. Monitoring factors affecting intention would help develop a strategy to prevent an individual stop using a work technology and retain usage success.

3.3 Success Levels of IT Systems

The current interaction between participants enabled by LMSs is a derivative of the early education civilisation that was offered via television. According to Holsapple and Lee-post (2006), the prerequisite for instructor satisfaction on using e-learning tools (LMSs) is the ability to comfortably share control of the learning activities with students. Interaction, space, control, time, technology and place are dimensions that users tend to use to measure the quality of LMSs service. Dishaw et al., (2004) argued that LMSs should be tailored to each group and institutional needs. They postulate that students are the intended recipients of the e-learning service and the technology in question (LMSs) should facilitate service delivery with elements of interaction and a unique learning experience (Al-busaidi, 2010; Al-busaidi & Al-shihi, 2010; Al-gahtani, 2016; Assareh & Bidokht, 2011; Evans & Roux, 2016; Motaghian et al., 2013; Taylor & Al-busaidi, 2013). The instructors should be able to make it possible to use the LMSs to fulfil this experience by learners. Holsapple and Lee-post, (2006) postulates that the adoption and use of LMSs by institution should be viewed as an e-service. They argue that this service can be categorised into three classes namely; 1. Service product, 2. Service environment, 3. Service delivery. They further argue that service quality is a key determinant for a successful continued-use of LMSs in an institution. According to Dishaw et al., (2004), similar to other Information systems, the LMSs consist of 3 main levels of success which are discussed below.

3.3.1 Technical Level

This is the accuracy and efficiency of the communication system that produces information. The system functions, capabilities, capacity and usability define this layer of a system. These attributes define the nature, quality and quantity of the input information that goes into the system. It further determines the user's ability to use the system to perform their duties. Instructors should be able to perform their pedagogical duties without difficulty if the technical level of the system is well built (Al-busaidi, 2010; Lee et al., 2011; Naveh et al., 2010). Institutions with internally built LMSs need to succeed at this level to keep the users motivated and the information quality uncompromised.

3.3.2 Semantic Level

This is the success of the information in conveying the intended meaning (William, 2003). The concept of education is centred on discovering helpful authentic information. Institutions thrive to guide students to discover knowledge by themselves. Instructors are expected to lead the way in providing guidance and co-ordinating this process through the use of LMSs in learning institutions. The LMSs are developed to ensure that learning itself becomes easy and self-paced. The semantic level of the LMS should enable instructors to effectively co-ordinate learning and information passed to learners should be received and processed as intended (Islam, 2014; Lee et al., 2011; Said, 2004).

3.3.2 Effectiveness level

This is the effect of the information on the user and receiver. The effectiveness level is a deciding factor on user satisfaction for the LMSs. Once the instructors find the system to be easy to use and also useful in terms of enhancing their duties, they form intentions of using the system. Effective LMSs enhance the instructor's ability to be heard by learners as intended. An LMS that is successful in these three levels is summed up as a quality system. William (2003), defined quality as the evaluations, perceptions and judgements of the service obtained from using a system. Comprehensively, the system quality measures technical success; while the information quality measures semantic success and use, user satisfaction, individual impacts and organizational impacts measure effectiveness success (Findik & Kunçay, 2009). The LMS should be evaluated using the extent to which instructors are able to perform their duties exceptionally to their satisfaction and of the learners.

3.4 The IS Success Model and LMSs

A number of studies such as Dishaw et al. (2004); Findik and Kunçay (2009); Flavián et al. (2006); Seddon et al. (1995), and Udo et al. (2010) have highlighted the challenges of applying and contextualising the D&M IS Success Model in different practical work environment scenarios. This is an indication that further development and validation of the model is needed before choosing it as a basis for the selection of appropriate IS measures for different work environment contexts. Kim et al. (2006) argues that organizations, users, and systems vary in terms of attributes and the importance of system functions vary depending on the type of users. If higher learning institutions are to measure their LMSs effectiveness or success, these measures should be based on firstly, the type of system being studied and secondly, the stakeholder in whose interest the IS being evaluated. This two-dimensional matrix is able to capture the role of context in measuring success of LMSs housed within different institutions.

3.5 Dimensions of Measuring Information System Success

According to Zaied (2012) success dimensions are a pillar for the measurement, analysis, and reporting of IS success in most empirical studies. According to William (2003), when Information System is modelled and developed it retains many functionalities and features which demonstrates various gradations of system and information quality as a first step. Secondly, users and managers practically interact with the system to experience

these features and that may result in either satisfaction or dissatisfaction. The individual user's conduct or attitude in using the system for their work is influenced or impacted by the system and its information products and these individual impacts collectively result in organizational impacts (Azadeh, 2015; Jiang, Klein, Parolia, & Li, 2012; Kettinger & Lee, 1997; Kim et al., 2006; Lassila & Brancheau, 1999; Udo et al., 2010). This process is clearly captured by D&M IS Success Model. Higher system quality is expected to lead to higher user satisfaction and use, leading to positive impacts on individual productivity, resulting in organizational productivity improvements (Azadeh, 2015). D&M argued researchers to further explore the possible casual relationships that exist among the success model variables in order to be able to successfully measure the IS success. To effectively measure the success of LMSs and any other information systems, William (2003) argues that the following principles should be adhered to;

1.The IS success dimensions should be measured collectively and in isolated form. This enables institutions to isolate variables that are more significant in influencing the intention and use of the LMSs by instructors while noting constructs with significant influence collectively.

2. IS success measurement methods should be minimised so that research results can be compared and findings validated. If measurement methods are minimised and consolidated, it is easier for effectiveness evaluations to be made based on the success benchmarks established.

3. More field study research should investigate and incorporate organizational impact measures. To be able to develop success strategies that suit each unique work environment, the success of LMSs in institutions should be identified and defined.

4. Combine individual measures from the IS success categories to create a comprehensive measurement instrument.

The study by Azadeh (2015) and William (2003) tested and validated the D&M IS Success Model and made the same conclusion with Seddon et al., (1995) who significantly found relationships between system quality with user satisfaction and individual impact, between information quality with user satisfaction and individual impact, and between user satisfaction and individual impact. Instructor satisfaction is central in forming opinions and intentions of using and re-using the system. These studies reveal that if users (instructors) were satisfied with the system (LMS), they would voluntarily continue to use it in their work activities. This continuation is a reflection of the relevance of the LMS to the instructor task.

3.5.1 The Impact of Satisfaction on Individual Users

The use of the system result in the individual impact that is either satisfaction or dissatisfaction. Holsapple and Lee-post (2006); Seddon et al. (1995); Shannon and Weaver (1964) and William (2003) measured the system use in terms of usage patterns, frequency of use, number of accesses, dependency and frequency of use. The same studies tested the association between "system use" and "individual impacts" and found the association to be significant. Individual impacts were measured in terms of job performance and decision-making performance.

Similar to the assertions of the technology acceptance model, the D&M model also alludes that if an individual instructor perceives a technology to be enhancing to their job performance, they form intentions of using it on continuous basis. So long the instructors perceive the LMS to be useful, they are likely to remain satisfied with use resulting in continued-use.

3.5.2 The Impact of Quality on Individual Users

Azadeh (2015); Dishaw et al. (2004); Findik and Kunçay (2009) and Seddon et al. (1995), tested the interdependency of "system quality" and "individual impacts" and concluded that their relationship was statistically significant. The studies measured the information system quality in terms of functionality, portability, flexibility, ease-of-use, importance and data quality while the individual impact was assessed in terms of work performance and quality of work environment. A quality system would enable better work performance and also create a conducive, highly productive work environment. These measurements are most relevant especially in determining constructs that cause an individual instructor to renew intentions of using the LMS and the actual use of the LMS on a continuous basis.

3.5.3 The Impact of Information Quality on Individual Users

Azadeh (2015); Holsapple and Lee-post (2006); Seddon et al. (1995) and William (2003) analysed the information quality and its impact on the individual user or employee. The studies tested the relationship between information quality and individual impacts and found the association to be significant. The D&M IS Success Model is founded upon the process and understanding of IS impacts on individuals first (Holsapple & Lee-post, 2006). Information systems development, use and use outcomes are the pillars of D&M IS success model. To realise the success of operationalising an information system, each of the cited three pillars of D&M IS success model must be seen as necessary but not sufficient conditions. The importance of quality of information is that no intended benefits can be realised even if there is extensive use of the learning management system by individual instructors so long that use is inappropriate. Information input to the system and the output thereof should be useful to both the instructor and the learner. Information quality is measured in terms of accuracy, timeliness, completeness, relevance, and consistency (Seddon et al., 1995). The impact on Individual is measured in terms decision-making performance, job effectiveness, and quality of work as a result of the quality of information exchanged through the system.

3.6 The Success Benchmarks

3.6.1 Frequency of System Use

Seddon et al. (1995), argue for the removal of system use as a measure of information systems success because use does not cause impacts and benefits. William (2003) disagrees with this assertion on the basis that system usage is an appropriate measure of success in most cases. Failure to clarify the nature of systems use while measuring the IS success renders the measurement process to be incomplete. This implies that the nature, extent, quality, and appropriateness of the system use should be investigated and measured. William (2003) further

argues that the nature of system use could be addressed by determining whether the full functionality of a system is being used for the intended purposes. Azadeh (2015) argues that for an e-commerce system, full functional use of a system should include informational use, transactional use, and customer service use. Flavián et al. (2006) argues that the extent of use is defined by different states of systems utilization based on the use or non-use of basic and advanced system capabilities. Similarly, e-learning/blended learning in higher learning institutions can be successfully realised through continued full use of LMSs.

There is no correlation between the expected results and the time spent on using the system. The time of system use does not automatically translate to the expected results however, a decline in use are a key indicator of benefits not being realised. A good system quality and intensity of use significantly affect system benefits positively. Continued system use continues to be used as a dependable variable by many studies in measuring IS success (Azadeh, 2015; Cheng & Huang, 2013; Dishaw et al., 2004; Findik & Kunçay, 2009; Flavián et al., 2006; Holsapple & Lee-post, 2006; Seddon et al., 1995; Udo et al., 2010; William, 2003). In situations where system use is voluntary, correct usage can effectively be used as a measure of success. Instructor's use of most functions of a LMS is mostly voluntary depending on policies of individual institution. The adoption and use of LMS for course management and administration has taken a new importance in the e-learning success. The measurement of instructor's informed and effective LMS use, will continue to be an important indication of IS success for many systems.

3.6.2 Service Quality

The quality of service is a unique feature whose measurement instrument has been debated for some time. Parasuraman, Zeithaml, and Berry (1988), developed a measurement instrument that has been widely accepted and used. This instrument is based on the concept of service quality gap (SQG). The SQG is the difference between what the organisation offers and what customers are expecting in terms of the quality of service. There is consensus among researchers in that service quality measure should be part of IS success (Kettinger & Lee, 1997; Lassila & Brancheau, 1999; Seddon et al., 1995) . Researchers have applied and tested the 22-item SERVQUAL measurement instrument (Jiang et al., 2012; Lassila & Brancheau, 1999) to an IS context. This instrument uses the dimensions of tangibles, reliability, responsiveness, assurance, and empathy to measure service quality. Some sample SERVQUAL instrument items include:

3.6.3 Tangibility

The information system should meet minimum hardware and software standards for it to be acceptable and used efficiently in the workplace. According to Kettinger and Lee (1997), poor IS infrastructure compromises the quality of information output and makes the system use to be difficult. The tangible characteristics of the LMSs should enhance the ability of the instructors to perform their duties in a best possible manner.

3.6.4 Reliability

The LMS should be dependable. According to Holsapple & Lee-post (2006), success of e-learning is also based on the capabilities of the chosen platforms. For institutions who chose to internally develop their LMSs, the following attributes are important.

- **Responsiveness** - the LMS should enable instructors to get prompt service.
- **Assurance** – the LMS should enable instructors to do their jobs well.
- **Empathy** – LMS has instructor's best interests at heart.

3.7 Contextualising D&M IS Success Model

This section demonstrates how the updated D&M IS Success Model can be adapted to the-measurement challenges of the e-learning world.

Within the e-learning context, primary system users are learners and instructors' who both are internal users. Instructors and learners are the primary users of the LMSs who exchange all the academic information throughout the learning process. This electronic information exchange between instructors and learners impact individual users, institutions, communities, and even national economies. The LMSs use and the e-learning process fits well into the D&M IS Success Model and its six success dimensions (Holsapple & Lee-post, 2006).

System quality, in the academic environment, measures the desired characteristics (usability, availability, reliability and adaptability) of the learning management system. Reliability is an example of a quality that is valued by instructors for a learning management system. ***Information quality*** captures the entire electronic learning content issue (Al-busaidi, 2010). The LMSs should make it easy for instructors to develop content to be shared with learners in a personalized, complete, relevant, easy to understand, and secure way for them to continue using the learner site and return to it on a regular basis.

Service quality, is the overall support delivered by the institution towards instructors to efficiently execute their duties using the LMSs (Holsapple and Lee-post, 2006). This institutional support could be outsourced or provided by an IT unit within the institution. Organisational support is fundamental towards success of LMS full utilisation and continued-use thereof by instructors. Lack of support will translate to dissatisfaction and discontinued-use of LMS by instructors. ***Usage*** measures everything from a visit to the LMS, to navigation within the site, to information retrieval, to performance of any information sharing duties. ***User satisfaction*** remains an important means of measuring instructors' opinions of the LMSs and should cover the entire instructor experience cycle from content development to course service delivery.

Net benefits are an important success measure because it captures the balance of positive and negative impacts of the e-learning on instructors and learners. Has the adoption and use of LMSs saved instructor time and made their work better? Has the institutions yielded a net positive growth in the gross national product? Has education investments in e-learning in general and LMSs in particular increased education access? "Net benefits" measures must be determined by context and objectives for each e-learning investment. These success measures are most important, but they cannot be analysed-and understood without "system quality" and "information quality"

measurements(Chang & Cheung, 2001; Dishaw et al., 2004; Findik & Kunçay, 2009; Halonen et al., 2009; Holsapple & Lee-post, 2006; Udo et al., 2010).

D&M IS success model

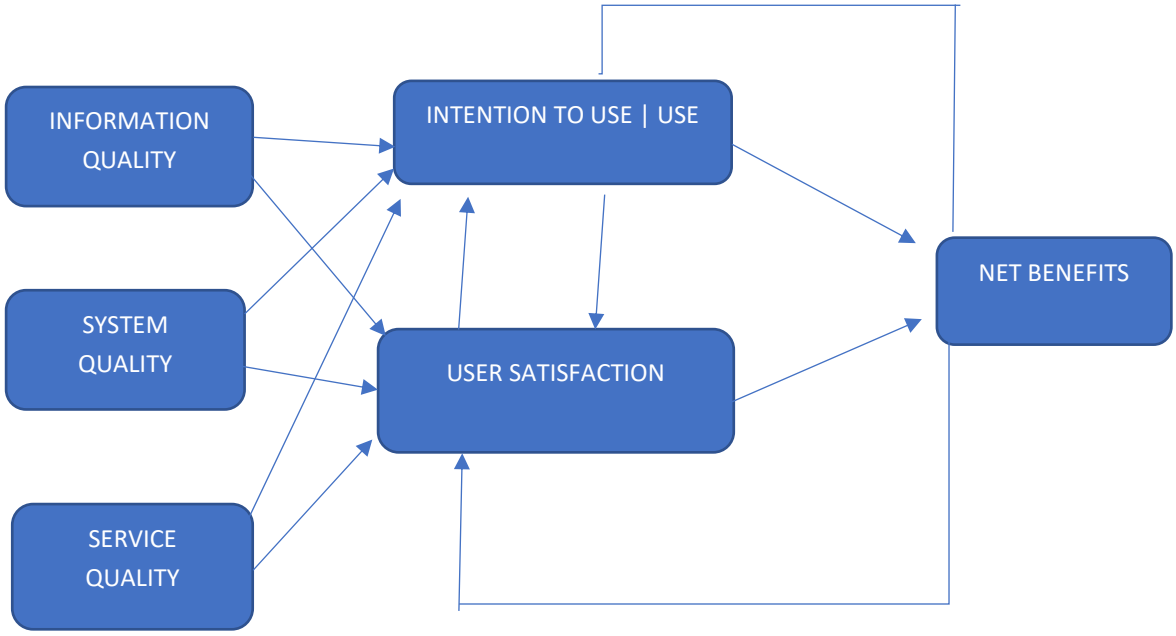


Figure 3.1: D&M IS Success Model (William, 2003).

The D&M model summarises the key constructs that determine the information systems success in any organisation. The success of LMSs in institutions is determined by the instructors' ability not only to properly convey quality information to the learners but also to be able to manage the entire learning process. The quality of the system in terms of reliability, response, functionality and other capabilities define the quality of the system. These tend to affect user satisfaction and perpetuate the intention and the system use. Service quality is another key determinant for measuring success. What the instructors want to do with the system should be measured against what the system can do. According to Azadeh, (2015); Findik and Kunçay, (2009); Flavián et al., (2006); Halonen et al., (2009); Lassila and Brancheau, (1999); Seddon et al., (1995); Taherdoost, (2018) and Udo et al., (2010), the closer the capability of the system to the desired functionality by the user, the higher the likelihood of continued-use and renewed intention to use the system.

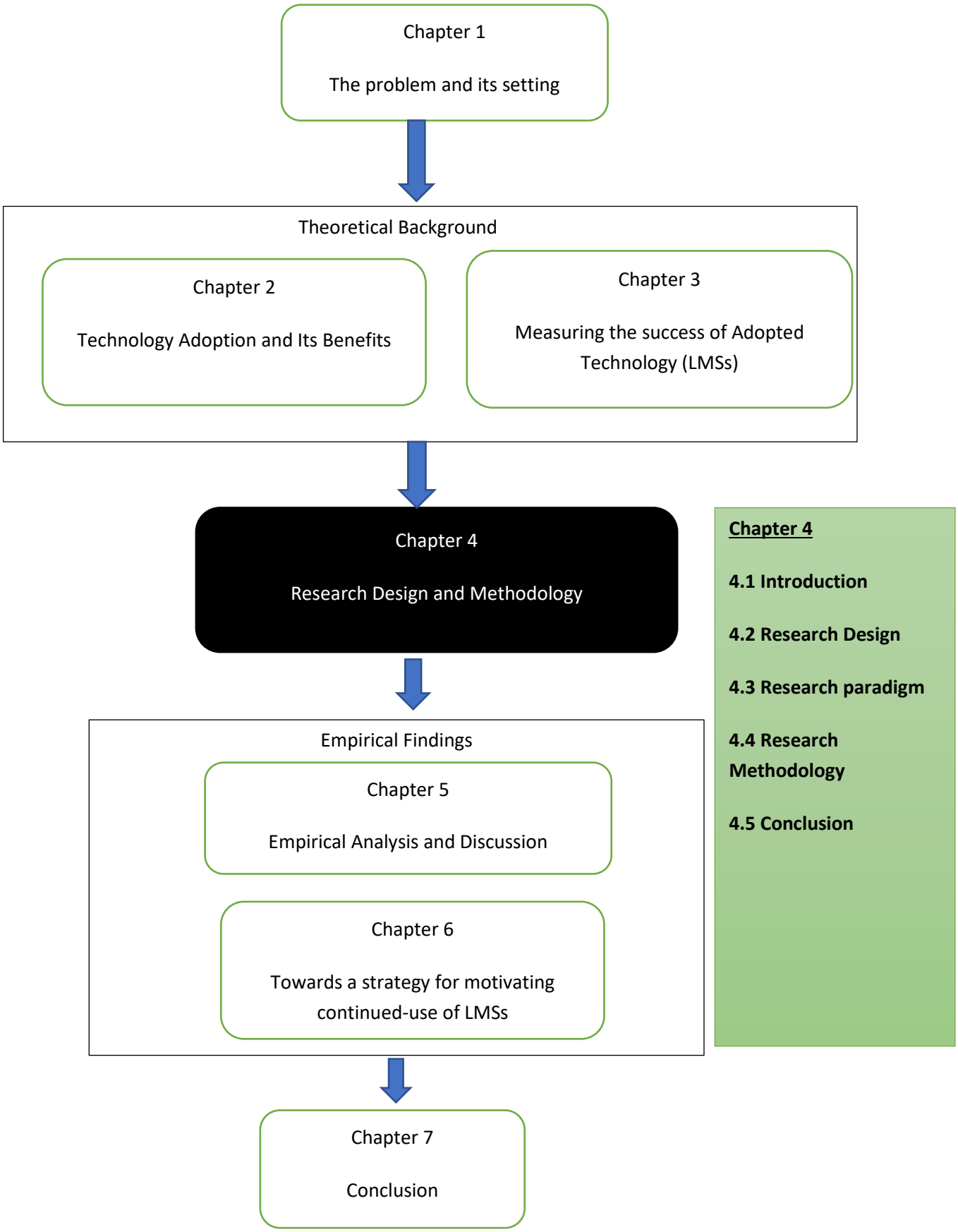
3.8 Conclusion

Successful continued-use of learning management systems can be predicted by analysing factors that influence the intention to use the LMSs. This chapter discussed the most significant contribution on Information systems success done by Deone and McLeon in the 90s and revised in the early 2000s. The quality of the system, information quality and service quality are major contributors towards user (instructor) satisfaction that result in the formation of intention and actual use of the information system.

The following chapter discusses the steps that will be followed in this research to establish a strategy that enhances continued full use of LMSs by instructors. As much as a gap will always exist between what the instructors want the LMS do and what the LMS can do, a strategy to motivate continued-use can be sought and found within institutions of higher learning.

CHAPTER 4:

Methodology



4.1 Introduction

The previous chapters discussed the problem and the literature review relevant to the study. The theoretical and conceptual lens for identifying and developing a strategy relevant for enhancing continued-use of learning management systems was also provided. The insights gained from analysing the literature reviewed were instrumental in the identification and formulation of the developed strategy to address discontinued-use of LMSs. This chapter provides a description of the research process that was followed in collecting, measuring and analysing data for this study. The relevant research paradigm is described followed by the selected research methodology. Following this, a detailed discussion of the primary and secondary data collection methods will be provided as well as the population of the study and data analysis methods. The chapter concludes with an overview of how the credibility of the study can be evaluated.

4.2 Research Design

This study follows a Design Science strategy of research. According to Peffers, Tuunanen, Rothenberger, and Chatterjee (2007), design science extends the boundaries of human and organisational capabilities by creating new and innovative artefacts. In Design Science, knowledge and understanding of a problem domain and its solution are archived in the building and application of the designed artefact. The paradigm has its roots in engineering and the science of the artificial (Simon, 1996). It seeks to create innovations through which the use of information systems can be effectively and efficiently accomplished (Barab & Squire, 2004). For this study the artefact will be a proposed strategy for motivating continued usage of learning management systems in higher learning institutions of Zimbabwe.

The study reviewed current and available literature on adoption and implementation of LMSs including the analysis of frameworks and other related articles. This literature review informed the creation of the research instrument (questionnaire), and consequently, the proposal of the artefact (Continued LMS Usage Strategy). As an iterative validation step is required in the Design Science strategy, the artefact was validated through two rounds of expert reviews. Figure 4.1 below provides a diagrammatical representation of the research approach that was employed in this research project.

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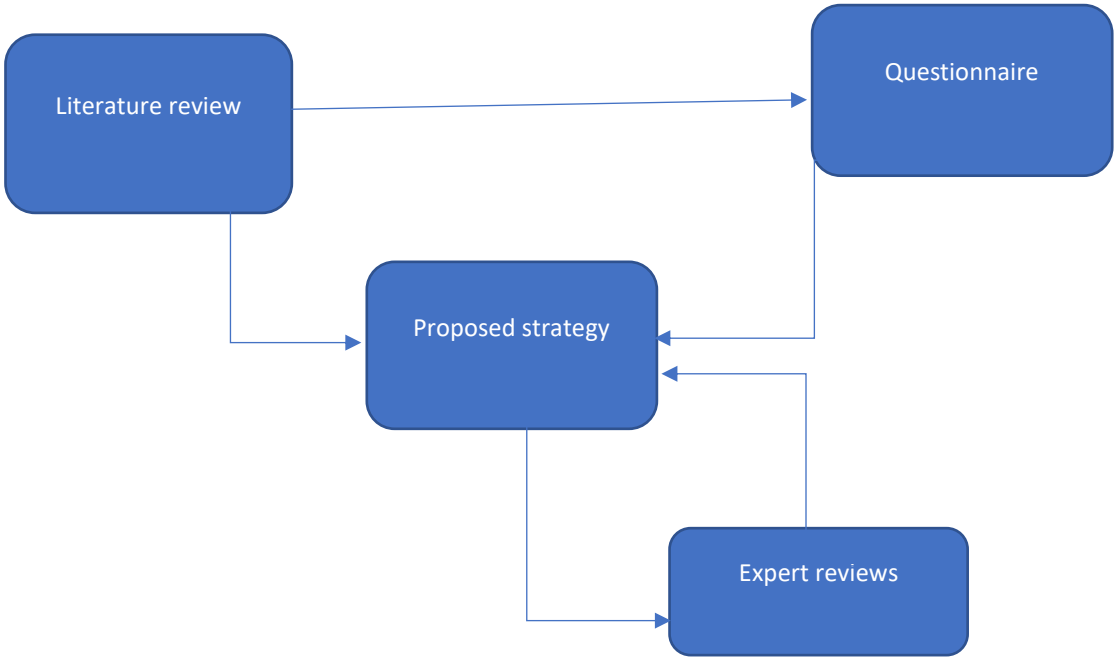


Figure 4.1: Research strategy

This is the research strategy that was followed throughout this research project. A discussion of the choice of research paradigm, research methodology, data collection methods, data analysis methods and the sample and population for this study follows below.

4.3 Research Paradigm

According to Hofstee (2006), a research paradigm is an explanation of how a particular study has been carried out. Hofstee (2006) postulates that a variety of ideas, perspectives and views gave birth to a variety of philosophical paradigms. It is an identification of the basis to construct a scientific investigation (Lewis & Thornhill, 2019). Maxwell (2005) refers to a paradigm as a set of general philosophical assumptions about the nature of the world (ontology) and how we understand it (epistemology) which is shared by researchers working in that area. Ontology is concerned with the form and nature of reality. This is a theory of what exists and how it exists. Epistemology is a philosophical assumption about what constitutes valid knowledge in the context of the relationship of the researcher to that being researched (Collis & Hussey, 2009). Methodology identifies the particular practices used to attain knowledge.

A number of philosophical paradigms are differentiated by a set of assumptions they hold. The choice of a particular methodology should therefore be carefully contextualised in order to achieve the set objectives of a particular study.

Positivist, interpretivist and critical theories are three general paradigms that exist in the world of research (Hofstee, 2006). These research paradigms inform specific data collection methods, observations and interpretation methods for both primary and secondary data that is relevant to what is being researched. The following sections briefly discuss the three key research paradigms.

4.3.1 Positivist Paradigm

According to Glaw, Inder, Kable, & Hazelton (2017), positivism predominates in science and assumes that science qualitatively measures independent facts about a single apprehensive reality. It is an epistemology which seeks to explain and predict what happens in the social world by searching for regularities and casual relationships between its constituent elements. Measurable properties of positivism are used to analyse reality independently from the researcher (Schoonenboom & Johnson, 2017). This ensures that research is conducted empirically and can be repeated. According to Oates (2006), the positivist approach is largely based on two assumptions, namely:

1. The world is ordered and regular, not random.

2. The world can be investigated objectively.

Thus, social reality is singular and objective and is not affected by the act of investigating it (Collis & Hussey, 2009).

4.3.2 Interpretivist Paradigm

The interpretivist paradigm posits that there is no objective reality. According to Lewis & Thornhill (2019), this paradigm is qualitative and subjective. It assumes that there are multiple realities constructed by human beings who experience a phenomenon of interest. The interpretivist researcher attempts to understand human behaviour in a specific context, in this case in the LMS usage context.

According to Collis and Hussey (2009), the interpretivist paradigm emerged in response to criticisms of positivism. Oates (2006), further explains that interpretivism does not aim to prove or disprove hypotheses as is done in positivist research, but rather to identify, explore and explain how the factors in a social setting are related and interdependent.

4.3.3 Realism or Critical Theory

According to Glaw et al., 2017; Schoonenboom & Johnson (2017), this philosophical paradigm has elements of both positivism and interpretivism. Realism has been referenced as empirical research that involves the collection and analysis of both qualitative and quantitative data in a sequential and/or simultaneous and rigorous manner which integrates the two forms of data (Schoonenboom & Johnson, 2017). While positivism concerns a single, concrete reality and interpretivism multiple realities, realism concerns multiple perceptions about a single, mind-independent reality (Lewis & Thornhill, 2019). Within a critical realism framework, both qualitative and quantitative methodologies are seen as appropriate. Methods such as case studies and unstructured or semi-

structured in-depth interviews are acceptable and appropriate within the paradigm, as are statistical analyses, such as those derived from structural equation modeling and other techniques (Glaw et al., 2017). The dichotomy between quantitative and qualitative is therefore replaced by an approach that is considered appropriate given the research topic of interest and level of existing knowledge pertaining to it (Lewis & Thornhill, 2019). Triangulation provides opportunities for convergence and corroboration of results that are derived from different research methods.

4.3.4 Research Paradigm Applicable for this Study

This study is based on underlying theoretical paradigms which influence the reasoning and approach taken to conduct this research. It should be noted that different philosophical paradigms have differing views about the nature of the world and the way in which unique knowledge about it can be acquired (Oates, 2006). The research paradigm is also an indication of which school of thought and principles the study is aligned. A number of philosophical paradigms exist; but for the purposes of this study the philosophical framework was narrowed down to the choice between positivism and interpretivism, which are the two extremes on the continuum of ontological assumptions (Collis & Hussey, 2009).

The paradigm choice of this project is illustrated bellow.

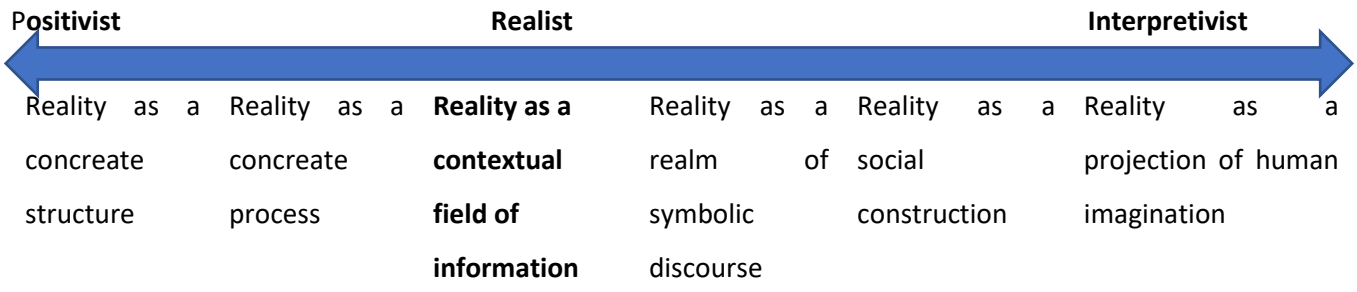


Figure 4.2 Ontological Assumptions (Collis & Hussey, 2009)

In the continuum illustration above, two extreme research approaches are illustrated. The positivist and interpretivist approaches stand on extreme sides while in-between there are several approaches that retain the elements of both extremes. The realist Paradigm combines the elements of both extremes and thus gives the researcher a broader view of the problem and its solution. A realist influence will emerge in this study in line with the third stage (reality as a contextual field of information) of the continuum represented in Figure 4.2 due to both objective and subjective nature of the methods used in this study. Positivism is aligned with quantitative research and interpretivism is often linked with qualitative research while both quantitative and qualitative methods are acceptable in a realist paradigm.

This study will lean toward a realist paradigm, which strongly relates to qualitative methods of data analysis but also retains quantitative methods of data interpretation. This enables the interpretation of a social setting in a particular way, within a particular context because of both the inductive and deductive process followed by this

type of research. The qualitative research emphasises the understanding of a social phenomenon more than its measurement. The inductive process with a view of providing an interpretive understanding of the social phenomenon within a particular context is what this study seek to achieve. The quantitative methods of data collection and interpretation are aimed at aiding the researcher to further understand the social phenomenon while aiding with statistical tools to measure correlations on certain themes and behaviours.

The strategy contribution will emerge from a process of inductive and deductive reasoning including researcher observations, formulated research questions, identified patterns and general underlying theories of the study. For this research these conclusions will be recommendations based on the proposed strategy. Instructors as users of LMSs in tertiary institutions of developing economies provide the context. The next section discusses the research methodology used for this research project and the reason for its implementation in this study.

4.4 Research methodology

The aim of this study is to develop a strategy to motivate usage of LMSs in higher learning institutions of Zimbabwe. The strategy will be derived from reviewing and analysing existing theories and models discussed in previous chapters of this study. The empirical evidence collected will be used to confirm and refine the strategy. The method used to conduct this research is further described below.

A research methodology is a way to systematically solve the research problem. It comprises a body of methods (Collis & Hussey, 2009). Hofstee (2006) describes the research methodology as the blueprint that explains various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them. Three categories: qualitative methods, quantitative methods and mixed methods (which comprises of both qualitative and quantitative methods) often characterise how research is conducted. A methodology that reflects philosophical assumptions of the chosen paradigm must be carefully chosen by the researcher. In this study the chosen paradigm is realism.

Positivist research is often referred as quantitative approach while interpretivist is qualitative, while the realist research may include characteristics of both positivist and interpretivist approaches (Hofste, 2006). Clarity on the differences of approach between qualitative and quantitative research should be made while indicating which research method will be adopted.

4.4.1 Qualitative and Quantitative Research Methods

Qualitative research involves the examination and interpretation of observations for the purpose of discovering underlying meanings and patterns of relationship. It provides much richer, in depth data, which often provide insights into valuable data that quantitative approaches might miss. According to Lewis & Thornhill (2019), this method is useful for exploratory research and often uses techniques such as case studies, literature review, action research, physical experiences, theories, observations, in-depth interviews, experiments, social interaction, questionnaires and expert review.

Quantitative research involves the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomenon that those observations reflect. Methods under quantitative research include written surveys, questionnaires, experiments and theories. Presentation of data under this method is usually statistical which includes graphs and tables formatted for analysis. It is argued that quantification allows for more precision in analysis and ease in summarizing data and making inferences. The attempts to be very objective and controlled.

This study uses thematic analysis component of qualitative research methods to gather and analyse the empirical data. Qualitative categories and themes are first obtained by collection and analysis of qualitative data, and then later quantitized as recommended by Schoonenboom & Johnson (2017) on mixed methods study.

The selection of mixed approach was appropriate for quantitative analysis on closed questions of the questionnaire and also to quantitise the collected qualitative data. Expert reviews in analysing and evaluating the developed strategy are utilised in this study. The Design Science strategy followed will be discussed in the section that follows.

4.4.2 Nelson Mandela University – Design Science Methodology (NMU-DSM)

According to Deport & von Solms (2018), the design science methodology approach embodies a number of well known branches namely; 1. The Peffers approach 2. Design-Oriented IS research and 3. Design-based research. The NMU-DSM was developed by Deport & von Solms (2018) and combines the principles of design-oriented IS research and design-based research. Design-Oriented IS research follows an iterative process as opposed to an evaluation at the end of artefact creation. Mckenney (2013) defines design-based research as a series of approaches, with an intent of producing new theories, artefacts and practices that potentially impact naturalistic settings. This is similar to the design-oriented IS research. All phases of design-based approach include comprehensive guidance on the tasks that need to be completed in each individual phase. Design oriented-IS research allows for academic freedom and does not necessarily provide comprehensive guidance or prescribe what should happen on each phase. NMU-DSM combines principles of design-oriented IS research and design-based research to come up with a more tailored approach as summarised in table 4.1.

This study follows the principles of NMU-DSM. It was necessary to adopt this tailored research approach given the type of environment under which this research is undertaken. According to Deport & von Solms (2018), NMU-DSM provides guidance on conducting design science research in an environment that requires close collaboration with stakeholders on a continuous basis. Deport & von Solms (2018) describe this approach as punctuated by three mandatory phases and steps, namely;

1. Identifying the problem in a real world environment
2. Conducting a thorough review of current literature to identify possible solutions to the identified problem. Based on the solutions identified in the review of literature, an initial artefact should be developed.

3. The third step requires the researcher to work closely with the related stakeholders by continuously refining the artefact.

The continuous refinement of the artefact should continue until the stakeholders agree that the artefact or solution is acceptable (Deport & von Solms, 2018). The initial set out objectives and the validated outcome should be distributed to the stakeholders.

Table 4.1. Summary of NMU-SDM

NMU-DSM	
Analysis	**Analysis: PHASE 1** • Problem statement • Research objectives • Literature review
Design	**Development: PHASE 2** • Theoretical framework • Core aspects • Initial draft artefact
Evaluate	**Refinement: PHASE 3** • First iteration • Second iteration • Final iteration
Diffuse	**Diffuse: PHASE 4** • Strategy finalisation • Strategy validation • Strategy diffusion

Phase 1: Analysis of the research problem

According to Herrington et al (2007), this phase requires the researcher to identify, refine and discuss the problem, objectives and projected solution through extensive review of literature relevant to the study. Deport & von Solms (2018) assert that research problem and research objectives should be the outcome of this phase.

In this study, the review of literature provided the theoretical and conceptual lens for identifying the research problem. Adoption and use of LMSs in Zimbabwe is still characterised by unsystematic, and undefined way of encouraging uptake and continued-use of LMSs (Mtebe, 2016). Less than 50% of lecturers consistently use more advanced functions of teaching using LMSs (Ashrafzadeh & Sayadian, 2015; Hart & Paucar-Caceres, 2017). Out of the 50%, less than 30% continue using the LMSs other than for administration purposes (Al-harbi, 2011; Govindasamy, 2002; Ngai, 2007).The primary objective of developing a strategy for enhancing continued-use of

learning management systems in Zimbabwe was established as an outcome of this phase. The insights gained from analysing the literature reviewed were instrumental in the identification and formulation of the research problem of discontinued-use of LMSs and the research objectives thereof.

Phase 2: Development of the LMS Continued-Use Strategy

The NMU-DSM strategy development phase encompasses a number of systematic actions intended to understand the environment of operation in order to design a practical solution. According to Deport & von Solms (2018), the development phase requires the researcher to establish a theoretical framework, core aspects and the initial draft of the artefact. The environment assessment reveals the feasible and non-feasible solutions. Ngcaza & von Solms (2018) asserts that sound environmental analysis retains the following three characteristics;

- Gathering and assessing of information
- Use of information towards design of the artefact
- The information assessment should be conditioned and formal

In this study, literature review was conducted to establish a theoretical foundation on LMS-usage in Zimbabwe and its associated challenges. A questionnaire with open and closed-ended questions was distributed to 120 instructors from both institutions with each institution contributing 60 respondents.

The 5-point Linkert scale was used to analyse the feedback on the closed-ended questions. Respondents were required to choose their responses from strongly agree to strongly disagree as shown in the questionnaire in Appendix 1. The mean and median of per question response was calculated to ascertain the percentage of respondents who agreed or disagreed with an assertion statement on the questionnaire. Cronbach alpha analysis was used to determine the instrument's consistency in the solicitation of data from respondents. The results of these statistical measures informed the development and reliability of the sought continued LMS-Usage strategy.

The responses on open-ended questions were analysed through thematic analysis. The process involved six steps as briefly explained by Walters (2017);

<u>Phase 1: Text familiarity</u>

Response texts were read to gain familiarity and understand the content. Interesting representations were noted.

<u>Phase 2: Coding</u>

In this coding phase, readings were repeated to code texts and responses were examined for similarities and differences. Recurring words were noted and recorded in a matrix. According to Walters (2017), this exercise is known as capturing of affective and semantic connotations.

<u>Phase 3: Development of Basic Themes</u>

Codes were consolidated into basic themes by collating together all codes that seemed similar. Key basic themes are noted.

Phase 4: Consolidate into Organising Themes

According to Walters (2017), themes are clustered into coherent groups and condensed into higher themes that share similarities. In this study, basic themes were assessed for coherence across the data set and amalgamated.

Phase 5: Derive Global Themes and Networks

Analysis of organising themes was done to uncover overarching global themes that could be derived from them while maintaining their internal hegemony and mutual exclusivity. Basic themes, organising themes and global themes form a thematic network.

Phase 6: Describe, Explore and Analyse Networks

Describe, explore and analyse the drawn together thematic network.

The empirical findings from the questionnaire led to the diagnosis of the challenges that lead to discontinued-use of LMSs in the selected institutions. The findings were further used as an input in the development of the continued LMS-usage strategy. Diagnosed challenges without guiding policy and a coherent action were presented as an input to the initial artefact to the panel of experts for scrutiny. This was necessary so that problems are correctly identified and a comprehensive solution developed. Guiding policies and coherent actions were added to the agreed-upon expert reviewed diagnosed challenges. According to Ngcaza & von Solms (2018), a guiding policy outlines how the identified and defined challenge are tackled while coherent actions are well co-ordinated steps of action to be taken in addressing the guiding policy. The presentation of this continued LMS-usage strategy initial artefact completes the development design phase of the NMU-DSM.

Phase 3: Refinement of the LMS-Use Strategy

According to Deport & von Solms (2018), phase 3 of NMU-DSM requires that an artefact be refined through continuous iteration with the stakeholders. This refinement should continue to a stage were the proposed artefact is now feasible and acceptable. The refined artefact, ready to be presented as a final solution that can be validated becomes the outcome of this phase of strategy development.

In this study, expert review was used in the refining phase of the proposed artefact. According to Jeffries (2003), expert reviews are the most effective method to evaluate and to refine an artefact. Eight (8) LMSs experts were asked to scrutinise and give recommendations on each stage of iteration from the initial artefact to the refinement phase. Their recommendations were implemented leading to the refinement of the continued full-use strategy presented for finalisation and diffusion. Jeffries (2003) further explains an expert review as an evaluation approach that uses an expert group to criticise the research artefact. Skulmoski, Hartman & Krahn (2007)

postulates that the criteria that should be used to select an expert review panel is mainly guided by the following four principles namely; capacity and willingness to participate, knowledge and experience to the relevant study; sufficient time to participate and effective communication skills.

Phase 4: Diffusion

According to Deport & von Solms (2018), the diffusion phase of NMMU-DSM requires the refined artefact to be finalised, validated and diffused. When the artefact has been refined acceptably, it would have moved to the final version. According to Ngcaza & von Solms (2018), the presented final version needs to be validated by the stakeholders and be diffused. The validity of research findings can be accredited to either the use of a rigorous process in conducting research or the argumentation provided by the researcher (Ngcaza & von Solms, 2018). In the case of this research, the validity of the strategy is espoused by the use of a rigorous strategy development process as defined by Tsokota et al, (2017).

According to Ngcaza & von Solms (2018), the use of a sound methodology can insure the trustworthiness of research findings. The use of an appropriate research approach accordingly produces accurate and meaningful results. The methodology used to design the proposed LMS continued-use strategy in this study is sufficient in ensuring that the resultant strategy is valid. The continuous iteration process with stakeholders add to the relevance and validity of the strategy. The process is firmly established on the principles of the strategy kernel as defined by Rumelt (2011). A good strategy is characterized by identifying precise and coherent actions that need to occur to remedy the hindrances towards achieving the goals. In essence the strategy kernel is the heart of a good strategy, adapted in order to ensure that the proposed strategy is 'good' thus ensuring the validity of the proposed strategy.

Panel of expert reviewers

Eight LMS experts all agreed to participate in this study and provided their input towards the proposed strategy. Expert sampling technique was used to select this group mainly because the general population of LMS experts is unknown in Zimbabwe. Expert sampling requires that individuals with demonstrated expertise in the research area of interest be identified, seek their consent and collect the information either individually or collectively in the form of a group (Almalki, Arabia & Centre, 2016).

In this study, NUST contributed four academic Doctors (Drs) from the faculty of Commerce, Engineering, Computer science and Education respectively, while at MSU members came from Food Science, Computer Science, Law and Education faculties. This panel was composed of members who effectively participated as departmental advisors and to the office of the Co-vice Chancellor during the process of recommending the type of LMSs that best suit the institutions. The same Drs have had training on Moodle, web CT and blackboard while retaining an extensive knowledge on the implementation and use of LMSs gained from various institutions that they previously served. A similar criterion was used in selecting the members of the panel from MSU. The experts assisted in reviewing

and contributing to the development of the proposed strategy. It was agreed that each member of the panel in both institutions review the proposed strategy and provide insight on areas of the strategy that need to be refined.

4.4.3 Population

Secondary literature review, expert reviews and questionnaires were used in this study for data collection. The following section discusses the population for each of the methods

4.4.4 Respondents of the questionnaire/Sampling

A sample of 120 instructors out of a possible population of 1500 from two institutions of higher learning in Zimbabwe were selected for the study. Judgemental or purposive sampling was chosen as the most appropriate sampling technique because of its ability to aid the researcher to establish and construct a historical reality and describe a phenomenon about which little is known (Schoonenboom & Johnson, 2017). These institutions were considered appropriate due to their influence and academic standing countrywide and their instructors were considered more inclined to new teaching methods. 100 responses were received after a questionnaire was distributed to all 120 potential respondents.

4.4.6 Data Analysis

The following section discusses methods used to analyse both primary and secondary data. According to Lewis & Thornhill (2019), data collected has to be analysed and interpreted. The analysis includes establishing themes, trends, patterns and relationships of the gathered data. Data collection in any study ends with analysis and interpretation.

4.4.7 Secondary Data Analysis

Content analysis was used in this study to establish relationships between concepts and variables. Patterns were drawn from important concepts that were used in the development of the coherent actions on the proposed strategy. Content analysis enables the researcher to identify, isolate and establish themes in the data.

4.4.8 Questionnaire Data Analysis

The distributed questionnaire had both open ended and closed ended questions. Thematic analysis and pattern matching on the qualitative section of the open-ended question was used in this study. According to Glaw, Inder, Kable, & Hazelton (2017), thematic analysis is inductive and rigorous by nature. It is a useful technique to establish the truthfulness of the gathered data especially for the qualitative section of the study. Thematic analysis has Six steps; 1. Intitial reading of data texts/responses to gain familiarity, 2. Repeated readings to code texts, 3. Development of basic themes, 4. Consolidation into organising themes, 5. Derive global themes and networks and 6. Describe. Explore and analyse global networks.

Descriptive statistics and the Cronbach alpha was used to analyse the closed ended question responses. This tool is highly reliable and recommended in a mixed approach study as it establishes the internal consistency of the research instrument. Data collected using the questionnaire was used in the development of the proposed strategy.

4.4.9 Expert Review Data Analysis

The refinement of the proposed strategy through all two iterations were done through expert reviews. The gathered feedback from each expert review was summarised and implemented in the strategy refinement.

4.4.10 Research Evaluation

As mentioned before, the continuous iteration process with stakeholders add to the relevance and validity of the strategy. In the case of this research, the validity of the strategy is espoused by the use of a rigorous strategy development process as defined by Tsokota et al, (2017).

4.4.11 Ethical considerations

Consent from two universities was sought and granted. All respondents were assured of total privacy that was further enhanced by allowing respondents not to reveal their identities.

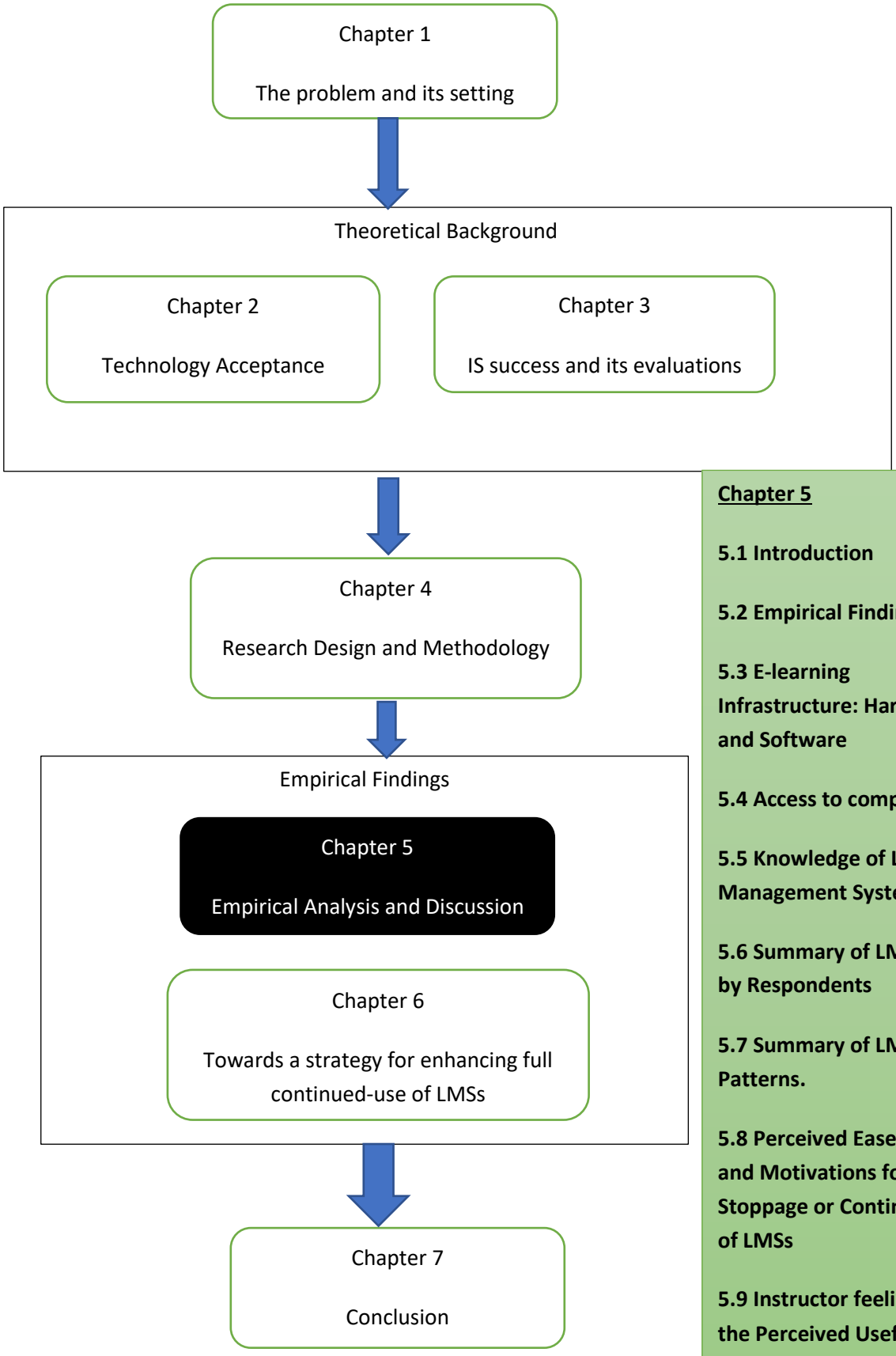
4.5 Conclusion

This chapter discussed the methodology in the development of a strategy to enhance continued full use of LMSs in higher institutions. The NMU_DSM is an iterative development methodology that involves a number of steps. In the strategy formulation, the first step of this process starts with problem identification and environment assessment. Further practical engagement with the institutions in question was done to understand the nature of the practical environment challenge. Analysis of the gathered information was done and expert reviews were done to further refine strategy development and implementation. A successful strategy should address the existing real work environment problem while consistent with the objectives and mission of the organisation. This methodology was followed to plan, collect and analyse data within the selected institutions of Zimbabwe as discussed in the following chapter.

The following chapters discusses the data collection, analysis and interpretation in adherence to the methodology that has been set. Furthermore, a strategy is developed which seeks to answer the primary and secondary research objectives using the same guidelines as set out in the methodology.

CHAPTER 5

Data Collection and Data Analysis



Chapter 5

5.1 Introduction

5.2 Empirical Findings

5.3 E-learning Infrastructure: Hardware and Software

5.4 Access to computers

5.5 Knowledge of Learning Management Systems

5.6 Summary of LMSs Used by Respondents

5.7 Summary of LMS Usage Patterns.

5.8 Perceived Ease-of-use and Motivations for Stoppage or Continued-use of LMSs

5.9 Instructor feelings about the Perceived Usefulness of the LMSs

5.1 Introduction

The previous chapter presented the research approach, techniques, procedures and instruments used in conducting this research. This chapter discusses the collection, analysis and the results of data gathered during the research project. The chapter captures the demographic background of the respondents, IT infrastructure for the institutions, knowledge of LMSs by respondents and ultimately instructor experience as well as their feelings as they continuously interact with LMSs in their respective institutions. The chapter also analyses the instructor experience and their developed feelings.

5.2 Background of the respondents

Table 5.1. Summary of the Respondents Background

Variable	**Category**	**% Respondents**
Age	25-34 35-44 45+	64 24 12
Gender	Male Female	54 46
Department	Commerce Education Bio_Chem	45 30 25
Work experience	1-5 years 6-11 years 12-20 years 21+ years	40 36 20 4
Level of education	Masters's degree Doctorate Professorship	75 10 5

Table 5.1 shows a summary of responses gathered from 100 instructors from the two selected institutions. The respondents indicated their age, years of experience, gender, department and the highest level of education achieved. These variables influence the richness and reliability of the feedback gathered. Responses gathered indicate a relatively even representation of instructors from each department of the two institutions with Commerce contributing (45%), Bio-Chem department (25%) and Education (30%). To enrich the quality of responses gathered, department selection followed variations that inherently exist in the mentioned fields and methods of teaching required.

Responses gathered indicated that 75% of the respondents have more than 5 years of working experience as instructors and thus adding to the reliability of the responses gathered. 75% of the respondents were PhD candidates who hold a Master degree, while 10% were Doctors and 5% Professors. The results expose that respondents are individuals exposed to research and are able to make informed choices. Their continuity of using LMSs would be voluntary and informed by certain factors.

Table 5.1 also show that 62% of the respondents were between the age of 35 – 44, while 20% of the respondents were above 45 years old. The remaining 18% were below 35 years of age. In essence, 80% of the respondents were below the age of 45. 80% of the instructors were within the age group exposed to technology and more prone to adapt technological methods of executing their duties. Combinations of educational background and age tends to influence the technological savviness of groups and methods of teaching as discovered by other researchers. This however is dependent also on access to good technological facilities. The following section discusses the current technological capabilities of the institutions and use of LMSs by instructors.

5.3 E-learning Infrastructure: Hardware and Software

Hardware and network infrastructure are foundational in the implementation of LMSs in tertiary institutions. They determine the capacity and capability of the institution to blend technology in its teaching activities.

Table 5.2. Summary of the Hardware and Network Infrastructure

Network service	**National University of Science and Technology**	**Midlands State University**
Number of network points	3000	1000
Type of Internet link	Radio Link Dial-Up	Fibre optics – leased
Number of users	8000	10 000
Cost of Bandwidth per month	US$1 million	US$ 5 million
Size of the bandwidth	2 Mbps	1 Mbps

(Mtebe, 2016)

Table 5.2 above summarises the infrastructure of the two institutions. The bandwidth size in both institutions is too small for the university needs. Access points and number of users also indicate that there is a high computer to user ratio. The bandwidth size and total number of users in each institution indicates that there are huge traffic volumes for university networks and slow internet download speeds. LMSs can only be effectively utilised when internet access is satisfactory and computer access immediate. The section below discusses the instructor access to a computer.

5.4 Access to computers

Access to computers and internet are the most basic requirements for any learning to take place when utilising LMSs as a platform. It was therefore necessary to determine if all participants had access to a computer as a point of departure. Table 5.3 below shows a summary of responses on the question as to whether respondents had computer access.

Table 5.3. Number of Respondents with Access to a Computer

Response	Number of Respondents	Percentage %
Yes	100	100%
No	0	0%
Total	100	100%

The table above shows that 100% of instructors have computers to perform their teaching. A personal laptop or desktop that instructors can use to facilitate and coordinate learning is sufficient. This is important because a computer is a mandatory tool used in the facilitation of academic co-ordination.

5.5 Knowledge of Learning Management Systems: Questionnaire Findings

In order to discover levels of motivation, it was important to define the knowledge instructors have in LMSs. This determines whether the respondents are able to contribute to this research project. Respondents were to answer two open-ended questions about their knowledge of LMSs. Table 3 shows a summary of the responses to the first question: *What do you consider to be a LMS?* These open-ended responses were matched to themes identified from the definitions of LMSs described in Chapter 2 and 3.

Table 5.4: Knowledge of Learning Management Systems summary

Theme/Pattern	Number of respondents	Percentage
An Information System used to coordinate learning	23	23%
Online platform used by instructors to share information with learners	21	21%
Any platform that allows learning to take place online	20	20%
It is a web based learning that provides an instructor with all the capabilities to manage student learning	19	19%
An online platform used to plan, execute and assess a specific learning process	17	17%

Table 5.4 above shows that 20% of the respondents identified any platform that allows learning to take place online in a coordinated way as their definition of an LMS. A similar number of respondents (23%) mentioned that an LMS is an information system used to coordinate learning online while 16% indicated that an LMS has to be a platform used to plan, execute and assess the learning process. All respondents indicated that they had knowledge of LMSs except one, who turned out to have used Moodle several times but without knowing that it is a LMS.

Below are some of the responses regarding the knowledge of LMSs.

1. “Any technological instrument that enables me to conduct and coordinate my classes online”
2. “An online platform of interaction retaining the same feel as the physical classroom interaction”
3. “A technological platform that allows me to have a class without physical boundaries”
4. “My students should be empowered to communicate and access information from me as their instructor without problems”
5. “I do not have an exact definition, but what I know is that Moodle enables me to coordinate my Masters program efficiently”
6. “An LMS is any tool that allows my students and I to access or share data anywhere without carrying the personal laptop around.”
7. “An LMS has helped me to keep my documents intact and ready for use anywhere there is internet services.”

Feedback from respondents indicate that instructors have knowledge and experience of using LMSs. Feedback also shows that instructors view LMSs as a capable tool for improving their course delivery. Below is a summary of LMSs known by respondents.

Table 5.5: Summary of LMSs Known by Respondents.

	Number of Respondents	Percentage of Respondents
Moodle	94	94%
Blackboard	72	72%
Sakai	70	70%
Google class	66	66%
WebCT	33	33%
ATutor	30	30%
TalentLMS	12	12%
LearnUpon	8	8%
iSpring Learn LMS	8	8%

Table 5.5 above summarises the LMSs known by the respondents. The total percentage sum of respondents is more than 100% as each of the respondents may have listed more than one LMS. The most common LMSs identified were Moodle, google class, web CT and Blackboard. 94% of the respondents identified Moodle as the LMS they know better mainly because it is the main LMS at NUST and MSU. Moodle is the most dominant LMS in institutions of Zimbabwe (Mtebe, 2016). The results indicate that Zimbabwean instructors are familiar with a range of LMSs and are able to make a choice regarding the best platform to use. Fig 5.1 below further attests that instructors in these institutions have used a range of these tools before with the majority of them having used Moodle the most. Respondents could select more than one application, thus the results are expressed as a percentage of respondents.

5.6: Questionnaire findings: Summary of LMSs Used by Respondents

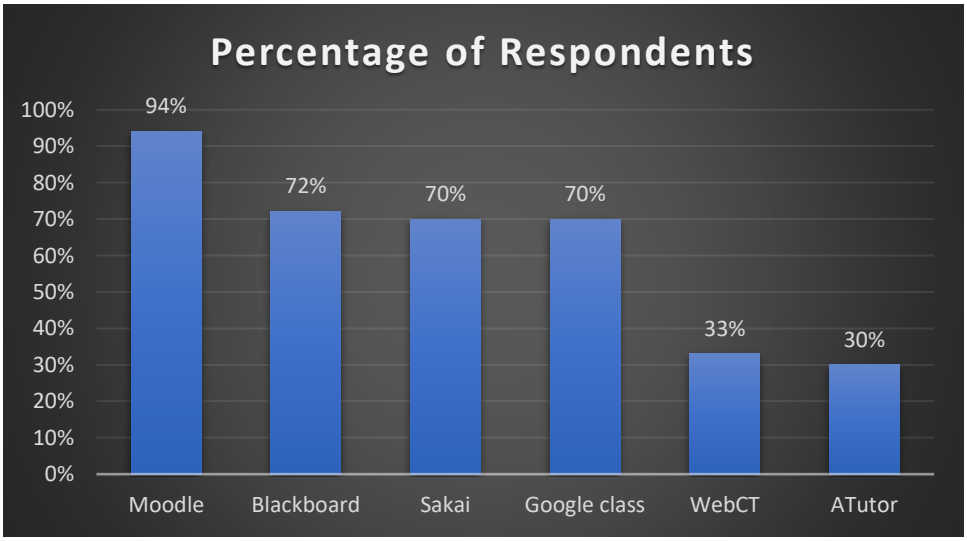


Figure 5.1: LMSs That Have been Practically Used by Respondents

Figure 5.1 shows that most respondents have used Moodle (94%), Google class (70), Blackbord (72) and Sakai (70%). Almost a 3rd of the respondents alluded that they have also used WebCT (33%) and ATutor (30%). The results show that most respondents had exposure to a number of LMSs, which strengthens their judgement regarding the usefulness and ease-of-use of LMSs. The section below discusses the respondents' usage pattern of LMS (Moodle) on daily basis as this is the main LMSs in both institutions. Results as presented in Fig 5.2 indicate that LMSs hold a lot of promise if causes of usage stoppages are addressed. Seemingly, the uptake of LMSs is relatively high but there are major de-motivators that cause partial use or total stoppage as indicated below.

5.7 Questionnaire findings: Summary of LMS Usage Patterns.

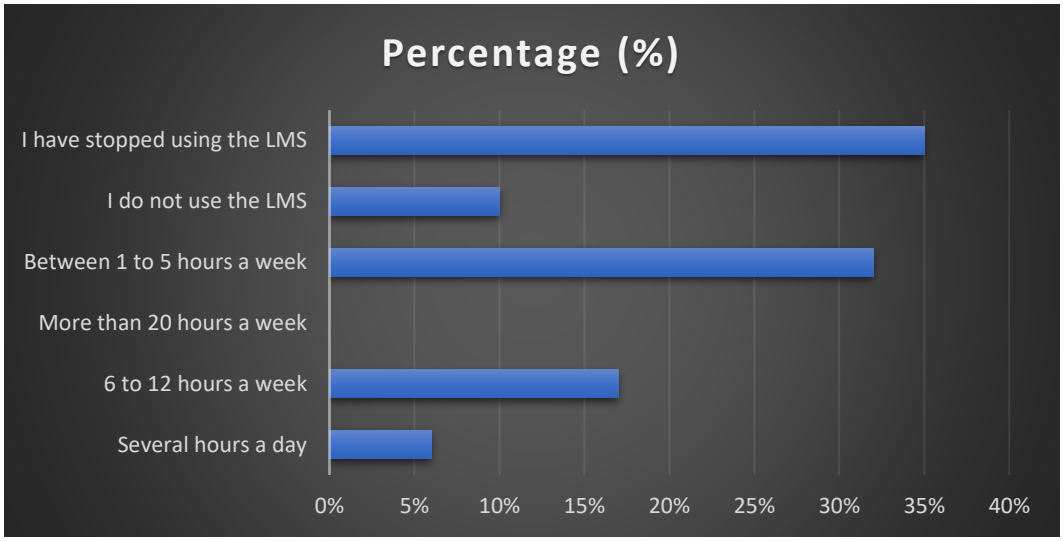


Figure 5.2: Summary of Usage Patterns

Figure 5.2 above summarises the hours spent by instructors using the LMSs in both institutions. The information shows that 10% of the respondents do not use the LMS. Given that some modules in the Bio-Chem departments requires lab experiments and other activities, it is not surprising that the instructor may find the existing LMS (Moodle) to be very limiting to use. 35% of the respondents indicated that they have stopped using an LMS. Respondents were asked to share their usage experience and motivations behind their continuity or stoppage. Responses are discussed at the end of this section.

Only 6% of the instructors claim to use the LMS for several hours a day and 17% moderately use the LMS in their pedagogical duties on weekly basis. The usage trend reflects low LMS usage, inconsistency and a high rate of stoppage. These patterns may be a reflection of instructor attitude and feeling towards the LMSs due to usage experience. Research has established that a number of variables contribute towards attitude which may include experience and satisfaction.

The following section are responses from an open-ended question asking the respondents to relate what influences their behaviour in using LMSs. The responses are quoted in verbatim below and the motive behind use indicated in addition after the response:

1. “The system is very convenient; the ability to share my information with all learners in different places by a click of a button is very nice. The problem is excessive power cuts and intermittent internet”

2. “LMSs have enabled me to teach and coordinate my class easily. My frustrations are that internet availability is not consistent and my students have limited access to computers”

3. “My students should easily access all my communication from their phone devices but they often claim that downloading them takes a lot of time because of slow speed.”

4. “I could access my data anywhere without carrying my laptop around but I need more training on using certain functions.”

5. “I find the use of LMSs limiting as I need internet services. Our internet speed is very slow and its availability inconsistent”

6. “I cannot rely on LMSs anymore to do my work; power supply is extremely poor on campus.”

7. “I ended up stopping using the LMS, IT is not supportive when I have challenges accessing the system.”

8. “I did not get enough orientation to use the LMS. I do not know how to hold a live session with my students and I have not been helped so far.”

9. “I have only used Moodle, I found it easy and trustworthy to use but my students insist that they cannot access the system because of internet challenges”

10. “I stopped using LMSs as a matter of a choice. Most of my students do not access it and few read their emails.”

11. “I tried using the LMS but I find most features difficult to navigate. Management should prioritise training of employees”

12. “I find LMSs to be an efficient tool of reaching many students at once. But very few staff members and students use ICT.”

13. “Access to all my shared course materiel by students is possible anytime and anywhere but there is no policy directing users.”

14. “My documents and applications are accessible via the network 24 hours and are very secure.”

15. “I recently started using our LMS; my challenge is that there is no culture of ICT usage among students and stuff.”

A significant number of respondents indicated that they have stopped using the LMS. Section 5.6 discusses challenges that influence the choice of instructors to continue employing LMSs to execute their duties.

Respondents feedback show that internal and external factors influence usage patterns of instructors. These factors include power cuts, internet connections, low usage rate of technology and many others that make it difficult for instructor to use the LMS tools at their point of need. These external factors may be outside the control of instructors and the institutions as highlighted by the responses given. Research has shown that factors that negatively affect usefulness and ease-of-use of LMSs may lead to user stoppage. The following section discusses the LMS internal motivations that affect usage patterns.

5.8 Questionnaire findings: Perceived Ease-of-use and Motivations for Stoppage/ Continued-use of LMSs

The barriers to use LMSs presented by respondents can be summarised into two most important variables namely ease-of-use and usefulness. The below is a summary of responses from the close ended question that seek to clarify usage patterns. A Likert Scale, which ranged from 1 (Strongly Agree) to 5 (Strongly Disagree) was used to evaluate the feedback gathered.

Table 5.6: Instructor Feelings on Perceived Ease-of-use

	Percentage of instructors			
	Mean	**Median**	**Agree**	**Disagree**
LMS is easy to use	1.8 (Disagree)	2.20 (Disagree)	3%	85.71%
The organisation offers training programs regarding the LMS use	2.1 (Disagree)	2.3 (Neutral)	9.22%	89.77%
Training material is available during training	1.6 (Disagree)	1.75 (Disagree)	79%	11%
I always get assisted when I have challenges with LMS use	2 (Disagree)	2.4 (Disagree)	8.22%	75%
Management encourages using the LMS and appreciates the optimal use of the system to meet its goals	2.2 (Disagree)	1.86 (Disagree)	8.26%	78.13%
The management discusses problems regarding the LMS and provides all necessary resources to improve it	2 (Disagree)	2.2 (Neutral)	3%	85.71%
I find the LMS to be flexible to interact with	2.3 (Disagree)	2 (Neutral)	9.22%	89.77%
The LMS is available and flexible	1.6 (Disagree)	1.75 (Neutral)	79%	11%
Interacting with the system is a clear and understandable process	2.3 (Disagree)	2.1 (Neutral)	8.22%	75%

Table 5.6 shows that 85.71% of the respondents did not agree that an LMS was easy to use. The difficulty in usage may be a result of lack of training and orientation amongst other factors. 89.71% of the respondents disagreed with the assertion that they receive training to use the LMS. Ease-of-use has a significant influence on whether LMS users continue or discontinue using LMSs. Lack of training to a significant number of respondents may be an indication of poor coordination on the implementation and use of LMS by the mentioned institutions. 85.71% of the respondents indicated that management rarely discusses problem regarding LMSs and do not provide all necessary resources towards its continued-use. A significant number of instructors (89.77%) declared that it is hard for them to interact with the LMS as the process is not clear and understandable. Poor support structures to educate and sustain the use of LMS may be a huge contribution towards the difficulty being experienced by instructors as 75% of the respondents do not get assisted when they have challenges in using the LMS.

Poor coordination by management may affect usage rate amongst instructors and learners. Without proper management involvement and direction, institutions may be affected by unstructured LMS adoption and inconsistent use of LMS tools. Theoretical evidence suggest that two variables namely ease-of-use and usefulness determine choice to continue using a particular technology or not. Certain internal and external factors within institutions affect these variables. In this research, 90% of respondents confirmed that LMSs are useful to their daily work. The respondents highlighted a range of factors that make it difficult for them to continue using LMSs. The following section discusses results that affect instructor's perception regarding usefulness of the LMS.

5.9: Questionnaire findings: Instructor LMSs Perceived Usefulness

According to Dishaw et al., (2004), perceived usefulness is an important variable that shape attitude and behaviour of information systems users. In this study, a number of variables that determine the usefulness of an information system were clustered together and questions were posed to respondents as highlighted in table 5.7 below. Interesting responses were gathered and their analysis reveal valuable information that institutions can use to motivate continued-use of LMSs. The instructors feelings on perceived usefulness of the LMSs is presented in table 5.7 below.

Table 5.7: Instructor Feelings on Perceived Usefulness of the LMSs

	Participants Agreements			
	Mean	**Median**	**Agree**	**disagree**
Using an LMS in my job would enable me to accomplish tasks more quickly	4 (Agree)	4.20 (Agree)	88%	9.62%
By using the functions of the LMS, I can upgrade the efficiency of my work	3.12 (Agree)	3.07 (Neutral)	77.22%	12.70%
The LMS provides sufficient information	3.6 (Agree)	3.75 (Neutral)	79%	11%
The LMS contains enough topics to complete related tasks	4 (Agree)	4.4 (Agree)	82.22%	11%
I believe it is worthwhile for me to use the LMS routinely	3.12 (Neutral)	3.86 (Agree)	66.20%	13.13%
I believe that using the system will further increase my daily work	4 (Agree)	4.20 (Agree)	72%	12.71%
I have fully accepted the LMS in my daily work	2 (Disagree)	1.87 (Disagree)	12.22%	79.77%
I am pleased with the experience of using LMS	2 (Disagree)	2.87 (Disagree)	9.22%	89.77%

Table 5.7 above summarises results that were obtained from respondents regarding the perceived usefulness of the LMS. These variables include efficiency, productivity, compatibility, number of system visits and enjoyment. 89.77% of the respondents affirmed that they are not pleased with the experience of using the LMS. 79.77% of the respondents confirmed to have not fully accepted the LMS in their daily work. The mentioned assertions seem to contradict the beliefs of the instructors regarding the LMSs. This seeming contradiction may be a positive indication that LMSs hold a promise of being effectively used in the institutions of Zimbabwe. 88% of the respondents believed that using an LMS in their jobs would enable them to accomplish tasks more quickly. 66.20% believed that it is worthwhile for them to use the LMS routinely, as this would increase their efficiency. The instructors seem to be convinced that the LMS is a useful tool in their pedagogical duties but somehow are

demotivated by certain factors to fully accept the LMS tools as their main tool of teaching. There is a compelling need to investigate this seeming contradiction. It can be deduced from the empirical findings that instructors are mainly demotivated by factors that affect the ease-of-use as presented in Table 5.6.

It was also necessary for the researcher to assess consistency in the manner in which questions were posed to the respondents. Table 5.8 below summarises the values of variables that composed the Alpha value. An acceptable value of alpha (78%) was achieved thereby indicating some internal consistency on the research instrument used. Table 5.9 below is a summary of Cronbach Alpha analysis results on instrument consistency for both perceived ease-of-use and perceived usefulness questions as presented in table 5.6 and table 5.7 were as follows;

Table 5.8: Cronbach Alpha Results

No of questions or components	17
Average covariance	4.7442
Average Variance	26.2144
Cronbach's Alpha	78%

The sum of item variables and variance of the total scores were calculated using the Cronbach Alpha's formula to derive the value of Alpha. The value of Alpha indicates that research consistency was achieved in the manner in which questions were posed. The high percentage value of alpha indicates that possible question overarch exist, however the result still indicate that there was consistency in data collection and a valuable solution may be developed based on the responses gathered. A lower Alpha's value would mean huge variances would have existed in the data collection and inconsistency would be a negative reflection on the quality of data gathered. The value of Alpha (78%) reflects that acceptable internal consistency was achieved and gathered data can be reliable. The section below summarises the findings already discussed in this chapter.

5.10 Summary of Data Analysis Findings

This section presents a summary the empirical findings as discussed above. Interesting findings were established for the open-ended and closed ended questions in this study. It was necessary for the study to identify variables that affect instructor feelings, attitude and opinion on the usefulness and ease-of-use on the LMSs. To strengthen the reliability of the findings, Cronbach alpha analysis was done to assess the strength and consistency in the manner in which primary data was gathered using the questionnaire instrument. Interesting and encouraging results were attained as the alpha value was found to be at an acceptable range that indicates internal consistency. A thematic analysis of open-ended responses also indicated clarity on the causes of discontinuation by instructors to use LMSs. The results indicate that instructors from the two institutions see value in LMSs but a range of internal and external factors disrupt their efforts to perform their duties using the LMSs.

Table 5.9: Summary of Key Findings

Summary of the key findings:
Open ended questions
- Respondents revealed that LMSs are a valuable and relevant tool in the execution of their duties - All respondents revealed that they are familiar with a range of LMSs, the most popular being Moodle - Findings revealed that respondents have willingness to use LMSs but are demotivated mentioned internal and external factors. A significant number has since stopped using the LMSs with some minimising their use. - Key demotivation and disablers of continuous use of LMSs include power-cuts, poor internet connections, culture of low ICT usage across the institutions and lack of management support. - Despite these challenges, gathered responses indicate that instructors still view LMSs as a right tool in the execution of their duties.
Closed ended questions
- The section mainly focused on two key variables of TAM namely 1. Perceived usefulness and 2. Perceived ease-of-use - Findings reveal that respondents perceived LMSs to be very useful - Findings also revealed that perceived ease-of-use was very low amongst instructors. This is supported by findings on the open ended questions and literature - The perception on the ease-of-use was influenced by already highlighted difficulties regarding use of LMSs. - Cronbach Alpha analysis revealed strong consistency on the research instrument with an Alphas percentage value of 78%. There could have been an overarching on the questions but instrument consistency was proven and therefore it could be inferred that correct information was solicited from respondents.

The following chapter discusses the development of a strategy that can be employed by the institution to deal with existing challenges and motivate instructor continued usage of LMSs.

5.10 Conclusion

This chapter was aimed at gaining deeper insight into the current position and the continuous utilisation of LMSs in Zimbabwe's higher learning institutions. 100 responses were received after questionnaires were administered in the two leading institutions of Zimbabwe to solicit opinions, intentions, experiences and existing attitudes towards the use of LMSs. This chapter thus analyses and interprets the data gathered by means of qualitatively

establishing patterns of behaviour. The chapter analyses and interprets the collected data while contributing towards the development of a continued LMS use strategy for tertiary institutions in Zimbabwe. The proposed strategy and critical success factors necessary for the strategy success will be presented as recommendations to the institutions of higher learning of Zimbabwe in the following chapter.

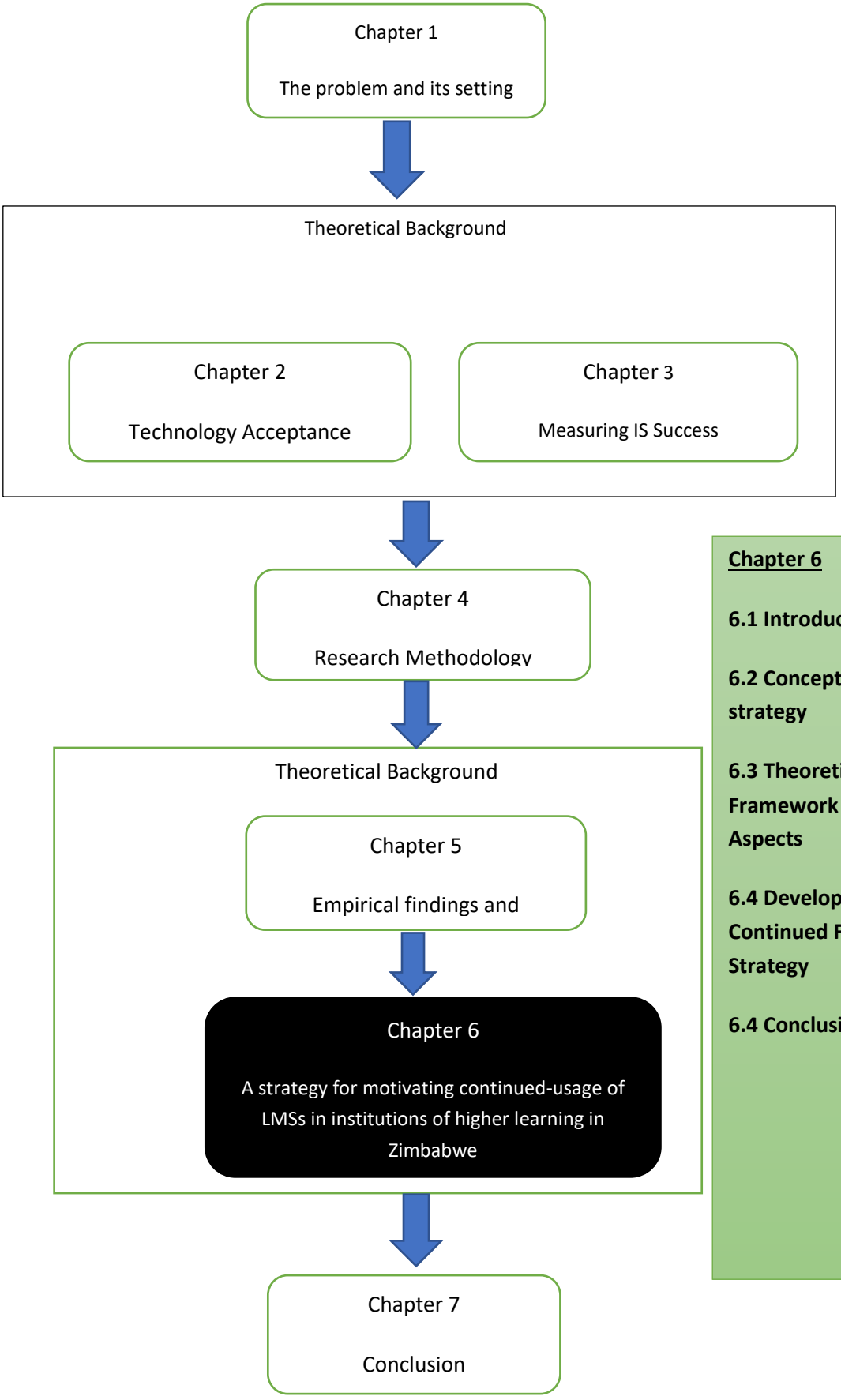
From the questionnaires findings it was clear that the respondents did have knowledge on what they termed Learning Management System. The questionnaire also confirmed that all respondents had made use LMSs.
In terms of LMS benefits the questionnaires findings revealed that, flexibility, productivity and efficiency were the most important benefits.

From the questionnaires findings it was found that internal and external variables such as management support, training, internet connections and power-cuts directly affect attitude and use of LMSs by instructors. The questionnaire also confirmed lack of structural approach, user education and general culture of low ICT use as main concerns that contribute to decrease in the use of LMSs.

There is therefore a need to establish and formulate a strategy that institutions can use to motivate continued-use of LMSs. The next chapter provides a detailed discussion of the development of the proposed strategy for motivating continued-use of LMSs. The proposed strategy was based on the literature reviewed and the questionnaire findings that were discussed in this chapter. The remaining primary data collected, in the form of expert reviews used to refine the strategy is also provided in the next chapter.

CHAPTER 6:

A strategy for Motivating Continued-Usage of LMSs in Institutions of Higher Learning in Zimbabwe



Chapter 6

6.1 Introduction

6.2 Concept of a strategy

6.3 Theoretical Framework & Co-Aspects

6.4 Developing the Continued Full-Use Strategy

6.4 Conclusion

6.1 Introduction

The previous chapter discussed the empirical findings in the two Zimbabwean institutions. These findings reveal that instructors have some great exposure and an appreciation of the usefulness of the LMSs. There are however factors beyond the control of instructors that demotivate the continued usage of LMSs. This chapter aims to develop a strategy that Zimbabwean institutions can implement in order to realise continued instructor LMS usage. The identification of what hinders continued full use of LMSs and eliminating such factors contribute towards a continued usage of LMSs.

6.2 The Concept of a Strategy

According to Gartner (1997), the word strategy originates from the military battlefield and it details the future courses of action to outwit a competitor. Unique tactics intended to aid goal attainment are defined within a broad strategy. These tactics could be a pattern of behaviour by the organisation or its function. This study seeks to develop a tailored LMS continued usage strategy for selected Zimbabwean institutions.

6.3 Theoretical Framework and Core aspects

TAM and D&M IS success model both allude that individual technology use is a conscious decision; therefore, it is born out of intention to do so (Bower & Sturman, 2015; Holdsworth & Hegarty, 2016). They then argue for the identification of elements that cause behavioural intention. The behavioural intention can change after the initial use of a given technology. For example, a study by French, Luo, and Bose (2017) discovered that a certain age group of individuals in South America stops using the Internet after a period of 6 months of initial use. The discontinued LMSs usage by instructors is an existing problem mainly linked to demotivation and dissatisfaction (Dold, 2016). It is imperative that factors that sustain the continued-use of LMSs in higher learning institutions be identified. The sustained use of LMSs lead to academic, financial and social benefits to any given economy (Chang, Chang, Wu, & Huang, 2015). The variables of both the TAM and D&M IS success model directly affect user satisfaction and ultimately the use of a given information system or technology.

6.4 Developing the Continued LMS Full-Use Strategy

This section details the development of the initial artefact, refinement steps and the presentation of the final artefact.

6.4.1 Strategy direction

The purpose of the LMSs continued full use strategy is to equip higher learning institutions of developing economies to fully utilise teaching technology and derive the benefits thereof. The strategy direction is a derivative of the long-term objective of the organisation (Enz, 2009). The strategy should be in line with the vision and mission of the organisation. The following subsection will address the environmental assessment.

6.3.2 Environment assessment

According to Lester and Waters (1985), sound environmental analysis retains the following three characteristics;

- Gathering and assessing of information
- Use of information in making strategic decision making
- Good assessments are conditioned and formal

In this study, the environmental assessment was formal and conditioned while the viewing was guided in a specified environment.

6.3.3 Strategy Formulation

A good strategy is defined by how it is formulated. The formulation of the strategy has three mandatory steps namely diagnosis, guiding policy and coherent actions. The formulation step is being guided by the step of environment assessment that involved review of literature and empirical questionnaire findings. After an environmental assessment was completed in two institutions (NUST and MSU), a summary of challenges, gaps and weakness in the use of LMSs was diagnosed and summarised in the table below.

Table 6.1: Summary of Diagnosis Results after Environmental Assessment

Challenges	**Gaps**	**Weaknesses**
• Minimum leadership support	• Lack of coherence in implementation	• LMS organisational policy does not exist.
• Lack of financial resources	• Lack of controls – no one monitors if available tools are utilised or not	• Departments function with huge autonomy and there is no formal IT governance
• Poor Internet access and infrastructure	• Differences in instructor characteristics	• LMS user education does not exist
• No guiding policy and consistent actions	• No clear cut short term and long term goals as well as LMS use objectives for instructors	• Poor stakeholder management
• Low ICT usage	• Lack of institutional regulation	• Low ICT prioritisation by the institutions
• Power shortages and poor service delivery	• Lack of research and development	

The questionnaire findings show that 88% of the respondents cited **a culture of low ICT usage and prioritisation within the institutions** as one of the major challenges. Simple popular electronic tools as emails are not recognised as a standard and formal method of communication within the institutions. Instructor student communication is

still largely verbal and non-electronic mainly due to low usage of ICT. Additionally, 88% of the respondents confirmed **poor Internet connectivity** as a disruption to any form of communication between instructors and learners. Instructors insist that some students fail to submit their assessment work and cite poor Internet connection as an excuse. Without Internet, LMSs are not able to serve their purpose.

The environmental assessment diagnosed that 98% of the respondents felt the need for improving existing **poor network infrastructure**. The Internet broadband speed, Internet access points and computer student ratio is not encouraging use of LMSs. Internet access is the lifeblood of any ICT initiative with an objective of being successful. The use of LMSs by instructors and students is anchored on availability of Internet. Most instructors complained that students always find excuses for not submitting their work on the speed of Internet of which some students may be genuine in their excuses. Organisations and institutions that value IT do channel a huge portion of financial resources towards IT investment and in encouraging ICT use. 74 % of the respondents felt that **inadequate financial resources** devoted towards ICT has resulted in a culture of low ICT use particularly LMSs right across the departments of the two institutions.

72% of the respondents mentioned the absence of **IT governance structure** to regulate and monitor the use of ICT within the institutions as a setback. IT is regarded as a support function instead of being a driver of research, innovation and development. Implementation of IT projects is still unstructured and unregulated within institutions resulting in lack of accountability by instructors. The institution, faculties, department and individual instructors do not have set goals, objectives, programs and plans of using or contributing towards the vision of LMSs usage. 68% of the respondents alluded that **LMS use is incoherent and lacks guiding principles**. Policy and coherence gaps hugely contributes towards poor implementation and evaluation of LMS use. A clear guiding policy accompanied by acceptable and unacceptable principles of LMS use would create clarity amongst users. A good guiding policy would create uniformity and conformance among instructors. Progress in usage and acceptance can easily be tracked and monitored if there is a guiding policy that cut across the academia.

Due to **extensive autonomy that exits amongst different departments and instructors alike**, the institutions lack a framework of controls that instil a culture of LMS use. Implementation of LMSs should be cascaded to all lower layers of the institution. Instructor behaviour should be guided by the principles of the institution. If the use of LMSs is embedded as one of the principles of the institutions, instructors can easily adapt to the culture of LMS use.

The following is a summary of key diagnostics identified above:

Diagnosis 1 (D1): Embedded culture of low ICT use and prioritisation

Diagnosis 2 (D2): Poor Internet connection and technological infrastructure

Diagnosis 3 (D3): Poor stakeholder management

Diagnosis 4 (D4): Lack of LMS user regulation

Diagnosis 5 (D5): Lack of Resources

Diagnosis 6 (D6): Lack of Research and Development

Diagnosis 7 (D7): Lack of Training and Development

The above diagnostics is a summary of key findings that need to be addressed by providing guiding policy positions and coherent actions. A panel of experts assessed the completeness and relevance of these findings as an input to the continued LMS usage strategy before guiding policies and coherent actions were developed. Poor diagnostics of the existing problem would result in a weak strategy that would fail as a desired solution. The panel advised that Diagnostics 7 (D7: Lack of training and development) would be more valuable to the strategy if presented as a coherent action when addressing a structural problem of low ICT usage and prioritisation. The panel was convinced that lack of training and development was a symptom rather than a source of demotivation. The input from expert reviewers led to the refinement of key diagnostics and the reduction of their number from seven to six as presented in section 6.4 below. A combination of all diagnostics, guiding policies and coherent actions complete the proposed continued LMS usage strategy.

6.4 Diagnosis, Guiding Policy and Coherent actions towards Continued LMS Usage

A proposed strategy of individual diagnostics, proposed guiding policies (GP) and coherent actions (CA) are discussed in the following subsections.

6.4.1:D1: Embedded culture of low ICT use and prioritisation

Use of ICT should be encouraged at government level, while institutions should prioritise the ICT usage internally. Most institutions in developed economies have developed online systems of interaction with prospective and registered learners. NUST and MSU still have a low culture of ICT use and utilisation with simple ICT tools such as emails not yet recognised as formal channels of communication. The continued full use of LMSs will not be realised unless ICT is prioritised at institutional, departmental and instructor levels. To assist the institutions to change this culture, the following guiding policies are proposed.

a) GP1.1: Leadership

Institutions must take lead in changing the culture of low ICT use by investing more in IT education. Each institution must take up the responsibility to ensure that ICT usage in general is entrenched at all levels of the institution by conducting workshops that promote IT usage. A committee that oversee a new culture of prioritising interaction through ICT use should be established. The suggested action is as follows:

a) CA1.1.1: Lay solid foundations for management oversight.

b) GP1.2: Establishment of institution - led initiatives to change ICT culture

It is clear that MSU and NUST are not doing enough to raise awareness about LMS benefits amongst stakeholders. The institution is not engaged in any program of formally training its instructors and students on usage and on dedicating resources towards research to improve implementation. In USA and Europe, strides of success have

been realised through taking the aforementioned actions, which are worth emulating. Perhaps the point of departure is the establishment of national means, as suggested below.

i CA1.2.1: Establish an inter-institution LMS awareness campaign

ii CA1.2.2: Encourage enhanced performance through training and development

c) GP1.3: Management Continuous Support

Continuous management support is necessary to initiate a structured management and use of LMSs. This can ensure that institutional efforts are rolled-out, monitored, controlled timeously and that they remain relevant.

i CA1.3.1: IT must be represented at senior organs of the institution.

6.4.2. D2: Lack of Resources

Resources are an essential component, be they financial resources, infrastructure, information, people or application. The following questions regarding resource allocation should be asked. How large should our LMSs budget be; and how should we spend it? How much of our LMSs budget is spent on systems and tools; and how much on awareness and culture change? (KPMG, 2014). Higher learning institutions in the developed economies ask these questions hence the clarity of their financial resource allocation. Zimbabwean institutions should emulate and adopt this approach. The guiding policy and coherent action is stated below.

d) GP2.1. Resource allocation

i. CA2.1.1 Allocate sufficient dedicated financial capital towards IT projects.

6.4.3. D3: Poor technological infrastructure and service level agreements

Internet connection and good technological infrastructure are keys of success. Without Internet, alone, the use of LMSs is virtually impossible. Sadly, the institutions in Zimbabwe are battling with poor broadband connection, which comes at a high cost. Internet providers in Zimbabwe have the capability of installing high-speed access for institutions. The missing link is good service level agreements that empower institutions to hold service providers into account should Internet services fall outside the agreed spectrum. Properly drafted service level agreements will standardise the Internet supply and ensure that Internet use is predictable within the institutions. This is a requirement before rolling out important programmes like blended learning.

a) GP3.1 Service level agreement

i. CA3.1 Draft and enforce service level agreements

6.4.4. D4: Poor stakeholder management

The functional LMSs strategy should properly align the institutional programs with all supporting programs of stakeholders by engaging and communicating the outcomes of the strategy to stakeholder participants. Unfortunately, important stakeholders like academic members, power utilities, Internet providers and student bodies are not participants during the strategic planning and implementation of LMSs at MSU and NUST. The institutions should take the lead in engaging and clarifying the responsibility of each stakeholder during the

engagement process. This approach is beneficial because all the stakeholders are part of the strategic planning throughout the implementation process.

a) GP4.1: Stakeholder engagement

For successful stakeholder engagement, a plan has to be in place to specify the purpose of the engagement; the envisaged results from the engagement; as well as the manner in which the engagement will take place (Cundy et al., 2013). Different methods of engagement can be used for different stakeholders. These methods include meetings, workshop, conferences and surveys.

i. CA4.1.1 Develop a stakeholder engagement plan.

b) GP4.2: Partnership and collaboration

Institutions should establish partnerships with service providers, government and other stakeholders. Additionally, international partnerships should be established.

i. CA4.2.1 Establish relevant sector partnerships

ii. CA4.2.2 Establish International partnerships.

6.4.5. D5: Lack of regulation on LMS use

Institutions should develop a formal policy guideline to regulate LMS use. The lack of formal LMS policy guidelines is not unique to institutions of Zimbabwe. Some institutions in developed countries are leading in this regard and this creates an opportunity for developing countries to learn and adopt practices that are applicable to their needs.

a) GP4.1: Comprehensive ICT and LMS policy

From a national level, there is a great need for ICT and LMS policy. Currently, institutions in Zimbabwe do not have a framework for regulating LMSs use. Certification and accreditation program to encourage compliance with the national and institutional policies.

i. CA4.1.1: Develop a LMS policy

ii. CA4.1.2: Develop LMS implementation standards

iii. CA4.1.3: Establish accreditations for compliance programs

iv. CA4.1.4: Adopt competency models for institutions.

6.4.5. D6: Lack of Research and Development

The need for research cannot be over-emphasized. Industries in Zimbabwe appreciate the need to collaborate with higher education institutions for the purpose of research and development (Mbengo, 2014). Research and development can contribute greatly to the development of a context-sensitive solution that will ensure that instructors and learners take advantage of the potential of LMSs.

b) GP5.1: Establish LMSs Research Program

The research agenda should have projects that ultimately position institutions to successfully implement and utilise LMSs. Additionally, the research outcomes should develop statistical data particularly on institution-specific needs in order to develop a tailor-made LMS use programs.

ii. CA 5.1.2: Establish inter-institutional LMS research agenda.

Table 6.2: Summary of the Research Contribution: (Continued LMS Full-Use Strategy)

Diagnosis	**Guiding Policies (GP)**	**Coherent Actions (CA)**
Diagnosis 1 (D1): Embedded culture of low ICT use and prioritisation	GP1.1 Leadership GP1.2 Institute change of ICT culture GP 1.3 Management Continual Support	CA1.1 Lay solid foundations for management and oversight. CA1.2.1: Establish an institution LMS awareness campaign CA1.2.2: Encourage enhanced performance through training and development. CA1.3.1: Use of IT must be encouraged at senior organs of the institution.
Diagnosis 2 (D2): Lack of financial Resources	GP2.1. Resource allocation	CA2.1.1: Allocate sufficient dedicated financial capital for IT projects.
Diagnosis 3 (D3): Poor Internet connection and technological infrastructure	GP3.1 Service level agreement GP3.2 Partnerships and Collaborations	CA3.1.1: There must be clarity of expectations in the SLA to guide managers and service providers. CA3.2.1: Establish sector relevant partnerships. CA3.2.1: Establish international partnerships.
Diagnosis 4 (D4): Poor stakeholder management	GP 4.1 Stakeholder engagement GP4.2 Partnership and Collaboration	CA4.1.1 Develop a stakeholder engagement plan. CA4.2.1 Establish relevant sector partnerships CA 4.2.1Establish International partnerships.

Diagnosis 5 (D5): Lack of LMS use regulation	GP 5.1 Structure the Institutional bodies to add value	CA5.1.1: Develop a comprehensive institutional policy. All governance bodies should have clearly defined and public terms of reference. CA5.1.2: Develop LMS implementation standards CA5.1.3: Establish clearly prioritised objectives for the LMS service CA5.1.4: All LMS-related activities should encourage and deal with input from stakeholders at all stages. Issues, concerns and suggestions must be dealt with as they arise.
Diagnosis 6 (D6): Lack of Research and Development	GP 6.1 LMS research program	CA5.1.1: Establish inter-institutional LMS research agenda. CA5.1.2: Collect research findings and tailor them to institutional needs.

Guiding policy defines how the identified and defined challenge was tackled and coherent actions are well co-ordinated steps of action taken in addressing the guiding policy. A strategy can be considered a bad strategy if it does not retain these components in its development (Rumelt 2011). A strategy must define feasible and possible actions that can be carried out immediately. If a strategy does not spell out these immediate actions, then it will be impossible to implement. The proposed strategy actions should be rationale enough to encourage a culture of continued instructor maximum utilisation of LMSs. Steps 2 and 3 under the strategy formulation step are a response to the outcomes of the diagnosis step. In this study, the environment assessment was fully conducted by practical field data collection and thorough consultation of secondary sources of information.

6.5 Strategy implementation

The implementation of the standard simply means the execution of activities that make up a strategy. According to Glueck (1972), strategy implementation is complex and most strategies fail at the implementation stage. The higher learning institutions should address the prerequisites for the implementation of the ICT strategy. The prerequisites include the actions that institutions need to perform before ICT and LMSs can be effectively utilised by instructors. The point of departure in strategy implementation is stakeholder engagement, since external stakeholders provide critical infrastructure such as Internet and power.

Successful implementation of the strategy should be guided by the concept of stakeholder involvement. During policy formulation and implementation, there should be high level of participation between those who crafted the policies, those who are supposed to implement the policies and those who are affected by the policies. Stakeholder involvement can either be in the form of partnership or participation as these two involve a two-way

engagement, shared accountability and responsibility. Stakeholder involvement ensures that the concerns of the instructors, institutions and external stakeholders are addressed. All stakeholders must be involved so that their input in the policies and laws that affect them are taken into consideration. Every stakeholder should play their part and should understand how their roles affect other stakeholders. There should be no antagonism between the service provider and the recipient; instead, there should be cooperation and collaboration. Stakeholder involvement should lead to the overhaul of the current business relationship, which should result in enforceable service level agreements.

6.6 Strategy control

The guiding policies and coherent actions defined in Subsections 4.3.7 play a crucial role in the strategy-control phase. In this section, it is suggested that the body responsible for LMS should define benchmarks for all the initiatives that will be developed. It must also stipulate clear success indicators for each of the initiatives. This will ensure that progress is made in achieving the targets. After a program is rolled out to the targeted audience; it should be evaluated, in order to rule on its effectiveness. From the results of the evaluation, the strategy can be amended accordingly. To ensure transparency to all the stakeholders, periodic reports must be published. The following section will provide some concluding remarks. Adhering to the strategy control process, as defined in subsection 4.5, together with the control policies recommended in the proposed strategy, can ensure that the objectives of the strategy would be achieved.

6.7 Strategy Validity

A good strategy is characterised by identifying what hinders the organization in reaching the goals, and identifying precise and coherent actions that need to occur to remedy the hindrances towards achieving the goals. To cement the validity of the strategy, the panel of experts reviewed the complete proposed continued-use strategy as presented in section 6.2 above. The panel advised the researcher to present critical success factors that are necessary for the proposed strategy to be effectively implemented. Table 6.3 highlights the critical success factors backed by theoretical and empirical findings. These critical success factors were presented and duly accepted by the panel as a necessity for the strategy to be valid and useful in the selected Zimbabwean institutions.

Table 6.3: Critical Success Factors for the Proposed Strategy

CRITICAL SUCCESS FACTOR	*THEORETICAL FINDINGS*	*EMPERICAL FINDINGS*
Govern the use of IT in the entire institution.	CoBIT 5 and King V urge for structured way of managing IT within institutions	90% of the respondents believed this to be relevant in enhancing consistency and continuity of LMS use
Build enough capacity on Internet access and IT infrastructure	IS Success Model and Technology Acceptance Model External variables	96% of the respondents believed this to be a concern for both instructors and students in an academic environment
Establish formal structures that audit (regulate and monitor) the use of LMSs	CoBIT 5, ITIL and King 5, Principles and processes	70% of the respondents believed this to be relevant for enhancing continued full use of LMSs
Prioritise and instil a culture of ICT use throughout the institution	Attitude towards use – Technology Acceptance Model and IS Success Model	86% of the respondents believed this to be extremely relevant in enhancing full use and continuity of LMSs
Introduce and equip instructors with timely training sessions	Service quality construct – D&M IS success model	66% of the respondents believed this to be relevant in enhancing self-efficacy and in building strong intentions to use LMSs by instructors
Draft enforceable Service Level Agreements with service providers (Internet providers and power suppliers)	Service quality construct – D&M IS success model	90% of the respondents believed this to be a concern for institutions and individual service consumers
Secure instructor opinions and buy in before acquiring software for teaching purposes	Information quality – D&M IS success model	66% of the respondents believed this to be relevant for enhancing loyalty and continued-use of LMS by instructors

6.8 Conclusion

The development of a strategy to enhance continued full use of LMSs in higher institutions was an iterative process. The first step of the process was problem identification and environment assessment. Practical engagement with the selected institutions was done to understand the nature of the practical environment challenge. Analysis of the gathered information was done and expert reviews were done to further refine strategy

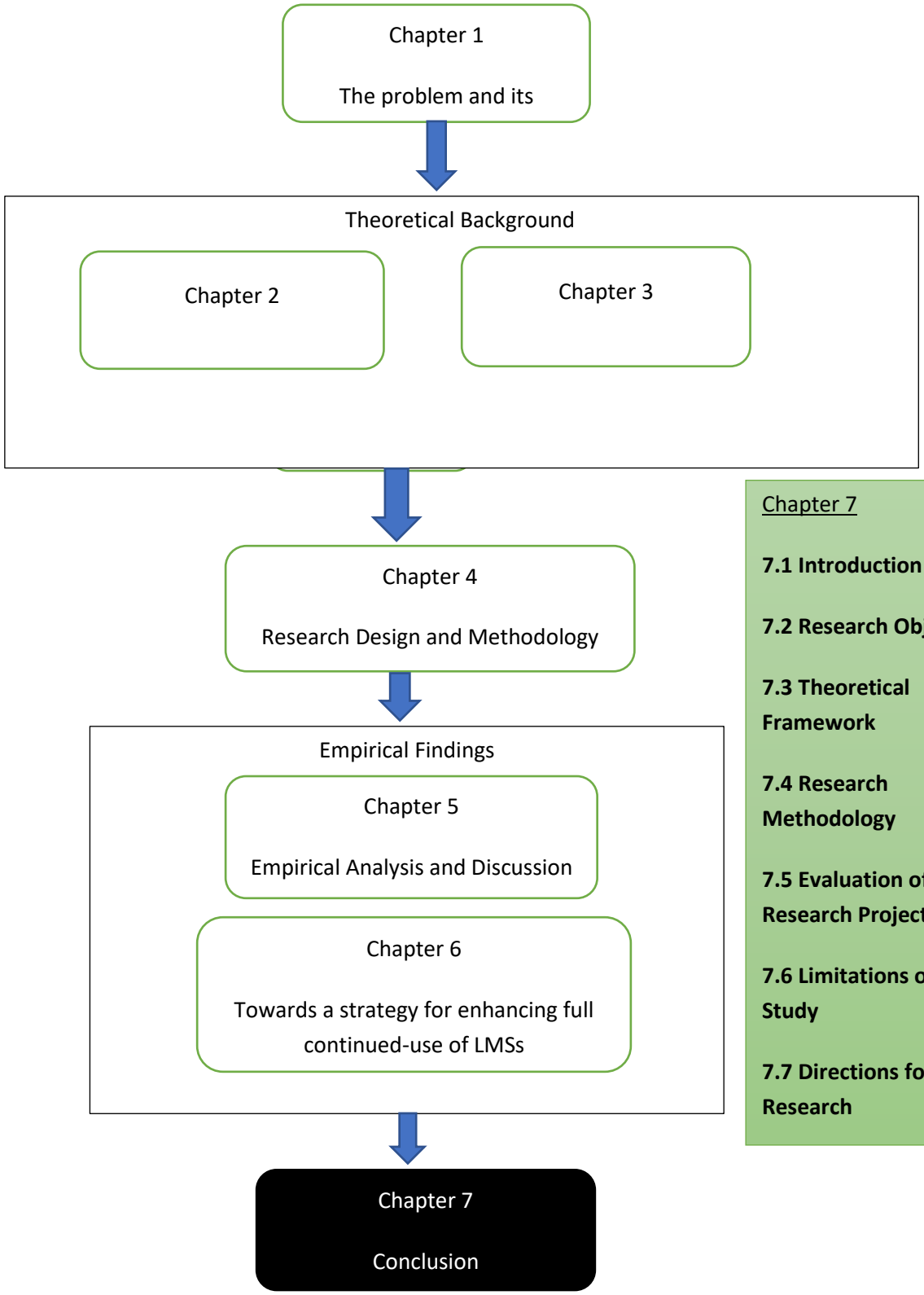
development and implementation. A successful strategy should address the existing real work environment problem while consistent with the objectives and mission of the organisation.

In the development of the proposed strategy, data collected from primary and secondary sources was analysed using statistical and qualitative measures to first diagnose the reasons why instructors in selected institutions of Zimbabwe stop using LMSs over a period of time. The identified reasons were presented before the panel of experts so that they scrutinise the comprehensiveness and relevance of these identified reasons. Major reasons identified included, general culture of low ICT usage, power-cuts, poor internet services and lack of resources amongst other factors as key sources of demotivation. The panel however recommended that lack of training and development is a symptom of structural problems and therefore should be removed from the identified sources of demotivation.

Two more rigorous steps of strategy refinement were reached when the diagnostics, guiding policy and coherent actions were presented to the panel of experts as a complete strategy. The panel scrutinised the proposed strategy and further recommended that critical success factors for the proposed strategy be presented as these would become foundational in implementing the proposed strategy. The presented critical success factors were also scrutinised by the panel to examine their relevance and feasibility towards the proposed strategy. All the critical success factors met the expectations of the experts except but one more critical success factor was recommended. The panellists believed that without formal IT governance structure in these institutions, it will be difficult to realise success on any long term IT projects. A comprehensive continued-use strategy was then compiled and presented to the panel, which agreed that all their recommendations were fully implemented. Strategy validity was achieved through the rigorous approach and use of expert reviews. The following chapter discusses the summary of all chapters from the proposal to the final proposed strategy presented.

CHAPTER 7

Conclusion



Chapter 7

7.1 Introduction

7.2 Research Objectives

7.3 Theoretical Framework

7.4 Research Methodology

7.5 Evaluation of the Research Project

7.6 Limitations of the Study

7.7 Directions for Future Research

7.1 Introduction

The research problem under investigation is stated and presented in Chapter 1 of this dissertation. The remaining chapters are proposing as solution to the discontinued-use of LMSs by higher learning institutions of developing economies. Chapter 2 and 3 discussed the theoretical background of the study while chapter 4 is centred on the design and methodology. The empirical findings are discussed in chapter 5 while Chapter 6 present the proposed strategy. Chapter 7 is the conclusion chapter of this research project.

The previous chapter of this research discussed the proposed artefact as an outcome of the research findings of chapter 5. This research project seeks to respond to the research primary objective and secondary objective, which constituted the strategy within which the findings are discussed. The strategy presented in this study is based on secondary data collected from the review of literature while primary data was obtained through a questionnaire and an expert review panel. The proposed strategy is refined through use of expert review panel to evaluate the artefact as set out by Design Science Methodology requirements.

This chapter provides a summary of discussion and conclusion of the treatise. Research objectives, theoretical frameworks, and research methodology are reviewed in this chapter. The credibility of the study is evaluated

7.2. Research Objectives

This project aimed to solve the problem of discontinued-use of LMSs by instructors in developing countries like Zimbabwe. The study investigated a question on how higher learning institutions of Zimbabwe can enhance continued full use of LMSs by instructors in their daily duties. Hence the primary objective of this study was to formulate a strategy that could be used to motivate adoption and continued-use of LMSs by instructors. This was achieved in the proposed strategy in chapter 7.

To answer the primary objective, the study further investigated

(1) Practical hindrances and challenges towards continuous use of LMSs encountered by instructors

The literature review in chapter 2 and 3 was used to answer this question. It was further answered in chapter 5 and 6. The earlier chapters outlined what successful implementation and use of LMSs would entail. The latter chapters solicited the opinions, experiences and challenges of instructors within their teaching environment. From the empirical findings, these hindrances were confirmed. They ranged from the following categories

- External factors
- Institutional factors
- Individual instructor factors.

This led to the inclusion of steps that address the institutional external environment in the developed strategy.

(2) The necessary conditions that must be met to achieve continued-use of LMSs

A range of necessary conditions that will enable continued-use of LMSs were identified. These in chapter seven are classified as critical success factors. To fully meet the conditions of success, a strategy was developed and presented. The pillars of a proposed strategy are diagnosis, guiding policy and coherent actions.

7.3 Theoretical Framework

Two technology models, TAM by Davis and the D & M IS success model were discussed at length to understand the fundamentals of successful technology adoption. The TAM and D & M's IS success model have so far triggered much research on Information systems adoption, acceptance and use (Al-gahtani, 2016). The successful evaluation and testing of these models practically and theoretical proves their robustness. Like the Siamese twins, TAM and IS success model are joined at the heart of measuring and enhancing the information systems success across fields, including the field of education which has not been spared by the infiltrations of technology. Oliver and Bearden, (1985); Venkatesh et al., (2016) and Davis (1989) and many other researchers have contributed immensely towards adoption and use of technology in many spheres. According to Ocak (2011), Davis's 1989 technology acceptance model (TAM) is a widely used model in the IS literature. In his TAM, Davis (1989) postulates that attitude, intention and the actual use of technology system is determined by two factors namely perceived usefulness (PU) and perceived ease-of-use (PEOU). In the past decade plus, the education sector has borrowed and successfully applied the principles of these two theories. For many researchers, the two models have influenced the future direction of research regarding the adoption and use of e-learning valuable insights on how to evaluate an adopted information system which could be useful in the formulating of a strategy to enhance continued-use of LMSs in particular. After the adoption of LMSs by institution, it is critical to measure the success of these teaching tools. The IS success model has provided comprehensive and valuable insights on how to evaluate an adopted information system which could be useful in the formulating of a strategy to enhance continued-use of LMSs.

7.4. Research Methodology

This study followed the principles of Design science methodology while retaining the realist paradigm. The design science methodology also retained the mixed methods approach as this is consistent with the realiist paradigm adopted for the study. The study used seven design science guidelines as shown in table 7.1 below;

Table 7.1 Design Science Guidelines

Design Science Guidelines	Description	Application
1. Design as an Artefact	The outcome of the design science research should be an artefact in the form of a construct, a method, a model or strategy.	This study proposes a strategy that can be used by institutions in motivating instructors towards LMS use, and therefore enhances continued LMS use.
2. Problem relevance	The solution produced under the design science research must address the practical business problem	This study identified underutilisation and discontinued-use of LMSs in higher learning institutions of Zimbabwe as the main problem. The study proposes a strategy to overcome this concern
3. Design Evaluation	The quality and efficacy of the design artefact must be demonstrated using well executed evaluation methods	The proposed strategy was evaluated using expert review. The experts were selected based on their expertise and experience on LMS adoption and implementation
4. Research contributions	Contributions should be clear and verifiable.	A strategy with guiding policies, coherent actions and critical success factors is the main contribution of this project. Implementation of this strategy is expected to motivate continued-use of LMSs in tertiary institutions of Zimbabwe and those of similar circumstances.
5. Research Rigor	The pillars of design are rigorous methods in the construction and evaluation of the design artefact.	The validity of techniques used in gathering and analysis of data for this project are discussed in Chapter 4. The said methods have been successfully used before by other researchers.
6. Design as a search process	The laws in the problem environment should be satisfied while utilising the available means to reach desired outcomes.	The comments and recommendations from expert reviews were used in the refinement of the proposed strategy while questionnaires and the review of literature was used to develop the strategy.
7. Communication of research	The technology oriented and business oriented audiences should be effectively presented with design science research.	This study will be presented before the faculty ICT.

(Source: Hevner, March, Park & Ram, 2004)

According to Hevner, et al. (2004), if all seven design guidelines are effectively employed, valid conclusions in terms of producing a strategy would have been achieved.

7.5. Evaluation of the Research Project

A proper evaluation of any research project examines if the project is trustworthy and credible. The guidelines of table 7.1 were used to evaluate the compliance of this study with the guidelines of Design Science Methodology. Five of Oates (2006) evaluation criteria for the realist research were adopted for this study.

1. *Trustworthiness*: The experts used are authorities in the implementation of teaching technology. Thus, the recommendations made by these experts can be considered trustworthy.

2. *Confirmability*: In this study the questionnaire was used and the theoretical findings were confirmed. This led to the development of the research strategy which was then confirmed through expert reviews.

3. *Dependability*: Dependability is established through borrowing from authorities and experts who have made significant contributions in the field of study. TAM by Davis and D&M IS success model are extensively used as theoretical foundations of this study adding to its dependability.

4. *Credibility*: Credibility has been achieved through the use of multiple data collection techniques and the use of expert review.

5. *Transferability*: Transferability has been achieved as the strategy can be applied by institutions on other new technologies with similar characteristics.
Through the application of these five criteria, the research project can therefore be considered credible.

7.6 Limitations of the Study

The objective of this study is to achieve continued-use of LMSs in higher learning institutions of Zimbabwe. The study has sought only the experiences of instructors and hindrances to their continued-use. Learners are part of the most important constituency of stakeholders regarding adoption and use of LMSs. This study did not seek their opinions and experiences. This could limit the full identification of some key hindrances towards continued-use of LMSs in learning institutions. The research project was conducted only in two institutions out of a possible 18, in Zimbabwe alone. This could further limit the findings for generalisation given the complexities of each institution and its different goals. The proposed LMS Continued-Use strategy was refined through a number of iterations but the finalised strategy was not tested. Future research may address this part.

7.7 Directions for Future Research

Further research can be undertaken to seek the experiences of learners in developing economies as highlighted above. Learners experience will add value in seeking strategies of continued full use of LMSs at learning

institutions. In addition, researchers can explore teaching technologies that are mobile phones friendly given the high penetration rate of mobile phone ownership in developing economies.

7.8 Conclusion

This study sought to address the perennial problem of discontinued-use of learning management systems in higher learning institutions of Zimbabwe. To answer the problem in question, a strategy which encapsulates critical success factors is developed. The development of this strategy is anchored on a sound methodology which includes rigor in the review of literature, conducting primary data collection using questionnaires and expert reviews. Furthermore, expert reviews are conducted in the review of the questionnaire and in each stage of strategy development. The refined strategy passes the scrutiny of the panel of experts who are chosen based on their sound academic background and solid exposure to LMS implementation and use. The formulation of the strategy which includes the diagnosis of the problem, developing the guiding policy and stating the coherent steps. This research project presents a practical strategy for motivating instructor continued full use of LMSs in discussed in Chapter 6. The significance of this study is the improvement in e-learning, adoption and continued-use of LMSs in higher learning institutions of Zimbabwe.

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Appendices

Questionnaire

Strongly Agree(5), Agree (4), Neutral (3), Disagree(2), Strongly Disagree (1)

Element	Statement	Agreements				
		5	4	3	2	1
Adaptability	It is easy for me to become skilful at using the system					
	I find the LMS easy to use					
Compatibility	The LMS contains enough topics to complete related tasks					
	The LMS provides sufficient information					
Efficiency	Using an LMS in my job would enable me to accomplish tasks more quickly					
	By using the functions of the LMS, I can upgrade the efficiency of my work					
Enjoyment	I am pleased with the experience of using LMS					
	I am satisfied with the information I receive from the LMS					
interactivity	I find the LMS to be flexible to interact with					
	I can interact with the LMS and get the desired information					
Management support	The management encourages using the LMS and appreciates the optimal use of the system to meet its goal					
	The management discusses problems regarding the LMS and provides all necessary resources to improve it					
Number of system visits	I intend to use the LMS frequently					
	I believe it is worthwhile for me to use the LMS routinely					

Productivity	I believe that using the system will further increase my daily work					
	I have fully accepted the LMS in my daily work					
Simplicity	Interacting with the system is a clear and understandable process					
	The system is simple to use					
Training	Organisation offers training programs regarding the LMS use					
	Training material is available during training					
Usability	I always do my job using the LMS					
	The LMS is available and flexible					

Open-ended questions

This section aims to solicit the views and feelings of instructors regarding their practical use of the LMS.

1. What is a Learning Management System in your own words? List any LMSs that you have ever used
   ……
   ……

2. What are the benefits of using a LMS when executing your duties……
   ……

3. List any challenges that have made you to stop or decrease the use of LMS in your duties……
   ……..

DEMOGRAPHIC INFORMATION:

This section seeks to understand the general background of the respondents

Please fill in the required information

Age	
Gender	
Department	
Years of experience	
Level of education	
Access to a computer at work	
Number of hours per week you use a LMS	