Infusing Learning Management Systems in Higher Education: A Study of Collective Actions of University Management, and Students at the University of Eswatini

A Thesis in fulfillment of the requirements for the Degree of Doctor in Philosophy in Education

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Dedication

To Him who makes all things happen. Thank you.

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Declaration

The work presented in this thesis is my own unaided work, except only where acknowledgements and references have been made in the text. I am aware, have read, and fully understood the University's Policy on Plagiarism.

I declare that I have not submitted this thesis before, to any other institution, either in part or in whole, for award of any degree or examination.

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Date: November 06, 2024

Abstract

Learning Management Systems (LMS) have become very relevant tools in higher education, facilitating online learning, communication, and resource management. The COVID-era lockdowns further ensured their necessity. However, their effective implementation remains a challenge for many institutions. Successful integration and utilization of LMS, it would seem, often hinges on institutional leadership and support. This study investigated the collective actions of university management and students in the infusion of LMS in higher education.

The study posited that specific management behaviors significantly impact LMS infusion. A mixed-methods approach was employed, combining quantitative and qualitative data to provide a comprehensive understanding of the research problem. Data were collected through an open-ended questionnaire with university administration, a questionnaire distributed amongst university students, and a follow-up focus group discussion with students at the University of Eswatini.

The findings revealed that three management actions were particularly influential in fostering LMS infusion: identification with LMS users, mobilization of users, and removal of barriers to LMS infusion. University leaders who demonstrate a deep understanding of LMS users' needs and challenges were more likely to create an environment conducive to LMS infusion. Moreover, actively engaging and motivating students to comprehensively use the LMS, through training, incentives, and support was crucial for successful infusion. Finally, addressing technical, and pedagogical barriers to LMS use was essential for maximizing its potential.

The study contributes to the understanding of how university management can effectively drive LMS infusion. By highlighting the importance of specific leadership actions, this research offers practical implications for higher education institutions seeking to optimize their LMS investments and enhance teaching and learning outcomes. Future research could explore the generalisability of these findings to different institutional contexts and delve deeper into the mechanisms underlying the relationship between management actions and LMS infusion. Furthermore, research that explores the long-term effects of these management actions on student performance and faculty satisfaction could also be explored.

Keywords: Learning Management Systems, higher education, university management, LMS infusion, Social Movement Theory, Legitimation Activity Model, mobilization, removal of barriers.

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1. Chapter 1 - Introduction

1.1 Introduction

The infusion of information and communication technologies (ICT's) is considered a critical determinant if organisations are to realise any benefits from their ICT investments as the mere implementation, adoption, and use of ICT does not provide meaningful benefits (Kim, Chan, and Gupta, 2016; Blumenthal and Tavenner, 2010; Jha, DesRoches, Campbell, et al., 2009). Rather, it is the infusion of ICT into organisational processes that has been seen as a key determinant (Cooper and Zmud, 1990). Karimikia, Safari, and Singh (2020) emphasize that "while the first-order benefits of new information systems are usually obtained when they are used routinely, the full potential of new systems is only unlocked when they are used deeply"[1].

Chen, Hsieh, Rai, and Xu (2021) describe infusion as the degree to which users within an organisation use information systems to their fullest potential, thereby optimally supporting the users' work processes. Infusion is a post-implementation process where technology undergoes successive stages of configuration, each stage promoting a deeper and more comprehensive integration of the innovation's functionality within an organisation. This process ensures that the technology is not only frequently used but also significantly, if not completely, replaces paper-based and manual processes (Eder & Igbaria, 2001; Zmud & Apple, 1992). Zmud & Apple (1992) provide a definitive definition, describing infusion as the extent to which an innovation is thoroughly embedded within an organization's operational and managerial processes. This concept surpasses mere adoption and usage, requiring sustained efforts to integrate the technology seamlessly into organisational workflows. Infusion, therefore, transcends mere adoption and usage, requiring ongoing, concerted efforts to integrate the technology into organizational workflows.

The concept of infusion involves utilising information systems (IS) in ways that surpass routine or expected usage, enabling users to fully exploit the system's potential. For this level of usage to be achieved, IS users must go beyond mandatory or expected interactions with the system.

Kim, Chan, & Gupta (2016) further note that "infusion requires deeper commitment and willingness on the part of the individual to experiment with the technology and put it to varying usages in the organization, thus opening and extending the frontiers of technology use" (2016:175). This deeper commitment is essential for leveraging the full capabilities of the technology and driving innovation within the organisation.

[1] Karimikia, Safari, and Singh (2020): Information Systems Frontiers ; 22: page 429

IS infusion literature therefore posits infusion as a post implementation process that involves a deep integration or embedding of the IS into organizational processes and requires widespread and extensive use. Infusion has to go beyond standard or expected usage as the IS must be exploited to its fullest potential and therefore the user must be committed to engaging and experimenting with the IS.

It therefore is the ultimate peak to reach in the technology adoption process, as well highlighted in Zmud & Apple's (1992) Technology Adoption Model (Figure 1.1).

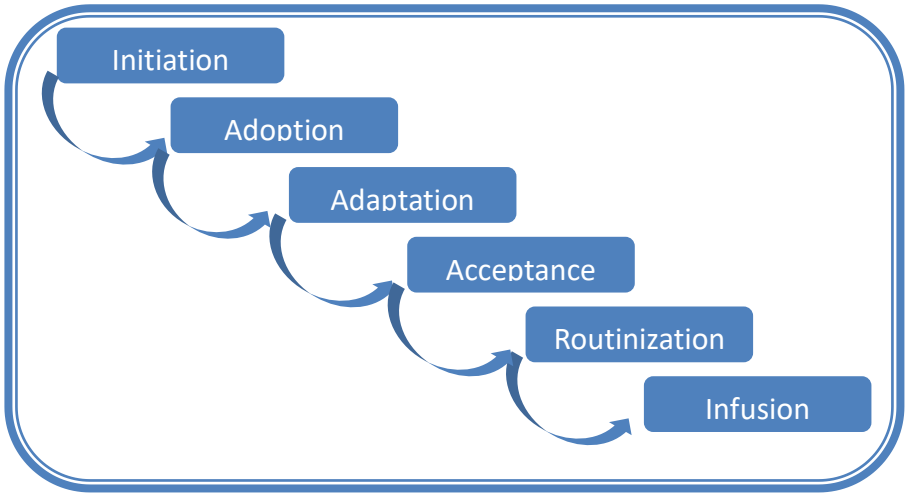


Figure 1.1: Zmud and Apple's Technology Adoption Model.

Cooper & Zmud, (1990) further note that infusion is a time-sensitive process that includes social learning and political behaviours whilst Ash (1997) suggests infusion can be seen as the depth of an ICTs' presence.

Infusion is therefore best seen as a continuous project, as opposed to a destination point. Those who intend to see a comprehensive use of a technology, one that is embedded in every process of their organization, must be cognizant of the fact that there will need to be a continuous monitoring of whether this vision is being achieved. Unlike other acceptance modes where one can tell if the technology has been accepted or not, infusion requires us to constantly monitor this succession of configurations to ensure that each configuration of the technology is entrenching the technology, as opposed to replacing it. Without infusion, that is, when users are not fully engaged in using new systems to their full potential, IS implementations have been known to fail (Karimika et al., (2020)

Institutions of Higher Learning, like many other organisations, have invested significantly in ICTs with the hope of attaining certain benefits. Specifically, they have invested significantly in learning management systems (LMS) to, amongst other objectives; enhance the learning-related activities of

each student. A number of studies such as De Smet, Valcke, Schellens, De Wever, & Vanderlinde, (2016); Arkorful & Abaidoo, (2015); Islam & Azad, (2015); Ruiz, Mintzer, & Leipzig, (2006); highlight intended benefits such as offering students control over the learning process, increased accessibility to learning information, and reduced travelling costs in some instances. Whilst operational benefits such as reduction in travelling costs may be easily quantifiable, benefits related to the learning experience may not be as straightforward. Meaningful learning involves, amongst other things, the interaction between student, educator, and content (Miyazoe & Anderson, 2013). This therefore suggests that, if technology has to play a part, that technology must ensure that the interaction is adequate and supported. Ain, Kaur, & Waheed, (2016), citing Pituch & Lee, (2006) state very clearly that the investment of LMS resources is not beneficial if students do not use the systems. Therefore, as earlier highlighted, LMS benefits are more likely to be beneficial if the LMS has been comprehensively embedded in the activities of the student's learning process.

LMS is the software that automates the administration and delivery of learning (Baturay, 2015, Arkorful & Abaidoo, 2015, Watson & Watson, 2007, Rogers & Newton, 2001). It is the overarching ICT that provides all of the functions necessary to provide learning in a digital format at a distance (Wang & Chen, 2009). While this does not preclude the ability for it to also serve in a blended learning environment, the LMS must be able to provide that learning where there is spatial, temporal separation or both. Lonn & Teasley (2009) suggest LMS can be used for facilitating student learning as well as facilitating change from passive to active learning. The most common use of LMS however remains the distribution, management, and retrieval of course materials (Binyamin, Rutter, & Smith, 2019, Yueh & Hsu, 2008, Coates, James, & Baldwin, 2005).

While learning management systems do not have universally accepted standards that define what they should be able to do, the Instructional Management Systems Global Consortium has proposed thirty-five (35) Interoperability Standards or specifications that LMS developers must ensure the LMS they develop must address (https://www.imsglobal.org/specifications.html). IMS Global Learning Consortium is an organisation that has several universities and software developing organisations as members and affiliates. It currently constitutes 497 member organisations spread across 22 countries. While IMS Global Learning Consortium is not the authority in LMS design, a number of organisations and LMS developers have used some of their 35 interoperability Standards in the designing of LMS[2].

Summarily, LMS seem to have the following features:

[2] For example see Sierra, Moreno-Ger, Martínez-Ortiz, López-Moratalla, and Fernández-Manjón, (2005); Dagger, Wade, and Conlan, (2002).

- *Provide access to learning resources*. LMS allow the students to access learning materials and resources including class notes and handouts.
- *Communication between faculty and students*. This may include reminders of deadlines, class management.
- *Interactive media*. This feature allows participants to engage in online chats, link with other media such as blogs, wikis as well as taking tests and submitting assignments.
- *Allows for management control*. As most activities undertaken on the LMS is documented and archived, management can know what is being done on any course that is part of the LMS. (Ssekakubo, Suleman, & Marsden, 2011; Lonn & Teasley, 2009; Coates, James, & Baldwin, 2005).

While LMS have been widely implemented by a number of universities for various reasons, a number of researchers such as Henderson, Selwyn, & Aston (2015), Mtebe (2015), Ssekakubo et al., (2011), have found that their use by faculty and students in developing countries has been limited. This is rather surprising as LMS systems seem to address most challenges faced by universities in developing countries, such as limited resources – infrastructure, finances, expertise – against a relatively growing demand for higher education. Aparicio, Bacao, & Oliveira, (2016) specifically note that LMS seem to be more attractive to mainly young, well-educated, and employed people in developed countries.

This therefore suggests a need for research on LMS in universities in developing countries. Specifically, there is a need to understand the way universities in developing countries try to infuse LMS into the learning-related activities. This research problem is unpacked and further articulated in the following section.

1.2 Background to Problem Statement

While the global economic crises and subsequent economic depression beginning 2007 had significant impacts on profit-making organisations, at times requiring them to undertake massive re-organisation, it also had a huge impact on national governments, forcing them to rethink their approach to social spending (González-Pernía, Guerrero, & Jung, 2018; Padayachee, 2016). Governments began to see dwindling revenues especially from the various taxes as, at the macro-economic level, companies closed down, downsized, or reduced economic activity whilst at the micro-level, individuals lost jobs or had lesser money to spend. As such Governments began to cut down on social services spending.

Among those social services affected was higher education (Mitchell, Palacios, & Leachman, 2015; Geiger, 2015).

As governments reduced social spending in higher education, institutions involved in higher education were forced to consider other means of providing education to an increasing demand. Higher institutions began to, amongst other things; actively engage in the acquisition and implementation of learning management systems as one form of delivery tool that could help them address the challenges of providing education to an increasing demand on one side and dwindling government support for expansion on the other. At the same time, people in developing countries have become more aware of their rights, and many now perceive that education as one of the basic rights. The 2015-2016 "Fees Must Fall" campaign in South Africa best highlights this view towards education. Such societal initiatives add pressure on educational institutions to respond appropriately, yet these institutions cannot, over the short and mid-term, expand facilities and infrastructure to respond to such demands.

Furthermore, the Coronavirus pandemic saw many countries go into different levels of lockdown – where a number of once-available services could no longer be made available on the physical space. Higher education became one of those key services that could no longer be offered on physical spaces.

As such, the relatively increasing demand for education and educational resources on one hand, and dwindling financial support especially from Governments on the other, are forcing both governments and higher education institutions to consider other options for providing education. In the process, the use of information and communication technologies has been considered as a viable option to reaching the targeted market; i.e., the student (Apricio et al., 2016; Oliveira, Cunha, & Nakayama, 2016; Henderson et al., 2015).

In the case of Eswatini, the government continuously faces significant reduction in revenues following dwindling global economic growth that limits foreign direct investments as well as a reduction in Southern African Customs Union (SACU) receipts (Mafusire, 2015; Basdevant, Benicio, Mircheva, et al., 2011). As a result, higher education funding, while still getting a major share in the overall country budget, has been significantly affected by government's cost-cutting measures[3].

[3] (see UNICEF trends at https://www.unicef.org/esaro/UNICEF-Eswatini-2019-National-Budget-Brief.pdf)

Concurrent to this period of fiscal challenges, there has also been a significant development in the delivery of education in developed countries, as highlighted by earlier by Coates et al., (2005) and of late by Henderson et al., (2015) amongst others. Within the Southern African Development Community (SADC) region a number of higher institutions have considered the use of information and communication technologies not only because of resource constraints, but also as an integral aspect of becoming relevant 21st century institutions.

This then leads me to the problem statement;

1.3 Problem statement

In response to the above challenges, universities have, amongst other things significantly invested in ICT to enhance the teaching and learning process as well as providing a strategic option for the institutions, such as enabling them to provide options where facility resources are a challenge, as mentioned earlier.

Whilst universities have implemented learning management systems, their continued use by the targeted users remains questionable (Dlamini & Ndzinisa, 2020). As such, the actions undertaken by universities to encourage comprehensive use of LMS by students in learning-related activities become of interest. If evidence of comprehensive use by students is inconclusive then the chances for the ICTs being embedded into learning-related activities remains a challenge. Specifically, the infusion of these ICTs so as to bring about the intended benefits also becomes a concern.

Secondly, the unexpected COVID-19 pandemic also caught a number of universities unprepared. Whilst these universities may have invested in learning management systems, the pandemic provided huge opportunities to assess whether these ICTs have been well crafted to address the challenges stated in the preceding sections. It is therefore of necessity that the actions of management in encouraging and supporting the comprehensive use of LMS be assessed. Likewise the actions of students in the use of LMS is also of interest.

While a number of studies have been done to understand how users take up technology, most of these studies have either been identifying and assessing factors that influence the uptake of the ICTs or they have been stage-based approaches focused largely on "explicit economic, physical, or information processing features with limited social context" (Higgins, Vidolov, Frößler, & Mullaney, 2008). Apricio et al., (2016) in their work on e-learning systems, also highlight that there is a need for studies in learning management systems that include other variables besides the technology itself. As

noted earlier, learning is likely to happen when there is interaction between student, content, and educator, therefore a focus on the technology artefact only may be presenting a narrow view. There is a need for studies that focus on the social aspect of the embedding on ICT into the learning process.

Additionally, while there have been studies, albeit limited, in IT infusion in general (Ash, 1997, Beaudry & Pinsonneault, 1999), there is even limited work in LMS infusion. These limited studies in infusion in general have largely focused on identifying individual, organisational, and technological factors that affect IT infusion. There is a need for studies that focus on the process of IT infusion, especially LMS infusion. Infusion is considered a post-implementation behaviour and given that factor research is more appropriate at the implementation phases (Cooper & Zmud, 1990), research that reflects a process approach to understanding the process of infusion of LMS is needed.

Infusion of ICT in education is also a topical issue. While there have been studies that focus on the integration of ICT in education; e.g., Alharbi & Drew (2014), these studies have been concerned largely with pedagogical soundness or requirements. LMS studies that focus on post-implementation social behaviours are limited.

Furthermore, the limited studies in infusion have considered infusion at single-level analysis. For instance some have looked at infusion at individual level (Beaudry & Pinsonneault, 1999) or organisational level (Ash, 1997; Cooper& Zmud, 1990), or at national level (Zhu et al., 2006; Kreamer et al., 2006). However given that infusion can be viewed as a social phenomenon, as it reflects social learning and political behaviours (Zmud & Apple 1989; Tornatzky et al., 1983), there is a need for multi-level analysis research that considers the different stakeholders which influence this social phenomenon.

Finally, LMS have been criticised for being content-centric with a number of educators simply moving their teaching material to the LMS when modern trends in education are towards learner-centric designs where learners can actively engage in the learning process (Lam, Lo, Lee, & McNaught; 2012). However, the deeper problem is the lack of understanding on how exactly ICT initiatives need to be integrated in the learning-related processes and activities. Notably, Dlamini& Coleman (2017) state that "there is a lack of formal research and under theorization of ICT integration into teaching and learning", with most ICT initiatives not "being informed by research thus lack theoretical grounding and a systematic approach"[4].

[4] Dlamini, R. and Coleman, E. (2017). Guest editorial: ICT in Education. South African Computer Journal 29(2)

Having identified the research problem, the next section will address the research objectives and questions than will assist in addressing the research problem.

1.4 Aim of the study

The aim of this study was to investigate how Learning Management Systems (LMS) are infused in learning-related activities at a higher education institution. Specifically, the research sought to understand the diverse ways in which LMS are employed to support learning-related activities, identify specific activities undertaken to infuse them in learning-related activities, and develop a parsimonious conceptual framework that can be used to guide institutions of higher learning in infusing learning management systems. Ultimately, this research aimed to contribute to the enhancement of teaching and learning processes through appropriate and effective implementation of Learning Management Systems.

1.5 Significance of the study

The integration of Learning Management Systems (LMS) in higher education has transformed teaching and learning processes, offering institutions opportunities to enhance accessibility, engagement, and efficiency in education delivery. This study was significant as it investigated how LMS are infused into learning-related activities at a higher education institution, with the aim of understanding their diverse applications, identifying infusion strategies, and developing a conceptual framework to guide effective implementation. The findings of this research hold substantial value for educators, administrators, policymakers, and, to some extent, instructional designers seeking to optimise LMS usage in academic settings.

Foremost, many higher education institutions face challenges in effectively integrating LMS into their academic frameworks, including resistance to change, inadequate training, and under-utilisation of system features. This study identified the specific activities and strategies employed by University administration to infuse LMS into learning processes, subjected them to statistical analysis, and provides a suggestion of how LMS can be infused in higher education institutions. offering a roadmap for overcoming barriers to adoption. By highlighting possible activities that could lead to LMS infusion, the research equips institutions with evidence-based approaches to maximize LMS potential, ensuring that technological investments translate into tangible educational benefits.

Secondly, a key contribution of this study is the development of a parsimonious conceptual framework that guides LMS infusion in higher education. Existing literature often lacks structured models tailored to institutional contexts, leading to inconsistent implementation. The proposed framework synthesizes empirical findings into a practical tool for administrators and educators, outlining key steps for effective LMS infusion. This framework serves as a reference for institutions aiming to align LMS usage and sustainable infusion.

Thirdly, as higher education undergoes digital transformation, this study positions LMS as central to modernizing learning environments. By documenting the various uses of LMS, the research highlights their role in fostering flexibility and inclusivity. This is particularly relevant in post-pandemic education, where hybrid and online learning models are now integral. The study's emphasis on effective infusion practices ensures that institutions can adapt to evolving educational demands while maintaining quality and accessibility.

Finally, the study opens avenues for further research on LMS optimisation, including comparative analyses across institutions or longitudinal studies on infusion outcomes. The conceptual framework can be adapted for diverse educational contexts, from universities to vocational training centers, making the findings scalable and broadly applicable.

1.6 Study Objectives and Associated Research Questions.

To tackle this specific aim, the study identified three key objectives. These were;

1. To examine the actions by which University management seeks to encourage the infusion of learning management systems among student users in their learning-related activities.
   To achieve this objective, the study addressed the following research question:
   a. What activities were undertaken by University management to encourage the infusion of learning management systems among student users in their learning-related activities?

2. To examine the activities of students in the infusion process of LMS.
   To achieve this objective, the study addressed the following research questions:
   a. What were the perceptions of students towards infusion activities?
   b. What were the effects of the activities on the infusion process?

3. To assess how social theories can contribute to the understanding of the infusion process.

   To achieve this objective, the study addressed the following research question.

   a. What lessons can be drawn from the Social Movement Theory and the Legitimation Activity Model and used in the infusion of LMS?

1.7 Context of the Study

The Kingdom of Eswatini (formerly Swaziland) is a landlocked country surrounded largely by the Republics of South Africa and Mozambique. The kingdom got its independence from the British in 1968. At present the population is estimated to be around 1,1million people[5]. The capital city is Mbabane, with Lobamba being the legislative capital, and Ludzidzini being the cultural capital. The Kingdom is ruled by an absolute monarch, the iNgwenyama.

The Ministry of Education and Training (MOET) is one of the oldest ministries in the Kingdom. It dates back to the independence era. It is also one of the largest in terms of employees, mainly teachers, and services it provides across the nation. It is responsible for the control of all forms of formal education – from primary to higher education (Hamid, Bisschoff,& Botha, 2015). The Government of Eswatini, through the MOET almost solely bears the burden to expand access to higher education with little to no private sector support. Over the last five years, the Ministry has been allocated between 12 – 15% and spends roughly 21% of its total budget on Higher Education (Ministry of Education and Training Report, 2018).

The country has five public higher institutions and one public university. There are two church-owned universities; the Southern African Nazarene University and Swaziland Christian University. The University of Eswatini is the biggest of the universities and oldest. The university's website (http://www.uneswa.ac.sz/about/history/) notes that the University developed from the Universities of Basutoland, Bechuanaland, and Swaziland (UBBS) between 1964 and 1975. In late 1975, Lesotho, then Basutholand, was withdrawn following student protest. The Universities of Botswana and Swaziland continued as sister universities until 1982 when the two universities became separate entities.

[5] See : http://sz.one.un.org/content/unct/swaziland/en/home/news-centre/news/swaziland-releases-population-count-from-2017-housing-and-popula.html

The University of Eswatini's first attempt into implementing a learning management system dates back to late 2007 when it explored the JOOMLA learning management system with its distance education programmes under the Institute of Distance Education (IDE). While this project simply did not succeed at all for more than one reason, it provided the university some learning curve into the implementation of student-based IT solutions. Two years later the university then experimented with MOODLE, again initially targeting programmes and learners under the Institute of Distance Education. While there was limited success in the next few years, the University decided to formally introduce MOODLE as the official learning management system in memos to staff and students during the 2014 – 2015 academic period. With that came a number of issues related to acceptance and use.

This study therefore sought to examine these actions of the key stakeholders involved in the attempt to make the learning management system an integral part of the student learning experience at the institution.

Given the context, it is also necessary to highlight the limitations and delimitations of this study. These two areas are addressed next.

1.7.1 Limitations of the study

Every research study has inherent limitations that may affect the generalisability, validity, or applicability of its findings. This PhD study encountered several limitations, outlined below.

Sample Size and Representativeness

The study relied on a sample of students and management from a single university, which may not fully represent the diverse experiences of other institutions in the country or region. Factors such as institutional funding, technological infrastructure, and digital literacy levels vary widely across universities in developing nations. Consequently, the findings may not be generalisable to all higher education institutions in similar contexts.

Self-Reporting Bias in Data Collection

The data was collected through surveys and interviews, which are susceptible to self-reporting biases. Participants may have provided socially desirable responses regarding their LMS usage or digital competence, rather than accurate reflections of their experiences. Additionally, recall bias could have influenced responses, particularly when participants were asked about past LMS interactions.

Limited Access to Reliable Internet and Devices

The study was conducted in an environment where inconsistent electricity and internet connectivity are common challenges as noted by other researchers such as Ng'ambi et al. (2016). These infrastructural barriers may have affected participants' ability to engage consistently with the LMS, thereby influencing their perceptions of its effectiveness. Students with limited access to devices or stable connections may have had different experiences compared to those with better resources, yet this variability was not always captured in depth.

Short-Term Study Duration

The data collection was conducted over a year, which may not fully account for long-term LMS infusion trends. Factors such as institutional policy changes, technological upgrades, or shifts in user behavior over time were not observed, potentially limiting the study's ability to predict sustained LMS success or failure.

Language and Cultural Constraints

The LMS platform studied was primarily available in English, which may not be the first language for many students. This language barrier could have influenced user engagement and satisfaction. However, it was not a central focus of the study. Additionally, cultural attitudes toward digital learning were not extensively explored, though they may play a significant role in LMS acceptance.

Institutional and Policy Limitations

The study did not deeply examine the role of government policies or university-level administrative decisions in shaping LMS infusion. In many developing countries, regulatory frameworks and funding priorities significantly impact technological integration in education. The absence of a policy analysis component may limit the study's recommendations for systemic change.

Despite these limitations, the study provides valuable insights into the challenges and opportunities of LMS infusion in resource-constrained higher education settings.

1.7.2 Delimitations of the study

Delimitations define the boundaries of a study by clarifying what the research will and will not cover (Theofanidis & Fountouki, 2018). Unlike limitations, which are potential weaknesses, delimitations are intentional choices made by the researcher to narrow the scope of the study. For this study, I had the following boundaries.

Focus on a Single Institution

The study was confined to one university, allowing for an in-depth analysis of LMS infusion within a specific institutional context. While this provided rich qualitative and quantitative data, it deliberately excluded comparisons with other universities, private institutions, or non-higher education settings.

Specific LMS Platform under study was MOODLE

The study examined only one LMS platform (MOODLE) rather than all available systems. This allowed for a more focused evaluation of features, usability, and institutional integration but did not account for alternative or emerging digital learning tools.

Limited Demographic Variables

While the study considered factors such as age, gender, faculty / programme of study, and manner of accessing the LMS, it did not extensively explore these and other demographic differences. These factors, while relevant, were beyond the primary research objectives.

Time Frame of Data Collection

The research was conducted during a specific academic year, meaning findings reflect LMS usage patterns and challenges at that particular time. Trends such as post-pandemic adaptations or future technological advancements were not part of the study's scope.

Emphasis on Academic Use Over Administrative Functions

This study prioritised LMS usage for teaching and learning (e.g., course delivery, assessments, student engagement) rather than administrative functions (e.g., enrollment, staff training, or institutional analytics). This delimitation ensured a sharper focus on issues that students, who were a major source of research data, could relate to.

Geographic and Linguistic Constraints

The research was conducted in one country and primarily examined LMS use in the institution's dominant language of instruction - English. Multilingual LMS applications or cross-regional comparisons were not included.

Exclusion of Broader ICT Policies

While the study acknowledged infrastructure challenges, it did not deeply analyse national ICT policies, broadband expansion initiatives, or government-led digital education strategies. These macro-level factors, while influential, were considered outside the study's central focus on institutional LMS infusion.

These delimitations were necessary to maintain a feasible and coherent research scope. By narrowing the focus, the study could provide detailed insights into LMS infusion within a specific context.

Having articulated the context of the study, as well as the associated limitations and delimitations of the study, the thesis layout is presented next.

1.8 Layout of this Thesis

The thesis is laid out as follows:

Chapter 2 – presents the literature background of the study. This chapter also presents the theoretical framework on which my research was based. The research model and the hypotheses that I intended to test when the data had been collected are also presented in this chapter.

Chapter 3 describes the methodological issues followed in this study. Specifically, I discuss the research design as well as my research orientation. I also explain the data instruments that were used as well as present the ethical issues that had to be considered in undertaking this study.

Chapter 4 consists of the results from the administrator questionnaire.

Chapter 5 presents the data results from the student respondents. In this chapter, I discuss the data preparation strategies employed, including how outliers and missing data were handled. I also discuss the techniques used to analyse the data and then present the results in relation to the hypotheses that had been developed.

Chapter 6 shows the results from the focus group discussion. These results are first presented based on the constructs that had been conceptualised for the study. Thereafter, I present the key themes that emerged from this discussion.

Chapter 7 articulates the discussion of the findings. In this chapter I reflect back on the research questions and use the results obtained from the different data collection phases to answer these research questions.

Chapter 8 is the summary and concluding chapter of this thesis. In this chapter, I discuss the key implications of the results, the key contributions of the study, as well as the limitations. I also offer some suggestions on where future research can be undertaken.

1.9 Summary

In this initial chapter, I outlined the role of learning management systems in higher education institutions and highlighted their importance in addressing institutional challenges. Subsequently, I articulated the research problem that inspired this study. The research objectives and questions designed to address this problem were then detailed, followed by an overview of the thesis's structure.

The subsequent chapter delves into the existing literature on Learning Management Systems, the infusion of information systems and technologies in higher education, as well as the theoretical underpinnings of this academic study.

2. Chapter 2 – Review of Literature

2.1 Introduction

In this chapter of the thesis, I will, foremost, address four key themes of Learning Management Systems [LMS] namely the purpose and uses of LMS, the adoption and use issues of LMS, concerns on LMS, and the evaluation issues of LMS.

Thereafter I will address the theoretical underpinnings of this study, including the two theories that are used as a lens for understanding the purported constructs and relationships within this study. Finally I will then discuss the proposed research model.

2.2 Learning Management Systems

The studies on LMS cover a wide range of issues. Some look at the systems themselves and how they operate, others focus on content-related issues, whilst others look at user perspective. Aparicio et al., 2016 provide a brief summary of these studies. These authors further present a timeline of e-learning related concepts, of which LMS are a key component. From their analysis, LMS became a clear concept in the early 1980's. Prior to that, while e-learning may have occurred as early as the 1960's where learning through the television and other electronic devices was happening, there were no specific learning management systems (Aparicio et al., 2016).

2.2.1 Definition and purpose of LMS

As highlighted earlier, the learning management system is the software that automates the administration and delivery of learning (Baturay, 2015, Arkorful & Abaidoo, 2015, Watson & Watson, 2007, Rogers & Newton, 2001). It is the overarching ICT that provides all of the functions necessary to provide learning in a digital format at a distance (Wang & Chen, 2009) as well as in a blended learning environment. Generally, learning management systems are able to provide different kinds of learning where there is spatial, temporal separation or both. Lonn & Teasley (2009) further suggest LMS can be used for facilitating student learning as well as facilitating change from passive to active learning.

LMS are an important communication channel between learners and instructors. Henderson et al., (2015) note that benefits of technology-enabled learning have been well established. Some of these benefits include equity of access to higher education where resources are a challenge as well as

enabling timely access to information for the learner. Access to knowledge is not just the aim in today's society, but also its timely access (Govindasamy, 2002). LMS are also making learning more accessible as they address a number of challenges especially those related to scarcity of resources. For instance, LMS are making it possible for educators to handle higher student-educator ratios, as well as an opportunity for interactive and iterative style of re-testing (Kruger, Inman, Ding et al., 2015; Arkorful & Abaidoo, 2015).

Ultimately, it would seem the key purposes of LMs are intertwined with the challenges they seem to address. Most researchers, however, have found that, in a nutshell, the most common use of LMS remains the distribution, management, and retrieval of course materials. As such, researchers such as Henderson et al., (2015) have criticized LMS content developers as lacking creativity in the use of the learning technologies, and as such, only certain forms of digital practices are being legitimised. I see this as a genuine criticism as the LMS has become one of the technologies of choice from a university management stand point, given the investment that universities are putting into LMS. The university then relies on this technology to enable and encourage interaction of the student, content, and educator for the learning process to be effective.

2.2.2 Adoption and use issues

Some studies suggest adoption of LMS is no longer an issue. These studies use statistics from students' enrolled and taking online courses. Studies such as Henderson et al., (2015) see these high numbers as part of the evidence of LMS adoption success. While other researchers have argued that enrolment does not mean or lead to completion, it would nonetheless seem there are higher levels of adoption of LMS in developed countries (Coates et al., 2005). The Coates et al., (2005) study further looked at Australian universities and noted that whilst LMS brought about complexities and risks, many universities nonetheless wanted to adopt them – following the footsteps of universities in developed countries that had adopted LMS.

Coates et al., (2005) specifically note the following as key drivers for the adoption or need to adopt LMS in universities.

1. *LMS provide an opportunity for large-scale learning programmes.* LMS help facilitate flexible course delivery as well as reduce course management overheads, reduce demand for physical space, as well as expedite information access.

2. *LMS provide an enhanced / enriched student learning.* Constructivists theory suggest students can use LMS to access a variety of information and construct their own knowledge and understanding

3. *LMS are a student expectation.* Students expect the use of technology to play an active role in their learning. Likewise the higher education marketplace has become quite competitive and universities are becoming more responsive to the expectations of their students, or clients as they are being seen by these universities.

4. *Competitive pressures among the universities themselves seem to be fuelling the adoption of technology.* Some universities are adopting LMS as these systems are seen the way to go in the higher education "industry".

5. *LMS are being seen as one of the strategic answers to increasing demand for higher education.* Universities worldwide, it would seem, are battling with similar pressures of an increase in demand for higher education against dwindling resources to cater for this increased demand.

While the preceding reasons are compelling, they also highlight one of the key concerns on LMS adoption as articulated by Dlamini & Coleman (2017) that there is a lack of research on how and why ICT need to be integrated in teaching and learning. They address all but the teaching and learning aspect. For instance, Samarawickrema & Stacey (2007) found that academics at Monash University had adopted LMS in response to a top-down authority directive, students demand, economic reasons – such as increase in student numbers – and due to political imperatives; e.g., threats of closure of schools and departments. Very few were found to have been motivated by research literature in technology adoption. In other words, academics were not driven by the relevance of the technology, but by other pressures. It would seem LMS adoption is driven by so many other pressures instead of the need for them in the teaching and learning.

The same researchers (Samarawickrema & Stacey, 2007) give more reasons for the reluctance to adopt LMS by academics. They note that academics fear workload increase as teaching with technology increases activities such as student emailing, constant upgrades, course maintenance, and sustainable strategies to make technology appealing / interesting to the learners. Their findings revealed that academics felt LMS-based learning required more preparation time, as well as brought about new work practices and new learning on their part. Finally, their study also found that LMS adoption had less to do with academics technical skills and their preferences to use technology, but more to do with differences in their motivation, approaches to change, and their ability to apply new processes.

Similarly, the Ssekakubo et al., (2011) study looked at the challenges associated with adoption of LMS, focusing on developing country perspective. They noted that ineffective user support mechanisms,

poor marketing strategies, LMS selection and usability issues, and high ICT-illiteracy in developing countries were key factors affecting the adoption of LMS in developing countries.

While these are genuine issues they are very similar to factor-based approaches that suggest the availability of certain factors as influencers of adoption and use.

These studies however highlight the adoption and use patterns in developed countries. There is a question on whether LMS actually cater for the situations and people they are supposed to target. Citing Christensen et al., (2013), Aparicio et al., (2016) note that the underprivileged are less represented in online enrolment figures. One would presume online/e-learning platforms are more helpful to those without access to higher education, as is largely the case in developing countries. The enrolment figures, as noted by, amongst others, Aparicio et al., (2016) and Henderson et al., (2015) seem to suggest online/e-learning platforms are attractive to mainly young, well-educated, and employed people from developed countries. One would argue that universities in developing countries may not be as well-resourced financially as those in developed countries, but these statistics nonetheless seem to suggest there is a concern on adoption and use of LMS in developing countries.

The studies cited here, as well as others elsewhere, paint a picture of LMS being bought by university management, implemented, but not being used by the targeted users. While these low levels of usage vary considerably between subject discipline, levels of study, mode of delivery, institution, and user characteristics amongst other things (Henderson et al., 2015), they are nonetheless a concern, as implementation should result in enhanced engagement and satisfaction among students, faculty, and administrators, as well as interest and participation. Where this implementation is successful, this is likely to translate to a successful infusion of the LMS. Boggs & Van Baalen-Wood, (2018) argue that when LMS transitions are not managed carefully, they can disrupt teaching and learning, leading to widespread frustrations. For instance, they note, faculty may worry about additional work, such as "migrating materials and learning new systems without any significant benefit or additional compensation" (2018:119). As highlighted earlier, innovations such as LMS can be disruptive, complex, compels changes at multiple levels, and has considerable consequences for the functioning of that institution (Samarawickrema & Stacey, 2007).

Hence, implementation leaders should prioritise cultural and affective shifts to foster institution-wide adoption of new technologies, rather than solely focusing on technical aspects like selection, implementation, and deployment (Boggs & Van Baalen-Wood, 2018). Similarly, Straub (2009) asserts that technology adoption is fundamentally a social process, influenced by peer pressure, change

agents, organisational pressures, and societal norms. These and other concerns highlight the need for research that seeks to look at the infusion phenomenon as a social one rather than a factor-based one.

2.2.3 LMS Concerns

While a number of higher institutions have adopted LMS or are seen to be moving towards that direction, the use of LMS at higher institution is not without criticism. A number of researchers such as Diaz & Diniz (2014), Coates et al., (2005), Govindasamy (2002), amongst others provide some insights to these criticisms. For instance Coates et al., (2005) argue that LMS assessments emphasize a positivist epistemology about the nature of knowledge because of its reliance on a form of assessment that can be automatically corrected such as multiple choices, true or false types of assessments. These researchers note that if this becomes the common way of testing or assessing at higher institution then there is a concern about LMS purpose and use.

LMS also have the potential to promote isolated rather than independent forms of study. This is more so because faculty tend to use LMS for posting material than for collaborative activity. Oliveira et al., (2016) suggest that online platforms require special techniques in course design, forms of instruction, methods of communication as communication is largely electronic, amongst other things. Instead, it would seem instructors are merely importing classroom experience and expectations to an online platform (Dobre, 2015), with the impression that the use of LMS will be a mirror of class experience.

A number of authors also note that LMS also bring in new structures and practices to teaching. Educators may not be aware or ready for this kind of shift and how it will affect their teaching. According to researchers such as Coates et al., (2005) as well as Samarawickrema & Stacey (2007), educators need to become adept at new forms of communication and online dynamics, new delivery methods, and sometimes virtual identities and develop sensitivity to the rhythms of just-in-time learning. Oliveira et al., (2016) rightly note that the interaction of student, content, and educator happens through communication devices, including the LMS, and the educator relies on the communication devices to encourage and enable these interactions. While on one hand this calls for a shift in the framing of content for LMS delivery, it also requires that management be aware of what it takes to make the LMS work for effective teaching and learning.

Furthermore, Coates et al., (2005) importantly note that while teaching has been the domain of educators, LMS requires the involvement of content developers (multi-media experts) and technocrats that can shape or influence what was essentially the educator's domain. LMS require collaborative efforts. The final output to the student is not just from the educator but also influenced or shaped by the other experts (software developers, multi-media experts).

These requirements require substantial adjustments of established routines and procedures. LMS therefore require instructors to change their practices in order to facilitate a deeper learning experience for the learner. This need is well articulated by Kruger et al., (2015) who call for an interactive and reflective LMS-driven learning experience as it is this reflective experience that allows the learner to construct knowledge by allowing the learner to guide the knowledge acquisition process. The learner then constructs their own representations of the new knowledge and shares these representations with the instructor and peers using whatever platforms have been provided.

Another major concern about LMS is their pedagogical contribution. Govindasamy (2002) argues that there is a lack of guidelines on how to design, develop, deliver, and manage pedagogically sound e-learning materials, whereas pedagogical principles must form the very basis for inclusion of features in LMS. Coates et al., (2005) also noted that it is important that discussions on LMS be informed by pedagogical considerations. This concern is consistent with Dabbagh (2005) and Mason & Rennie (2006), reflection that LMS must be evaluated on their contributions to issues such as pedagogical considerations.

Finally, LMS allows for managerial influence on the education process. LMS is an ICT tool that allows the digitization and archiving of activities. University management can use this as a tool for managerial influence, whether in the forms of evaluating the lecturer or, as is the case in authoritarian situations, to influence what gets taught.

Through their very design therefore LMS influence and guide teaching and will become more pronounced and incorporated into everyday academic practices. Ultimately, it would seem LMS will shape and define educators' imaginations', expectations, and behaviours. This highlights the importance that must be placed on LMS. Most importantly for me, the understanding of how LMS can be infused into learning-related activities is paramount given the requirements LMS are placing on the educator and the learning process as well as the role that LMS have been noted to have in learning-related activities.

2.2.4 Evaluation of LMS

The evaluation of LMS as a tool in the student learning process has also been of interest to a number of researchers. While no entity is recognised as an authority, there have been some prominent ones such as the Instructional Management Systems Global Consortium that has set proposed thirty-five (35) Interoperability Standards or specifications that LMS developers must ensure the LMS they develop must address. As noted earlier this consortium is an organisation that has several universities and software developing organisations as members and affiliates. Other standards include AICC

(Aviation Industry Computer-based Training Committee), Advance Distributed Learning (ADL) Initiative, its successor SCORM (Shareable Content Object Reference Model), as well as the IEEE Learning Technology Standards Committee (Sanders, 2023). That said, almost all learning management systems will have the following features, as presented in Table 2.1 below. The data on the table is adapted from Abdullah & Ali (2016).

Table 2.1 – Common features of a Learning Management System

Feature	Functionality
Structure:	For centralization and interoperability by enabling easy and efficient navigation via interfaces.
Assessment:	Creating and administrating assessments, storing assessment data. It also includes all functions related to assessment results.
Tracking:	Tracking learning functions into one system.
Security:	Prevents unauthorized access to courses, learner account, and other administrative facilities.
Registration:	Assigning to courses, activities by learners or instructors.
Delivery:	On-demand delivery of learning content and experiences to learners.
Interaction	Learner interaction throughout all administrative tools as well as between communicative content and the LMS (i.e. SCORM content).
Reporting	Extracting and presenting all information about learners and courses.
Record keeping	Storing and maintaining data about learners including their portfolio.
Reuse	Searching and composing contents for delivery in different learning tracks.
Personalization	Matching learner preferences with corresponding contents.
Integration	Exchanging of learner and content data via multi systems (i.e. content management systems).
Administration	For centralized management of all functions involved.

Other researchers however, such as Dabbagh (2005), suggest an evaluation framework that covers three aspects / perspectives, aspects related to pedagogical models, instructional strategies, and learning technologies. Mason & Rennie (2006), on the other hand, suggest their own evaluation framework that in summary suggests LMS must be evaluated on aspects of content driven, communication focused, or technologically oriented perspectives.

From the synthesis of literature it would seem the pedagogical considerations should play a key role in the evaluation of the LMS. That the key drivers of LMS implementation are not driven by the requirements of the teaching and learning process is a major concern. Given as well the significant requirements that LMS are placing on educators and their way of doing things, as well as the significant role the LMS, as a device, is supposed to have in the teaching and learning process, there is a need to understand how the infusion of the LMS can be undertaken.

2.2.5 LMS and the digital divide

The digital divide has significant implications for the adoption and effectiveness of Learning Management Systems (LMS) in developing countries. While LMS platforms such as MOODLE, have transformed education in high-income nations by enabling remote learning, collaborative tools, and digital resource sharing, their penetration in developing regions remains limited due to infrastructural, economic, and sociocultural barriers (Selwyn, 2019).

One of the primary challenges is inadequate internet connectivity. According to the International Telecommunication Union (ITU, 2022), only 36% of the population in least-developed countries (LDCs) has internet access, compared to over 90% in developed nations. This disparity restricts the ability of educational institutions to deploy LMS platforms effectively, as many students and educators lack reliable broadband access (Van Dijk, 2020). Even when LMS platforms are available offline, frequent synchronization requires stable internet, which remains a luxury in rural and underserved urban areas.

Economic constraints further exacerbate the issue. While open-source LMS solutions like MOODLE reduce software costs, hardware affordability remains a hurdle. Many students in developing countries cannot afford personal computers or tablets, and institutions often lack funding to provide these devices at scale. Additionally, electricity shortages in regions such as Sub-Saharan Africa disrupt consistent LMS usage, undermining their reliability as educational tools (Ng'ambi et al., 2016).

Sociocultural factors also influence LMS adoption. Digital literacy levels in developing nations are often lower due to limited exposure to technology, making LMS interfaces challenging for both instructors and learners. Furthermore, language barriers arise when LMS content is predominantly available in English, excluding non-English-speaking populations (Albalawi, 2020).

Despite these challenges, some initiatives show promise. Mobile-based LMS adaptations, for instance, leverage high mobile phone penetration rates in developing countries to deliver education (GSMA, 2023). Governments and NGOs are also partnering with tech firms to expand digital infrastructure, though progress remains slow (World Bank, 2022).

Addressing the digital divide in LMS accessibility requires multi-stakeholder collaboration, including policy reforms, infrastructure investment, and localized content development. Without such efforts, the potential of digital education to bridge global learning inequalities will remain unrealised.

Having articulated the key issues in the LMS discussion, I will now discuss the theoretical underpinnings of the intended research study.

2.3 Theoretical Underpinnings of the study

The use of a theoretical lens in studying a phenomenon is considered critical in PhD study. It allows the researcher to understand the themes and topics of interest that may emerge as one study the phenomena.

Theory is seen as "abstract entities that aim to describe, explain, and enhance understanding of the world, and in some instance, provide predictions of what will happen in the future" (Lee 2001, Gregor, 2006). It may also give basis for interventions and action.

Gregor (2006, page 622) suggests a taxonomy of theory types. I will briefly explain these.

1. Theory for analysing: these would be theories that explain "what is" and these are considered the basic forms of theory. They do not attempt to show causality or predictive generalisation.

2. Theory for explaining: theory that explains how and why some phenomenon occurs. It is a theory for understanding as such a theory often has "an emphasis on showing others how the world may be viewed in a certain way, with the aim of bringing about an altered understanding of how things are or why they are as they are. Interpretivists favour this type of theory.

3. Theory for predicting: the aim of this kind of theory is to predict what will be, but not explain why.

4. Theory of explaining and predicting: the aim is to answer questions on what is, how, why, when, and what will be. Very common positivist theories, such as Technology Acceptance Model, fall under this category.

5. Theory of Design and Action: this is theory on how to do certain things. The focus is on design as an activity rather than the problem of what a special design type theory might look like.

The study drew upon two important theories; the Model for Social Movement Participation by Bert Klandermans (1997), and The Legitimation Activity Model by Hussain, Taylor, & Flynn (2004) to understand the process of infusion activities undertaken by management and students as a collective.

Theoretical Perspective

As highlighted in the preceding section, this study used Bert Klandermans' (1997) Model for Social Movement Participation and Hussain et al., (2004) Legitimation Activity Model as a lens to understanding the phenomenon in question. The Model for Social Movement Participation, commonly referred to as the Social Movement Theory (SMT) is most relevant in understand how people, as a collective, are motivated towards participating in some form of mass action. The Legitimation Activity Model (LAM), on the other hand, is most relevant in understanding how leaders of IT projects try and legitimise activities related to an information system. These leaders purposefully undertake certain activities, and such activities are aimed at the group of individuals that the IT artefact will affect, to gain acceptance of the IT project.

The next section addresses each of the models.

2.3.1 Social Movement Theory

Social movements are interlocking networks of groups, social networks, and individuals, and the connection between them is a shared collective identity that tries to prevent or promote societal change by non-institutionalised tactics (Stekelenburg & Klandermans, 2009).

The same authors (Stekelenburg & Klandermans) suggest that there are two approaches to people participating on social movements. The classical approaches believe that deprivation, to a large extent, is the source of social movement. Classical theories saw social movement being a result of deprivation or dissatisfaction. Researchers have viewed this as a negative approach to social movements.

Contemporary approaches, on the other hand, such as the political process approach, see opportunities as a major source of participation. So while in the past deprivation would have been considered the major cause of social movement participation, modern day theories suggest people are being mobilized along the lines of opportunity. In other words social movements are no longer a result of negativity but rather seen as positive.

Klandermans' Theory for Social Movement participation is a four-step process. These are;

1. People must identify with movement, and then become the mobilization potential.
2. People must be targeted by mobilization attempts.
3. People must develop the motivation to participate.
4. People must overcome barriers to participation.

These steps are briefly explained next.

2.3.1.1 Mobilization potential

The mobilization potential is the group of individuals that identify with the movement / cause in question. The social movement literature uses terms such as sympathisers; identifying with the movement may include sympathising with the cause that the movement stands for. The mobilization potential is, in essence, the proportion of individuals within that society that is inclined to support the movement (Klandermans & Oegema, 1987). However, Oegema & Klandermans (1994) argue that sympathising with the movement does not always lead to participation in the social movement. These authors explain that two key things seem to affect the individuals' willingness to support a movement – namely, the number of individuals that believe that a specific movement can effectively mobilize to address the shared grievances; and the more serious these grievances are thought to be.

Social movement proponents face two possible and important failures of their mobilization efforts. These are non-conversion and erosion. Non-conversion is the non-participation of individuals who are prepared to participate, but somehow fail to convert their preparedness into actual participation. Non-conversion occurs when people have not been targeted by mobilization attempts. Erosion, on the other hand, is the non-participation of individuals who, though once prepared to participate, have changed their minds and choose not participate. As such the movement proponents may engage in various ways to ensure that this potential or target of people do not eventually back away from participation. Modern-day social movements have utilised tools such as the internet and social media to successfully get the mobilization potential to participate in movement actions, as has been the case with the recent Kenya Riots of 2024. Such sophisticated mobilization techniques, as opposed to the traditional approaches, increase the likelihood of participation (Oliver & Marwell, 1992) quoted by Oegema & Klandermans (1994).

2.3.1.2 Becoming a target for mobilization attempt

If individuals are not being targeted by mobilization attempt it is unlikely that they will participate (Klandermans & Oegema, 1987). Literature suggests mobilization can polarise a society. Accordingly, two basic forms of polarization can manifest. These are cognitive polarisation and social polarisation. Cognitive polarisation occurs as goals and ambitions get into the public space and people start debating these issues. Opponents express their views and start sowing seeds of doubt in potential sympathizers. Social polarisation occurs when the individuals' social environment becomes rearranged into proponents and opponents of the cause (Oegema & Klandermans, 1994). The individual discovers that some individuals/groups they identify with are opponents of the cause, whilst individuals/groups may be less happy about are proponents/allies of the cause. If the individual is not happy with these new arrangements, they may choose to detach themselves from the cause. As activists seek to disseminate their definition of a situation to the public and participants, they contribute to the polarization of society in the process. This process, known as framing, is an attempt by the movement to disseminate information in interpretations which tries to ensure individual connotations, values and beliefs become in line with activities, goals, and ideologies of the movement (Stekelenburg & Klandersmans, 2009).

Klandermans' SMT further highlights the importance of framing, where actors define the situation and motivate participation. Leaders of the cause play an important role in exposing what is possibly not right about the current situation and what the possible benefits will be, if the current situation is changed. Most of the time, this framing is usually aligned to the values and belief systems of the mobilization potential (Stekelenburg & Klandersmans, 2009).

2.3.1.3 Becoming motivated to participate

There are various motivating factors for people to engage in a particular activity. The Theory of Reasoned Action (Azjen & Fishbein, 1980) suggests that people will do something only when they expect the outcome to be beneficial. These kinds of models (such as the Theory for Reasoned Action) have been collectively labelled as expectancy-value models in some literature. Motivation to participate can be seen in three dimensions,

1. Expectancy – value approach: what one will benefit will be the motivating factor.

2. Social motivation: comes from the expected reactions of significant others to one's own participation.

3. Sometimes it is incentives contingent on the specific action and the circumstances of the individual that will influence the individual to participate. Therefore, the lower the cost of participation versus higher benefits, the more motivated the person is to participate. Whether motivation is converted to participation depends on the presence of barriers (Klandermans & Oemega, 1987).

Klandermans (1984) cited in Simon, Loewy, Sturmer et al., (1998) identified three different types of motivations.

1. Collective motive: collective goals and benefits.

2. Social motive: expected reactions of significant others.

3. Reward motive: personal incentives related to personal costs and benefits; e.g., losing time or money, losing friends, making new friends, risking one's health.

Willingness to participate in a cause should increase with the expected value of collective outcome of participation (collective motive), with the positivity of the reactions of important others (social motive) and the expected value of the personal motive of participation (reward motive) as per Simon, Loewy, Sturmer et al., (1998). The same authors criticize the opinion of the participant being focused on benefits/costs. They see this as an individualistic view as they believe there exists a collective identity. Their views are consistent with Kelly & Breinlinger (1996) who also note that the willingness to participate is highly influenced by collective identity.

2.3.1.4 Overcoming barriers to participate

Barriers to participation can be real or perceived. Real barriers may include tangible barriers such as those imposed by opponents; e.g., laws/law enforcers that will physically thwart participants from participating. In such instances, the expected benefit must outweigh the costs of such barriers.

In other instances, the barriers are perceived, such as the feeling of possible rejection should one be identified with a particular cause. While authors such as Simon et al., (1998) see significance in collective identity in movement participation, the same collective identity may be considered a perceived barrier; where one feels they cannot be associated with the proponents of the cause, even if they support the goals of the movement. In such instances, the perceived barrier could be a moral dilemma. For instance, the clergy may not participate in a pro-life campaign if alleged drug-lords are part of the campaign.

The Social Movement Theory has been widely used in studies that sought to understand why people participate in social movements. For this study the theory is used as a lens to understand why users of information systems would infuse the information systems in their processes. Specifically, it was used to understand why and how students would infuse learning management system into their learning-related activities.

The second model used as a lens for the study is the Legitimation Activity Model by Hussain et al., (2004). This model is discussed next.

2.3.2 Legitimation Activity Model (LAM)

"Legitimation concerns formal and informal approval of stakeholders as social agents, whereby they agree to something that conforms to their social and personal norms" Hussain et al., (2004, pg. 408). Legitimation therefore involves activities aimed at getting approval from stakeholders. In the LAM, the legitimation process has two main actors – the legitimation seekers (LS) and the legitimation providers (LP). Seekers are usually the project authorities who seek support for the information systems. Providers are the information systems recipients including users. As such, legitimation is defined as "a generalised perception or assumption that actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995). The legitimation process is therefore a social aspect than a technical one. Seekers pursue a social agenda to get providers to legitimise the IS-related process.

The LAM, in a nutshell, has the following key components:

- Legitimation: The process of gaining acceptance and justification for the use of a system within an organisation.
- Legitimation Seeker: The actor or group advocating for the system's use (e.g., IT department, project manager).
- Legitimation Provider: The individual or group with the power to grant or withhold legitimacy (e.g., senior management, end users).
- Legitimation Structure: The set of beliefs, values, and norms that define what is considered acceptable use of the system.
- Legitimation Activities: Actions taken by the seeker to influence the provider's perception of the system's value and alignment with the structure.

The LAM posits that the legitimation process is a eight-step process. According the Hussain et al., (2004), it starts off when the legitimation seeker constructs a legitimation target. The construction of a legitimation target is a description of the IS characteristics and its predicted organisational effects. This also involves setting up the desired norms and behaviours that the IS requires. The seeker then identifies a range of legitimation providers who are likely to be either skeptical of the IS project or have a significant influence over others who may be key in gaining legitimation (Flynn & Hussain, 2004, Hussain et al., 2004). The seeker then tries to understand the norms and beliefs, culture, routines, and practices of the provider, thereafter compares these with the legitimation target (Flynn & Du, 2012).

Hussain et al., (2004) suggest that if a gap exists between the two norms, the seeker then applies various necessary strategies such as either modifying the target norms or persuading the provider to change some of their norms. At this point, the seeker checks if the strategies have worked; i.e., if the provider has granted legitimation. The granted legitimation needs to be constantly monitored, and if there is failure of legitimation the seeker may have to repeat the steps in the legitimation process (Flynn & Du, 2012; Hussain et al., 2004).

The LAM has been applied mainly in systems development projects where authorities try to gain legitimation of an information system as it being developed. For instance, Flynn & Du (2012) used it to understand the legitimation process at a Chinese University whereas Flynn & Hussain (2004) used it in a hospital context. Hussain et al., (2004) used it in a hospital context as well.

One of the key attributes of the LAM is that it focuses on social acceptance and adoption. LAM goes beyond technical functionality, emphasizing the social and organisational factors that influence how systems are perceived, accepted, and ultimately used. This aligns with the reality that systems are often met with resistance, inertia, and competing priorities, requiring active efforts to gain legitimacy.

It also highlights the role of actors and activities that need to be consciously implemented. LAM recognizes that different actors, for example users, managers, IT staff, engage in various activities, such as training, communication, demonstrations, amongst others, to build legitimacy for the system. This helps analyze the dynamics and strategies involved in getting people to use the system effectively. Figure 2.1 next shows a graphical depiction of the LAM.

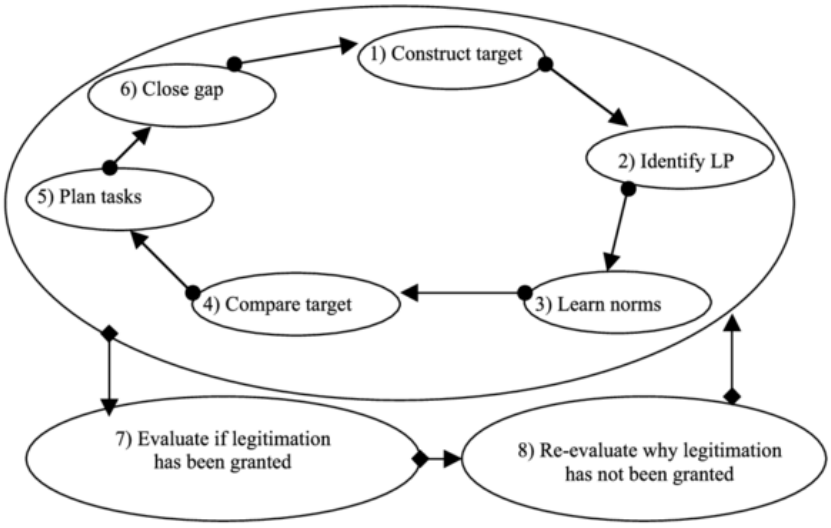
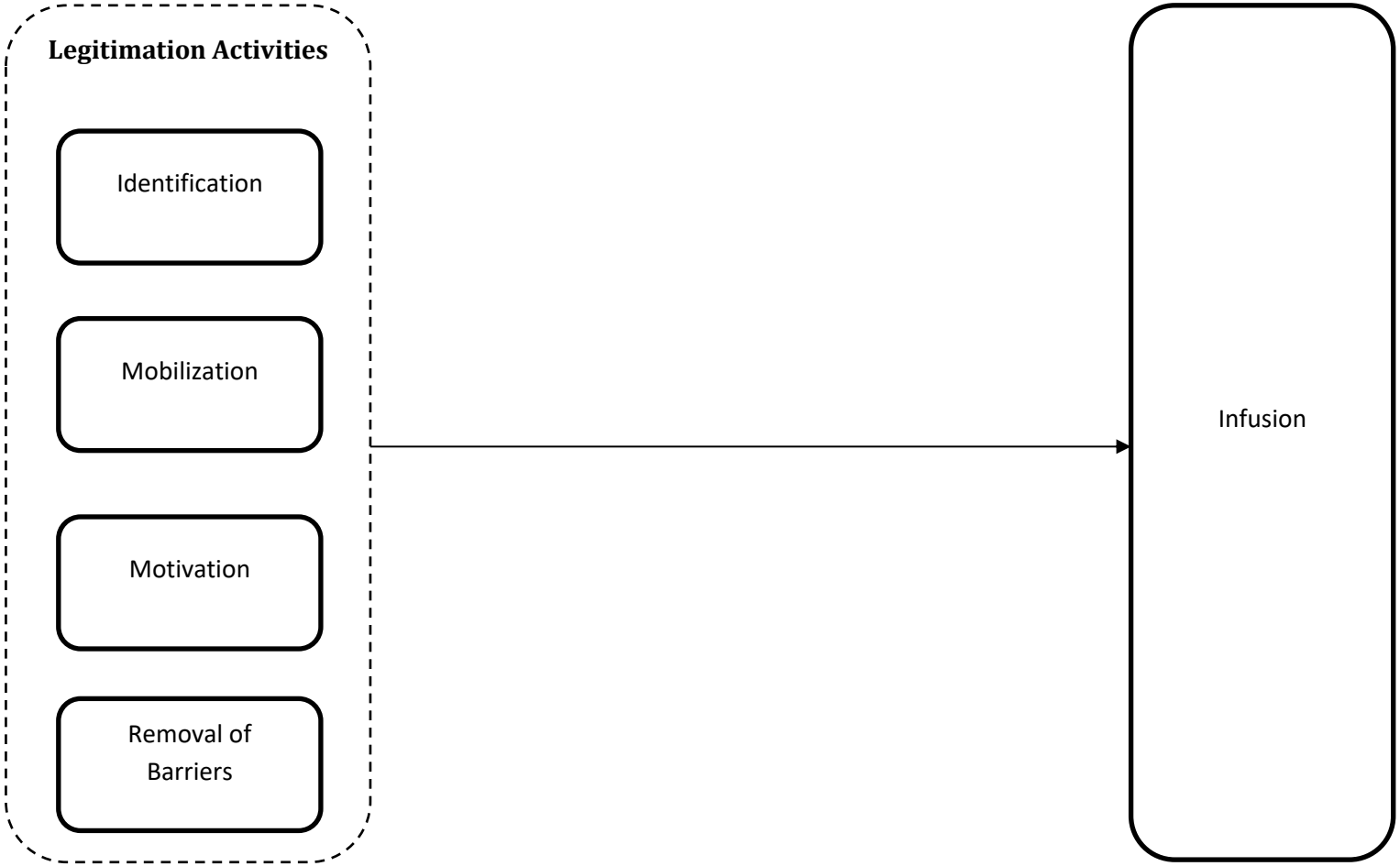


Figure 2.1 – Legitimation Activity Model. Source Hussain et al., (2004)

2.4 Developing the hypotheses

Based on the theoretical underpinnings, the following conceptual framework was developed. This is presented next in diagram form as Figure 2.2

Figure 2.2 – Conceptual Framework



From the theoretical frameworks the preceding conceptual framework can be formulated. Legitimation activities will lead to infusion. Whilst the LAM is silent on the specific activities that legitimation seekers undertake, the activities of the SMT can be used as a lens. Therefore, being guided by the SMT activities, I have categorized the activities into four;

1. Activities that are meant to create a sense of identity with the Learning Management System or Learning Management System users.
2. Activities that are meant to mobilize the users of the Learning Management System.
3. Activities that are meant to motivate the users to infuse the Learning Management System
4. Activities that are meant to remove or reduce barriers to infusing the Learning Management System.

Based on the conceptual framework the following relationships were assessed.

2.4.1 Identification

Identification and the Infusion of MOODLE

For this study, the definition used for identification has been adapted from Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, (1992) who define identification as "*The experience of personal involvement in a system or environment so that persons feel themselves to be an integral part of the system or environment."* Hagerty et al., (1992:173)

People are more likely to adopt a technology they perceive as aligning with their values, interests, or identity. They may see themselves as "early adopters" or technologically savvy individuals who embrace new tools (Mohamed, Higgins, Ferguson, & Kanaroglou; 2016). Social media platforms, for example, target specific demographics with features and functionalities that resonate with their identities. Furthermore, Oegema & Klandermans, (1994) argue that individuals are more likely to participate when they identify with a collective movement. As such, framing the LMS infusion as a shared journey towards a better future can foster a sense of collective identity among users and therefore promoting engagement. Therefore;

Hypothesis 1a: There is a significant relationship between Identification with MOODLE and the Infusion of MOODLE.

Identification and the Removal of Barriers

For this study, barriers have been defined as "*Factors in a person's environment that, through their absence or presence, limit functioning." T*his definition has been adapted from the *WHO & World Bank World Disability Report (2011).*

Users who identify with a particular group of users or a particular technology are most likely to overcome potential benefits if they perceive that their inability to overcome the barriers will lead to loss of identity from that particular group or particular technology. This has been the result in a number of studies in social media use, such as. In the case of a technology they are most likely to find workarounds, in order to remain being identified with that particular group of users e.g. early technology adopters. Therefore;

Hypothesis 1b: There is a significant relationship between Identification with MOODLE and the Removal of Barriers.

2.4.2 Mobilization Efforts

Mobilization Efforts and the Removal of Barriers

For this study, mobilization is defined as "to coordinate the actions of people, so as to increase their focus and commitment." This definition has been adapted from Heylighen, Kostov,& Kiemen, (2013). The impact of mobilization efforts is most likely to be affected by the barriers that are in place. Where barriers have been adequately addressed, mobilization efforts are most likely to be effective (Klandersman, 1997). Therefore;

Hypothesis 2a: There is a significant relationship between Mobilization Efforts and the Removal of Barriers.

Mobilization Efforts and the Infusion of MOODLE

Exposure to information campaigns, marketing strategies, or peer influence and recommendations can significantly influence the adoption and continued use of a technology. These campaigns can be viewed as mobilization efforts, as noted in a number of studies such as Muth & Peter (2023). In modern day, the use of social media to mobilize individuals towards collective goals is a common information campaign (Albanna, Alalwan, & Al-Emran; 2022). As such, individuals who are exposed to

effective mobilization efforts, such as advertising, social media promotion etc. are more likely to infuse a technology. Therefore;

Hypothesis 2b: There is a significant relationship between Mobilization Efforts and the Infusion of MOODLE.

2.4.3 Motivation

Motivation and the Removal of Barriers

This study adopted Schunk, Meece, & Pintrich (2014) definition of motivation. These researchers define motivation as "the process whereby goal-directed activities are instigated and sustained." (2014:5).

Where barriers have been removed, people are most likely to be motivated to infuse the technology. Yet, at the same time, motivated people are most likely to overcome both individual and collective barriers. While barriers are generally considered to be demotivators, Biresselioglu, Demir, Kaplan, & Solak, (2020) note that, in some instances the barrier can become the motivating agent, as the entity refuses to be overcome by the barrier. Therefore;

Hypothesis 3a: There is a significant relationship between Motivation to infuse MOODLE and the Removal of Barriers.

Motivation and the Infusion of MOODLE

Motivation is a result of both intrinsic and extrinsic factors. Perceived benefits however are largely considered the backbone of these factors. Users who see potential benefits to continuously using a technology are most likely to continue to use that technology. Therefore,

Hypothesis 3b: There is a significant relationship between Motivation to infuse MOODLE and the Infusion of MOODLE.

2.4.4 Removal of Barriers

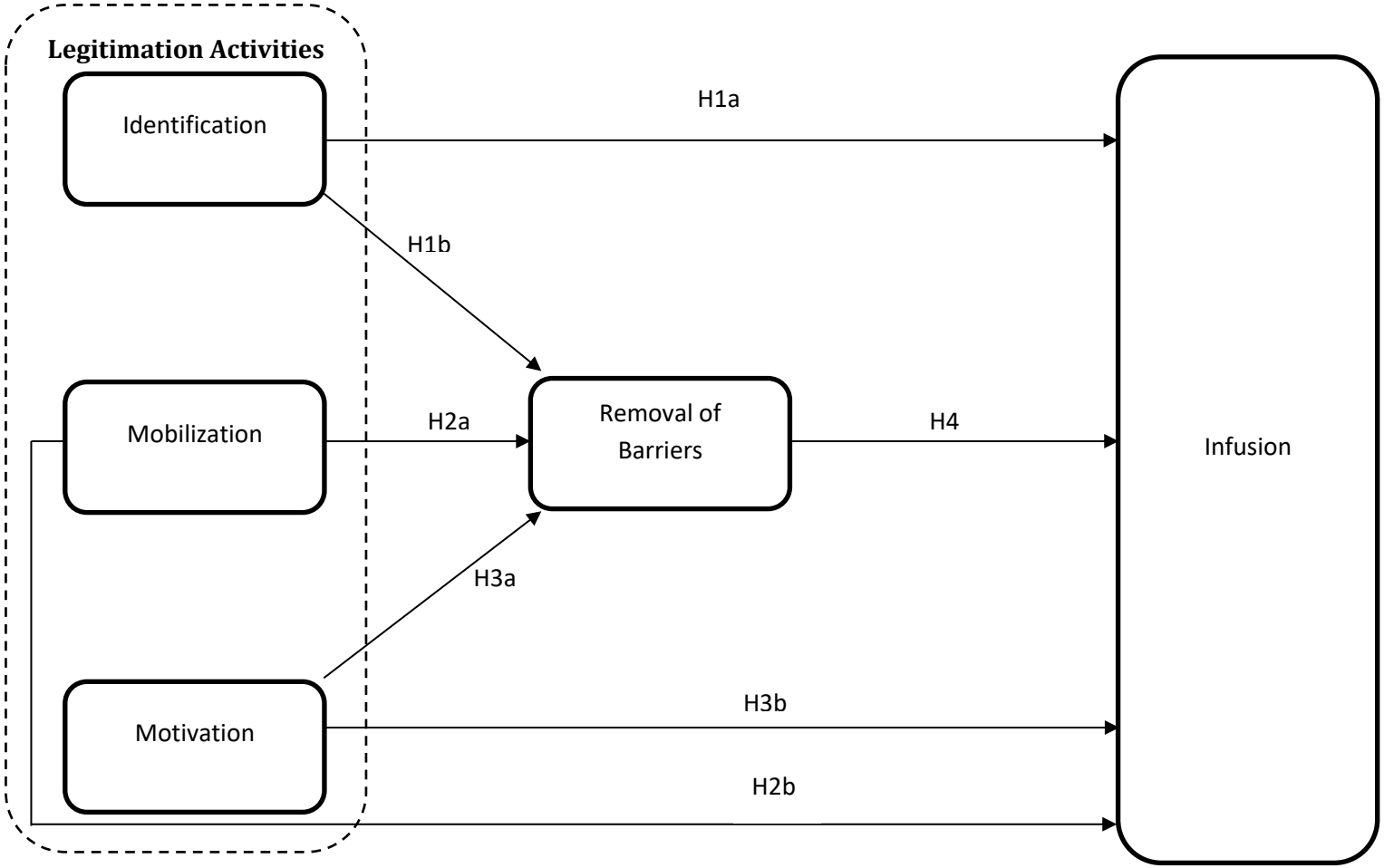
Barriers to technology infusion come in various forms. Studies such as Hsu (2016); Kopcha (2012); Francom (2020), suggest barriers such as cost, access to devices, and technical knowledge, continued

support, amongst others, as key barriers to the integration of technology within educational settings. Users who face fewer barriers will be more likely to infuse the technology. Therefore

Hypothesis 4: There is a significant relationship between Removal of Barriers and the Infusion of MOODLE.

This then leads to the research model that shows the purported relationships. It is shown next as Figure 2.3

Figure 2.3 – Research Model



2.5 Summary

This chapter has highlighted some of the past studies undertaken to assess Learning Management Systems in higher education institutions. These studies were discussed under four themes, namely purpose and uses of LMS, the adoption and use issues of LMS, concerns on LMS, and the evaluation issues of LMS. Thereafter the theories underpinning this study were unpacked. This then led to the conceptual model which posits that legitimation activities will lead to infusion of the learning management system.

Consequently seven hypotheses were developed. These are presented in tabular form below.

Table 2.2 - Summary table of Hypotheses

	Hypotheses
H1a	"There is a significant relationship between Identification with MOODLE and the Infusion of MOODLE."
H1b	"There is a significant relationship between Identification with MOODLE and the Removal of Barriers."
H2a	"There is a significant relationship between Mobilization Efforts and the Removal of Barriers."
H2b	"There is a significant relationship between Mobilization Efforts and the Infusion of MOODLE."
H3a	"There is a significant relationship between Motivation to infuse MOODLE and the Removal of Barriers."
H3b	There is a significant relationship between Motivation to infuse MOODLE and the Infusion of MOODLE
H4	"There is a significant relationship between Removal of Barriers and the Infusion of MOODLE."

Having articulated the theoretical underpinnings as well as the research model, it is necessary to explain the research methodology, the research design and all other elements required for data collection and analysis of this study. This I address in the next chapter.

3. Chapter 3 – Research Methodology

3.1 Introduction

The focus of this study is on the collective actions of the university management and student users in the quest for infusion of the learning management system. Given that the data was to be collected from one site, effectively rendering it a case study, a mixed methods approach was necessary. In this chapter I will get into the methodological foundation of the research, outlining the various approaches employed to meet my research objectives. I will begin by discussing the research design, specifying the overall research strategy and justifying the chosen approach in relation to the research objectives.

Thereafter I will address my research orientation, as this informed the selection of data collection and analysis methods. Furthermore, I will elaborate on the specific data collection instruments that I used. This will include details about the quantitative survey, such as the sampling method, questionnaire design, and pilot testing procedures. Similarly, I will also detail the qualitative data collection instruments that I used, namely the semi-structured interview protocols and focus group discussion guides.

Finally, I will acknowledge and discuss the ethical considerations involved in this research process. This discussion will include how I obtained informed consent, how I ensured participant confidentiality, and addressing any potential power imbalances, given that I work at the university where I was collecting data.

I shall begin the chapter by discussing the research design.

3.2 Research design

Research design involves the intersection of philosophy, strategies of inquiry, and specific methods (Creswell 2009). The researcher therefore needs to clearly understand how each of these aforementioned elements will interact in order to help the researcher achieve what they aim to achieve in their research. In this section of the thesis I will first address the area of research philosophy, then the strategies of inquiry, and finally the specific methods that were employed.

3.3 Research philosophy

Social research aims to discover laws and postulate theories that explain social phenomenon amongst other things. However, the conduct of research is shaped by our paradigms (Bhattacherjee, 2012).

Paradigms can be seen as the belief system that we hold on particular issues. Guba& Lincoln (1994), considered seminal writers in the qualitative research area, define a paradigm as "a set of basic beliefs that deals with ultimates or first principles." They continue to state that these beliefs are basic because they are simply accepted on faith, regardless of their truthfulness. A paradigm therefore gives us a lens to see the world; how the elements thereof are shaped, and how they relate or do not relate to each other. Bhattacherjee further states that these paradigms are "often hard to recognise because they are implicit, assumed, and taken for granted" (pg. 17), suggesting one may not even be aware that the conduct of their research is ultimately being influenced by their belief system. This therefore means it may be necessary for the researcher to declare their research paradigm as it gives the readers an opportunity to reflect on the researcher's paradigm as they digest the results.

Guba & Lincoln (1994) further suggest three key questions help us understand the basic beliefs of inquiring paradigms, namely;

1. The ontological question: This addresses the question of what is the form and nature of reality. Based on the belief held, some questions will not be answerable while those that are seen to relate to reality will be asked.
2. The epistemological question: This question addresses the relationship between the researcher and what is to be known. Where the researcher assumes a real reality they will observe from a distance that which needs to be known.
3. The methodological question: This question addresses how the researcher can go about finding out what they believe can be known.

Answering these three key questions allows the researcher to clearly define their research paradigm. In the next section I shall first address the current dominant paradigms in social science research to provide basis for the first two questions. Thereafter I shall discuss the dominant knowledge acquisition claims in social science research as basis for the methodological question. I shall then articulate my research orientation.

Dominant paradigms in Social Science Research

A number of researchers have written extensively on this subject. Key amongst these are Orlikowski & Baroudi (1991) Guba & Lincoln (1994), Bhattacherjee (2012), Kivunja & Kuyini (2017). Whilst each researcher has used different terminology to classify the paradigms, four key paradigms are consistent across. These are positivism, post positivism, critical theory, and constructivism. I shall endeavour to summarise these next.

Positivism

This has, for years, been the most dominant research paradigm in social research in general and in information systems research in particular (Orlikowski & Baroudi, 1991). Guba & Lincoln (1994) summarise this paradigm as "the received view" that has dominated the formal research space for some centuries. Positivism suggests fixed relationships exist within a phenomenon.

Positivism assumes observations can be interpreted in terms of facts or measures and aims to provide explanations based on measurable outcomes (Kivunja & Kuyini, 2017). As such, studies following this paradigm usually test theory. Citing Cohen, Manion, & Morrison (2000), Kivunja & Kuyini state that positivism's measurable outcomes rest on four assumptions; determinism, empiricism, parsimony, and generalisability.

Determinism suggests observed events are caused by other factors while empiricism suggests the need to identify verifiable data when addressing research problems. Parsimony on the other hand suggests the need for the most economical explanation of the phenomenon being studied. This is also a key characteristic of scientific method of building knowledge (Bhattacherjee, 2012). Finally, generalisability suggests the need for results obtained in a particular setting be applicable to other similar situations by inductive inferences.

Positivist paradigm holds an objectivist epistemology where understanding is gained by applying reason. This is likely to be the case as the basic assumption of the paradigm is that of fixed relationships within the phenomenon. Knowledge acquired helps us become more objective in understanding the world around us (Guba & Lincoln, 1994; Kivunja & Kuyini, 2017). The same researchers suggest the ontological stance of the positivist paradigm is that referred to as "naïve realist" which assumes the existence of material objects that have existing relationships; following law-like paths.

Many have claimed positivists hold a reductionist view of reality (Orlikowski & Baroudi, 1991).

Post-positivism

Post-positivism is best considered an umbrella of the views that were considered opposed to positivism; an anti-positivism stance (Bhattacherjee, 2012). As a paradigm, very few researchers have declared allegiance to the term itself. A number though, such as Orlikowski & Baroudi (1989), and Myers (1999) have identified with a fragment of this paradigm. Bhattacherjee (2012) notes that post-

positivism has fragmented into subjectivism and critical realism. Subjectivism views the world as a "subjective construction of our subjective minds" whilst critical realists view the world as an external reality that is independent of a person's thinking - an external reality that we can never know with any degree of certainty. Post-positivism generally assumes reality is imperfect and the truth is not absolute but probable.

Critical theory

Critical theorists view the world as virtual or historical reality shaped by social, political, cultural, economic, ethnic, and gender values (Guba & Lincoln, 1994). This reality becomes clear over time and then becomes "real". Critical theory paradigm therefore suggests a reality that is in existence, albeit unknown in what form, and as social forces interact they form the shape of that reality.

Constructivism

Views the world as subjective, mental constructions of the individual seeking knowledge. These mental constructions of knowledge are created as the knowledge seeker interacts with the respondents and environment they exist in (Guba & Lincoln, 1994; Kivunja & Kuyini 2017).

This paradigm assumes a subjective epistemology where the researcher makes meaning of data gathered in the research process through their own thinking. Their thinking is informed by the researcher's interaction with research participants. Quoting Punch (2005), Kivunja & Kuyini (2017) state there is an understanding that the researcher will be influenced by their personal experiences of the environment they are investigating when constructing knowledge i.e. interpreting the data results of the research.

The constructivism paradigm holds a relativist ontological stance in the sense that multiple realities can exist for the same situation, and these realities become knowledge as researchers, subjects of the research, and research participants interact (Kivunja & Kuyini, 2017).

3.4 My research orientation

In the following sub-section I will answer the ontological and epistemological question in an attempt to situate the research paradigm influencing this research.

The ontological question

This research followed the relativist ontology. The study sought to understand how an academic institution sought to infuse a technology within a particular group of users in a particular setting. This required the researcher to contextualise the process to a specific environment. Particular actions by one group of participants (management) were expected to have a particular influence on another group of participants (student users). The researcher needed an understanding of how these actions by management are interpreted by the student users. For me to understand this sense-making process, I needed to engage with the research participants, as noted by Kivunja& Kuyini (2017), amongst other researchers.

The epistemological question

This study followed the subjective epistemology. While the researcher did not influence the data results, subjective epistemology holds that the researcher's experience with the environment being studied has an effect on the interpretation of the data results. Given that the research took a process approach to a technology's infusion, a subjective epistemology allowed me to draw richer conclusions about the interactions of the artefact, the participants, and the infusion process. Past research in IS has been criticised for taking a factor-based approach as well as assuming a cause-effect relationship in issues related to technology acceptance and use.

In the next sub-section of the research design section I shall address the strategies of inquiry.

3.5 Strategies of inquiry

This sub-section also addresses the third question posed by Guba& Lincoln (1994); the methodological question. Foremost, I shall address the two dominant knowledge acquisition claims as well as the alternative strategy of inquiry; that of mixed methods.

3.5.1 Dominant Knowledge Acquisition claims in Social Science Research

Researchers such as Kimmons (2022), Kelly, Dowling, & Millar (2018), Horvorka & Lee (2010), Creswell (2003), have associated different research methodologies with distinct beliefs about knowledge acquisition. In social science research, two dominant belief systems about knowledge acquisition prevail. These are positivism and interpretivism. I shall briefly discuss each.

3.5.1.1 Positivism

Positivism, deeply rooted in the natural sciences, is a research tradition involving "the manipulation of theoretical propositions using the rules of formal logic and the rules of hypothetic-deductive logic" (Lee, 1991). These theoretical propositions must adhere to strict logical rules, allowing researchers to define formal propositions that specify independent and dependent variables and their interrelationships. This logical structure is considered pre-existent within the phenomena studied (Orlikowski & Baroudi, 1991).

Positivists assert the existence of a single, objective reality that can be measured reliably and validly through defined variables. This implies that scientific research is independent of the researcher's values. Positivist methodology is empirical and manipulative, with hypotheses framed as propositions tested under controlled conditions (falsification). Hypothetico-deductive logic posits that while the major premise may not be directly observable, it can be broken down into observable minor premises (Lee, 1991). This suggests that the phenomenon of interest is singular and fragmentable, with a unique, best description for any aspect (Orlikowski & Baroudi, 1991). Researchers thus define propositions based on existing logic.

Positivism aligns with the hypothetico-deductive model of science, which involves verifying a priori hypotheses through experimentation by operationalizing variables and measures. The outcomes from hypothesis testing are used to advance scientific knowledge. Studies within this framework focus on identifying explanatory associations or causal relationships using quantitative approaches, favoring empirically based findings from large samples (Cohen et al., 2010, Ikram & Kenayathulla, 2022). Guiding principles of positivist science include generalisable inferences, replication of findings, and controlled experimentation (Creswell, 2010; Alharahsheh, & Pius, 2020).

The hypothetico-deductive method is a circular process beginning with theory from literature to (1) build testable hypotheses, (2) design experiments by operationalising variables, and (3) conduct empirical studies based on experimentation. Findings from these studies inform and refine theory, completing the cycle (theory → hypothesis → operationalising variables → experimentation → theory). For instance, a hypothesis confirming the effectiveness of an instructional approach for a new group of learners can refine existing theories.

Proponents of positivism today are more cautious in their quest for objective knowledge and generalisable laws but still emphasize empiricism (Park et al., 2020). The positivist paradigm enables

researchers to rely on statistical generalisation, leading to the development of universal laws and findings. Thus, positivism suggests a separation between the researcher and reality, with the research object having inherent qualities independent of the researcher (Ikram & Kenayathulla, 2022; Godwin et al., 2022).

As such, positivism posits that the researcher and reality are distinct entities, and that the research object possesses inherent qualities independent of the researcher's perception.

3.5.1.2 Interpretivism

Interpretivism posits that the researcher and reality are inseparable, and that the research object is interpreted based on the researcher's lived experiences (Kroeze, 2012, Weber, 2004). This knowledge acquisition approach assumes that individuals create and associate their own subjective meanings as they interact with the world (Orlikowski & Baroudi, 1991). Consequently, the world is structured by individuals, making any rules, laws, or meanings subjective, and based on personal experiences (Creswell, 2003; Gregor, 2006). Rooted in symbolic interactionism and phenomenology, interpretivism contends that value and theory-neutral facts do not exist. People's perceptions shape the nature of objects and this paradigm encourages researchers to seek experiential knowledge and explore different interpretations of social contexts, thereby gaining deeper insights (Scotland, 2012; Myers, 2019).

For interpretivists, the world must be viewed from the subject's perspective, contrasting with positivism, where constructs and variables are defined by the researcher, not the subject (Hovorka & Lee, 2010, Junjie & Yingxin, 2022). Interpretivist researchers play a crucial role in interpreting what the world means to the human subjects they study (Kroeze, 2012).

Interpretivism emerged as a critique of positivism, emphasizing a subjective perspective in research. Unlike positivism, which focuses on objective measurement and generalisation, interpretivism explores the complex variables and contextual factors influencing human behavior. It recognizes that humans, with their capacity to infuse situations with deeper meanings, cannot be studied in the same way as physical phenomena (Johnson & Onwuegbuzie, 2004; Creswell 2010). Therefore, social sciences research necessitates a distinct approach from natural sciences.

Interpretivism acknowledges that factors such as culture, circumstances, and temporal contexts contribute to the creation of diverse social realities. This paradigm values the richness of insights that stem from understanding these varied influences. While positivism seeks universal truths,

interpretivism aims to delve into the depth of human experiences and the meanings they generate. (Miles & Huberman, 1984; Ikram & Kenayathulla, 2022).

By employing the interpretive paradigm, researchers are encouraged to consider participants' behavioral aspects and personal experiences. This approach aids in describing reality based on the interpretivist researcher's assumptions and beliefs. That is, the researcher is not a detached observer but an active participant in the research process. They engage with participants to understand their perspectives and experiences, recognizing that meaning is embedded within social interactions. This empathetic approach allows researchers to uncover the distinctions of human behavior that might be overlooked by a more rigid, positivist methodology (Alharahsheh & Pius, 2020). Furthermore, it treats the research context and situation as unique, accounting for the specific circumstances and individuals involved.

Interpretivist ontology adopts a relativist view, perceiving reality through inter-subjectivity. This perspective considers the meaning in research and the understanding of social and experiential aspects as socially constructed (Junjie & Yingxin, 2022). Authors such as Saunders et al., (2012), Myers (2019), Scotland (2012), amongst others, add that, due to the complexities of individuals and social subjects, there is often more than one truth.

It can therefore be argued that the purpose of interpretivist research is to examine how social groups or individuals create and understand their realities. That interpretivism seeks to demonstrate how these norms explain their behavior. Interpretivists assert that truth and knowledge depend on how people interpret reality in various historical and cultural contexts. Using narrative data, interpretive scholars argue that reality can only be accessed through social constructions such as language, consciousness, shared meanings, and instruments (Myers, 2008).

Furthermore, it can be deduced that this paradigm values the unique experiences of individuals, aiming to recognize these diverse perspectives without solely relying on quantitative measures. Unlike positivists, interpretivists focus on understanding the specific world of lived experiences. In positivism, reality is viewed as objective and singular, whereas in interpretivism, reality is subjective, with multiple interpretations. The goal of interpretivism is to construct meaning and understand knowledge and behavior.

Summarily, based on the writings on a number of authors on the research methods topic, the key tenets of Interpretivism may be summed as, amongst others;

1. Subjectivity: Interpretivism acknowledges that individuals construct their own realities based on their unique experiences, beliefs, and values. This subjective nature of human experience is central to the paradigm.
2. Contextuality: Social phenomena are understood within specific cultural, historical, and social contexts. These contexts shape individuals' perceptions and behaviors.
3. Sense-Making: Interpretivism focuses on understanding how individuals make sense of their world. By exploring the assigned or proxy meanings that people attach to objects, events, and relationships, researchers can gain deeper insights into their motivations and actions.
4. Individual biasness: Interpretivist researchers recognise the impact of their own biases and assumptions on the research process. They strive to be transparent about their own perspectives and to acknowledge the limitations of their interpretations.

Interpretivist research often employs qualitative methods such as phenomenology; an approach that seeks to understand the lived experiences of individuals. Where this method is being used, the researcher will immerse themselves in the participants' world to gain a deep understanding of their subjective realities. Ethnography can also be used. For example, ethnographers study cultures and societies by immersing themselves in the target group's environment. They observe behaviors, participate in activities, and conduct interviews to gain a holistic understanding of the culture.

Furthermore, the Grounded Theory method can be used by interpretivists to generate theory from data, as it is an inductive approach. In this instance, the researcher collects data through interviews, observations, and document analysis, and then systematically analyzes the data to develop theoretical concepts. Finally, case studies can also be a useful method for the interpretivist researcher.

Purposeful sampling is the commonly employed sampling method for interpretivists, and data is collected through observations, interviews, document and records analysis, as well as assessing artifacts at times.

I shall now discuss the three approaches commonly employed within the two dominant knowledge acquisition claims, namely quantitative, qualitative, and mixed methods approaches.

3.5.1.3 Quantitative and Qualitative Research Methodologies

Quantitative and qualitative research methodologies represent distinct approaches to knowledge generation. Quantitative research, often associated with the positivist paradigm, employs a structured

and systematic approach to investigate phenomena through numerical data. This methodology emphasizes objectivity, reliability, and validity. It assumes that the researcher maintains objectivity throughout the study. Based on positivist beliefs, quantitative approaches emphasize that social science inquiry must be objective and aim for time- and context-free generalisations (Johnson & Onwuegbuzie, 2004). Schofield (2002), citing Smith (1975), notes that quantitative researchers aim to generalise findings across diverse populations and times. To achieve this, researchers avoid direct participation in the study to prevent their subjectivity from influencing the study's direction and outcomes.

Quantitative research is characterized by formal, objective, rigorous, deductive approaches - where logic proceeds from general to specific - and systematic strategies for generating and refining knowledge for problem-solving. Its designs can be experimental or non-experimental, aiming to obtain accurate and reliable measurements (Rahman, 2017). This involves systematic observation and description of characteristics or properties of objects or events to discover relationships between independent (predictor) and dependent (outcome) variables within a population. The design and variables are predetermined before data collection begins.

Quantitative research methods deal with numbers and measurable phenomena in a systematic investigation of their relationships. Researchers decide what to study, ask specific and narrow questions, collect quantifiable data from participants, analyze these numbers using statistics, and conduct the inquiry in an unbiased and objective manner (Kimmons, 2022, Alharahsheh & Pius, 2020; Basias & Pollalis, 2018;).

Researchers utilizing quantitative methods typically formulate specific hypotheses, collect data through standardized instruments such as surveys or experiments, and rely on statistical analysis, measurement scales, and clearly defined variables. In most instances, the data is statistically analysed to draw inferences about a larger population (Kimmons, 2022). As highlighted above, the quantitative paradigm assumes that variables can be objectively measured. As such, it often focuses on studying cause-and-effect relationships among variables. Common methods include surveys and experiments.

In contrast, qualitative research, associated with interpretive paradigms like constructivism and phenomenology, seeks to understand the subjective experiences and meanings individuals ascribe to their social world. This approach emphasizes flexibility, depth, and context-specific understanding. Qualitative researchers often employ methods such as interviews, observations, and document

analysis to collect rich, detailed data. The analysis of qualitative data is typically inductive, involving the identification of patterns and themes within the data to develop theoretical insights.

While quantitative research prioritizes generalisability and the ability to make causal claims, qualitative research focuses on in-depth exploration and contextual understanding. Generalisability is not a primary concern in qualitative research, as argued by Orlikowski & Baroudi (1991) and supported by Schofield (2002); Alharahsheh & Pius, (2020); and Guraya, Harkin, Yusoff, & Guraya, (2023); amongst others. Instead, qualitative research focuses on the inductive analysis of social realities, adopting a descriptive and exploratory orientation. The main aim is to build theory and identify new variables, which quantitative researchers later test using detailed and in-depth information from participants' perspectives.

Qualitative researchers achieve their goals by understanding and abstracting the lived experiences of individuals. This type of research typically leads to explanations rather than generalisations, as it seeks to unravel the meanings attached to specific social constructs. However, qualitative research faces criticism in three main areas. These have been well documented by a number of authors such as Orlikowski & Baroudi, (1991); Schofield, (2002); Junjie & Yingxin, (2022); Guraya et al., (2023); amongst others. Foremost the use of small samples limits the ability to generalise or replicate findings. Secondly, researcher bias can influence the interpretation of raw data based on personal predispositions; and thirdly, in extreme cases, qualitative research can result in particular or context-specific theory building, where one theory may only apply to a single issue, case, or individual.

Both approaches have their strengths and limitations, and the choice of methodology depends on the research question, the nature of the phenomenon being studied, and the researcher's epistemological and ontological assumptions.

Another key distinction between the two approaches lies in their respective ontological and epistemological stances. Quantitative research often assumes a realist ontology, positing that social reality exists independently of human perception (Alharahsheh & Pius, 2020; Myers, 2019). Epistemologically, it adopts a positivist stance, advocating for objective and value-free inquiry. Qualitative research, on the other hand, often embraces a constructivist ontology, recognizing the social construction of reality (Junjie & Yingxin, 2022). Epistemologically, it tends to adopt an interpretive stance, emphasizing the subjective nature of knowledge and the role of the researcher in shaping the research process (Alharahsheh & Pius, 2020; Myers, 2019).

3.5.1.4 Mixed Methods

The mixed methods research design is seen as the middle-point of the two continuums, qualitative and quantitative designs. The beginnings of mixed methods were driven by the acceptance that all research methods have inherent shortcomings therefore the use of more than one method could reduce the bias presented by any one of them. While the research design was initially aimed at triangulating data results obtained from several methods, it has evolved to several uses, such as those highlighted by Greene, Caracelli, & Graham (1989). These researchers suggest five reasons for the use of mixed methods, which I discuss next.

1. Triangulation: this is when the researcher designs the use of multiple methods, with offsetting or counteracting biases, in investigating the same phenomenon in order to strengthen the validity of inquiry results. As all methods have biases, hence the use of more than one method to offset biases. The researchers further note that these multiple methods must be implemented at the same time, and independently.
2. Complementarity: where the study uses mixed methods to measure overlapping but also different aspects of the phenomenon. The researchers note that this produces a richer, elaborated understanding of the phenomenon.
3. Development: where the study seeks to use one method to develop or inform the other method. The aim here could be to increase validity of constructs and research results.
4. Initiation: the aim here is to discover paradox and contradictions i.e. to discover all differing angles.
5. Expansion: the researcher in this instance seeks to increase the breadth and range of query by using different methods for different inquiry components.

Creswell (2009) further provides three examples of mixed methods research strategies which the researcher may employ as a strategy of inquiry. Briefly, these are:

- Sequential mixed methods where the researcher uses one method to feed into the next method. This could be to expand or to elaborate further the discussion. For instance, the researcher could start off with a qualitative method and use the results thereof to inform the quantitative method.
- Concurrent mixed methods where the researcher uses the different methods at the same time to reach a more detailed, richer conclusion.

- Transformative mixed methods where the researcher uses a theoretical lens as a framework for coming up with questions and methods of collecting data as well as the topics that must be included in the mixed method research strategies. Creswell (2009, pg.15) notes that within this framework could be data collection methods that involve sequential or concurrent methods.

Within each inquiry strategy, the researcher has a number of research methods at their disposal.

Mixed methods in this study

My research study used mixed methods for complementarity purposes. While the use of mixed methods has in the past attracted criticism from those who align themselves with one paradigm only (qualitative or quantitative), researchers such as Venkatesh, Brown, & Bala (2013) as well as Venkatesh, Brown, & Sullivan, (2016); suggest that where the researcher finds that mixed methods are the most appropriate in addressing the research questions then the researcher must not be caught up in the "paradigmatic incommensurability". Venkatesh et al., (2013) also note that mixed methods are ideal in today's society where IT use is not only an integral part of the individual but its use is also multi-faceted. While a technology may serve a particular primary role in one sector of society, it may serve a different primary role in a different sector of the same society. For instance, while the cell phone may be a key communication device for the wealthy, it can also be a source of income to those in that society that crowd-source, or be a banking device for the poor and unbanked. Limiting the research method to one method may benefit one aspect but the researcher may lose greatly another aspect of the same phenomenon being researched.

The use of mixed methods also allowed me to complement inherent weaknesses in the individual methods. Researchers such as Venkatesh et al., (2013), Venkatesh et al., (2016), Johnson & Onwuegbuzie (2004) note that while quantitative methods provide the breadth of issues involved, the qualitative methods provide the depth of the issues in many phenomena.

Mixed methods can also address both exploratory and confirmatory research questions at the same time (Junjie & Yingxin, 2022; Venkatesh et al., 2013; Migiro & Magangi, 2011). Whilst qualitative techniques have been used to answer exploratory questions and quantitative techniques used to test, mixed methods allow the researcher to do both, especially where the research questions have both. Creswell& Creswell (2018) provide a further function of mixed methods – explanatory sequential

mixed methods. In this instance, the objective is to understand the "why" of data collected using a quantitative approach.

In my instance, I sought to understand the activities undertaken to promote infusion of LMS in learning-related activities on one hand (exploratory), and examine how student-users' perceptions are influenced by management actions (confirmatory) on the other, and then make sense of the data I had obtained from the confirmatory exercise.

Finally, the mixed methods approach was appropriate for my study as it enabled me to put into context the responses. While the survey instrument can be used in settings similar to UNESWA, the qualitative techniques employed and results thereof put into context the responses obtained from the quantitative tool. It was important that the responses received were seen and understood in the context that they were being collected.

The final sub-section of this section addresses the specific method that was employed in this study, which was the case study design.

Case study Research design

The use of the case study research method is one of the widely used research method in IS-related qualitative research (Darke, Shanks, & Broadbent, 1998). Case studies are seen as particularly appropriate for studying issues revolving around IS implementation and use within organisations (Rashid, Rashid, Warraich, Sabir, & Waseem, 2019; Benbasat, Goldstein,& Mead, 1987; Myers 1998, Darke et al., 1998). Bhattacherjee (2012) notes that the case method is well suited for studying complex organisational processes that involve multiple participants.

It is important for the researcher to ensure that they do their utmost best when undertaking case study research as there can be a number of challenges. Benbasat et al., (1987) note a few of these challenges frequently encountered in case study research. Specifically they note that:

1. Some case studies may start off with no particular research questions and therefore end up without specific answers.
2. In some instances, case sites are chosen based on access and convenience as opposed to fit with research questions. This means case sites become inadequate in addressing the research questions.

3. Researchers may also neglect validating or triangulating data collected, leading to biased interpretations.
4. Researchers may also fail to detail how data was collected or analysed. Specifically this would include what questions were asked, which particular documents were analysed, the position of the respondents in the organisation, amongst others.
5. Many case studies present a cross-sectional view of the phenomenon yet one of case study research strength is in longitudinal research.

Researchers intent on using the case study as their research method do best to address these particular challenges.

This study used the case study research method as it was seen as the most appropriate approach to answering the how and why questions of research. Bhattacherjee (2012) notes that the case study design can provide a "richer, more contextualised and authentic interpretation of the phenomenon" than most research methods. Yin (1994), on the other hand, also notes that the case method is ideal when the researcher has little or no possibility to control the events, as was the case with the implementation of the LMS at the target university. This research method also allowed me to focus on a contemporary phenomenon in its real life context (Yin 1994), without adjusting it or making any assumptions about it.

The case study design also allowed me to draw on the experiences of participants, which is very critical in studies around continuous use of technology. The case design ensured that the context of actions is understood within its environment. Rashid et al., (2019), Bhattacherjee (2012), along with a number of researchers, state that case research design is seen as ideal where "experiences of participants and context of actions are critical".

Generalisation in case studies

While the aim of the case study design is not to generalise to a population (Darke et al., 1998), Walsham (1995) suggests case methods can be used to generalise theory, amongst other things. To this end, Klein & Myers, (1999) note that "it is important that theoretical abstractions and generalisations be carefully related to the field study details, as they were experienced and/or collected by the researcher so readers can follow how the researcher arrived at his or her theoretical insights." (Klein & Myers, 1999:75).

Unit of Analysis

The unit of analysis in case studies can vary from individual to group. This is one of the key benefits of the case study design as it allows an analysis of multi-level participants. Yin (1999) suggests two types of case study designs that determine the unit of analysis. The holistic design includes a single unit of analysis where no logical sub-units of the units can be identified. On the other hand, embedded case designs involve multiple units of analysis which may be the main and smaller units on different levels. The intention may be to look for consistent patterns of evidence across the selected units, but within the same case. This study followed the latter case design as the unit of analysis was the organisation, with management and students being the main and smaller units situated at different levels of the organisation.

Respondents

As this study pursued a mixed methods approach, the respondents were management of the University of Eswatini as well as the student-users within the higher institution. As the entire management could not be interviewed, due to practicality and resources constraints, key informants were identified to represent the management perspective in the study. Key informants are generally regarded as extraordinary by those around them and usually hold positions of responsibility and influence (Marshall, 1996).

Seminal author in the area of key informant, Tremblay (2003) highlights five criterions that could be used to identify a key informant. These are;

1. Role in community. Their formal role should expose them to the kind of information being sought by the researcher.
2. Knowledge. In addition to having access to the information desired, the informant should have absorbed the information meaningfully.
3. Willingness. The informant should be willing to communicate their knowledge to the interviewer and to co-operate as fully as possible.
4. Communicability. They should be able to communicate their knowledge in a manner that is intelligible to the interviewer.
5. Impartiality. Key informants should be objective and unbiased. Any relevant biases should be known to the interviewer.

Key informants are individuals within an organization who possess in-depth knowledge and insights into specific aspects of the organisation's operations. They are chosen due to their formal positions and understanding of the research topic. These individuals serve as valuable sources of data, providing information and perspectives that may not be readily accessible through other research methods (Tremblay, 2003). Using key informants is efficient in the sense that the data can be obtained in a relatively short space of time. If done properly the data collected is usually in-depth and of high quality, comparative to the time taken (Akhter, 2022; Cossham & Johanson, 2019; Marshall 1996).

To reduce the effects of personal bias brought about by using the key informant technique, I used more than one key informant. The instrument used was the same and data from the two informants was collated. This is consistent with suggestions by Akhter (2022), Cossham & Johanson, (2019), Tremblay (2003),& Marshall (1996), amongst other authors.

Having identified the case study design as the research design of choice, as well as addressed who the respondents were, I will now address two key issues; the data instruments that were used, and how the data was collected and analysed. The next section discusses these briefly.

3.6 Data instruments

Three key research techniques were employed.

1. In-depth interviews with management to understand the process through which they sought to encourage infusion of the Learning Management System among the targeted users. This technique allowed the researcher to address objective 1 of the study. The interview guide is attached as Appendix A.
2. The researcher also used a survey method on student-users to examine their perceptions on efforts by management to infuse the LMS in their learning-related activities. This technique allowed the researcher to address objective 2 of the study. The questionnaire that was used is attached as Appendix B.
3. Focus group discussion technique with student-user focus group. This was the last data gathering technique after the researcher had used the other two data gathering techniques. This technique allowed the researcher to dig deep into the why aspect of the questionnaire responses.

Using thematic content analysis approach, I then identified key themes from the focus group discussion.

3.6.1 Developing the research instruments

Three research instruments were developed in the course of this research. One was an open-ended questionnaire that was filled by university administration, the other was a closed-ended questionnaire filled out by the students. The third research instrument was an interview guide that was developed after data had been collected and analysed from the previous two instruments. In the following section I shall address how these instruments were developed.

3.6.1.1 The Administrator questionnaire

The administrator questionnaire instrument was designed to be completed by the university administration. In this instance it was completed by the two key informants whose roles in the university are directly responsible for the IT infrastructure across the university and the teaching and learning respectively.

It had eight open-ended questions and six scale questions. The open-ended questions asked the respondent about activities the university had put in place to address a particular construct. The construct had been built from the theoretical framework. There were five specific constructs that the respondents had to address namely, Identification, Mobilization, Motivation, Barriers, and Participation.

The Barriers construct had two parts to it. First the respondent had to list challenges associated with availing MOODLE, then they had to list activities in place to address these challenges. The second part was listing challenges associated with the use of MOODLE, after which they had to list activities in place to address these particular challenges.

For each construct the respondent had to rate the effectiveness of these strategies used to address the activities / challenges identified with 1 being very ineffective; 2 = ineffective; 3= somewhat ineffective; 4 = effectiveness unknown 5= somewhat effective 6 = effective; and 7 being very effective.

The instrument did not require any demographics from the respondent.

Appendix A is a copy of the instrument.

3.6.1.2 The Student Questionnaire

The student questionnaire was divided into two parts. The first part collected the measures of the infusion variables. Specifically, the questionnaire had 40 items categorized into five (5) infusion variables. An extra variable, which was titled efficacy variable, was included in the questionnaire. The intention was to use it as a control variable. This, however, did not materialise as this variable fell away during the factor analysis.

Each of the five infusion variables had seven (7) items that measured it. The efficacy variable only had five (5) items.

The second part collected the demographics to be used to analyse any effect they may have. The following five demographic variables were captured here, namely Main Access to MOODLE, Year of Study, Faculty, Age Range, and Gender.

Pilot testing

Once the questionnaire had been developed it was pilot-tested among eleven (11) students. The participants in this test were purposively sampled, based on convenience, as the University was on lockdown due to the COVID-19 pandemic. The participants were not asked to assembly but the questionnaires were hand-delivered to twenty (20) students and they were asked to return them after responding. Only eleven (11) were returned.

Due to the abnormality of the situation, the pilot test participants were only asked to comment on questions the participants needed clarity on. No other objective, such as time taken, or face-to-face discussion of the questionnaire, was possible to implement.

The pilot results revealed only four (4) concerns on four separate items. The decision was to keep the items as they were on the questionnaire, as none of the concerns were on the same item. The items of concern are noted in the table below, as well as the concern raised. Given the approach used to seek feedback, as explained in the preceding paragraph, comments were not elaborate. They are recorded here as they were written on pilot questionnaires.

Table 3.1 – Items of concern during Pilot testing

Item No.	Statement	Concern raised
7	I have a feeling of connection with students that use MOODLE	"But all students have to use MOODLE. "
22	My motivation to using MOODLE in **NOT** related to schoolwork	"MOODLE, as far as I know, is only for schoolwork, so what do you mean?"
28	Using MOODLE is basically a straightforward exercise	"Depends. Taking a test is not as straightforward."
37	I am unlikely to stop using MOODLE	"No choice. MOODLE is forced on us"

The resultant questionnaire, which is what was used for the data collection, is attached as Appendix B in the appendices.

3.6.1.3 The Interview Guide

The interview guide was developed after the results from both the Administrator questionnaire and Student questionnaire had been analysed. This instrument was used to guide the discussions with the focus group.

Appendix C is the interview guide that was used during the focus group discussion.

3.6.2 Data Collection

To address how data was collected in this study, it is important to highlight the sampling method for the student-users who participated in the survey.

As mentioned in the preceding sections, this study sought to examine the perceptions of students, as a collective, to efforts to infuse LMS into their learning-related activities, as well as how those perceptions affect the infusion process. While the ideal scenario would involve studying the entire population, practical constraints often necessitate the use of a sample. These may include time constraints and financial resources. It could be relatively costly to collect data across a population, and in some instances collecting data over a relatively longer period of time could result in inaccurate data as the population's attitude may have changed over that data collection time period.

A well-selected sample therefore, representative of the population, allows researchers to draw inferences about the larger group. This is particularly crucial in large-scale studies where it is infeasible to collect data from every individual.

A sample can be defined as a representation of the population therefore it is important that the sample be representative of the population; i.e., it must display the same qualities and characteristics as the population. Results or findings obtained from the sample can then be extended (generalised) to the entire population (Sharma, 2017, Singh & Masuku, 2014). The choice of a sampling technique significantly impacts the validity and generalisability of research findings. Probability sampling methods, such as simple random, stratified, cluster, and systematic sampling, offer the advantage of statistical rigor and the ability to calculate sampling error. However, they can be time-consuming and resource-intensive. Non-probability sampling techniques, including quota, purposive, and convenience sampling, on the hand, are often used when probability sampling is not feasible or when specific types of participants are needed (Rahman et al., 2022; Etikan & Bala, 2017; Singleton & Straits, 2005).

Summarily, it would seem, the optimal sampling technique depends on several factors, such as the research question, the target population, available resources, and desired level of precision. Researchers must therefore carefully weigh the benefits and limitations of each method to make

informed decisions. By combining the strengths of probability and non-probability sampling, researchers can strive to achieve a balance between practicality and rigor. Ultimately, the goal is to select a sample that is representative, reliable, and valid, enabling the generation of meaningful insights (Sharma, 2017; Singh & Masuku, 2014; Singleton & Straits, 2005; Bradley, 1999).

In this study, whilst all students at the institution had an equal opportunity to participate, it was necessary to use Class Representatives to disseminate the questionnaires. As such, snowballing technique is considered the most appropriate classification of the sampling technique used.

According to the Vice Chancellor's Report[6] available at that time of the data collection, there were 4,926 full-time students at the University and 1,662 part-time students. Using Yamane's formula to calculate the sample size, the ideal sample size was found to be 378 students. The formula states that the sample size can be calculated by

n= N/1+N (e) ^2

Where: n=Sample size; N=Population size; e=Level of precision or sampling error, which in this case is 0.03.

Using Yamane's formula, the sample size will be

n = 6931 / 1 + (6931*0.0025)

n = 6931/18.3275

n = 378.18 ≃378 students

Due to the COVID-19 protocols that were in place during the data collection, I decided to target all students of the University i.e. every student (all 6,000+) was targeted to participate, via a university-wide link. As such, I first enlisted the assistance of the class representatives I had worked with in the previous years. These class representatives came from the B.Sc. programme, the B.Com. programme and the B.Ed. programme. I brought the three class reps together and explained the objectives of the study, as well as the ethical considerations, chiefly the informed consent aspect and the right to withdraw from the study. Having coached the class reps, I used snowballing techniques by emailing the link to the class representatives. They in turn shared the link and accompanying documents with their

[6] Vice –Chancellor's Report 2018 /2019. Available on http://www.uneswa.ac.sz/wp-content/uploads/2020/05/vc-report-2019.pdf

classmates and other class reps from other programmes. These three class representatives acted as my research assistants.

At the end, 306 questionnaires were collected. The analyses of the responses is undertaken in Chapter 5.

The next section highlights some of the ethical issues that were considered for this study.

3.6.3 Ethical Considerations

It is vital for any researcher to be ethical when conducting research. Regarding this study, it was necessary to address four key ethical issues. These were the confidentiality /anonymity aspect; issues on informed consent; the withdrawal from the study, as well as the ethical clearance aspect. I shall discuss each in the following sections.

3.6.3.1 Confidentiality / Anonymity

Respondents for both sets of instruments were expressly guaranteed confidentiality of their responses through the introductory letter that accompanied the questionnaires. Likewise, the research instruments did not require the respondents to, in any way, identify themselves.

To guarantee anonymity, respondents of the management questionnaire were not asked personal details. Respondents of the student questionnaires were not asked personal details except gender, year, and programme of study. Results from the survey are being reported in the aggregate. The completed questionnaires will be submitted to the Wits School of Education, as part of the thesis submission.

3.6.3.2 Informed Consent

Parahoo (2006) defines informed consent as "the process of agreeing to take part in a study based on access to all relevant and easily digestible information about what participation means, in particular, in terms of harms and benefits." It is necessary for researchers to obtain the respondent's consent as respondents are more likely to adhere to expectations if they have given consent (Manti & Licari, 2018).

To achieve informed consent in the group discussions, the researcher explained the purpose of the study as well as the intended manner of reporting – thematic analysis. Consent was sought by asking if the participant(s) were willing to participate in the focus group discussion.

To achieve informed consent in the survey, an introductory letter accompanied the relevant questionnaire. On it the respondent was informed about the purpose of the study and the intended

manner of reporting, which was aggregate reporting. Respondents were also made aware that their participation was entirely voluntary and that there would be no loss of any benefit whether they chose to participate or not to participate. For this study, the respondent was considered to have given consent if they chose to continue to complete the questionnaire.

3.6.3.3 Withdrawal from study

The respondents were also expressly guaranteed that they could withdraw from the study at any time. This guarantee was also contained in the introductory letter accompanying the questionnaire. The letters used during the study are attached as Appendices D and E. The letter did assure the respondents that there would be no prejudice suffered should the participants, in the case of the focus group discussion, or respondents, in the case of questionnaires, choose to withdraw from the study.

3.6.3.4 Ethical Clearance

The researcher obtained ethical clearance from the University of Witwatersrand Human Research Ethics Committee to conduct this study. The protocol number is H21/06/09.

Likewise the researcher obtained expressed approval from the University of Eswatini management to pursue this study. Such approval was appended onto the ethical clearance application sent to the University of Witwatersrand Human Research Ethics Committee.

Both ethical clearance and letter of approval are attached as Appendices F and G.

3.7 Summary

In this chapter I presented the methodology issues that relate to this study. I explained the research design, as well as my research orientation. Furthermore, I presented the instruments used to collect data and the ethical issues that this study considered.

In the next chapter I shall discuss the results from the first data instrument – the Administrator questionnaire.

4. Chapter 4 – Results: Management Respondents

4.1 Introduction

Having discussed the research methodology in Chapter 3, Chapter 4 presents the analysis of the data collected from one of the target respondents. As highlighted in the preceding chapter, two sets of respondents were targeted – the University administration and the students of the University, and the data gathering process took three stages.

The first stage involved sending out questionnaires to University administration. The second stage involved sending out questionnaires to students, and the third stage of the data gathering process as a focus group discussion with the students. Data was gathered between September 2021 and February 2022.

This chapter of the thesis presents that data results from the first stage. Specifically, the respondents' profiles are presented first. Thereafter, to address the first research objective – to examine the actions by which University management seeks to encourage the infusion of learning management systems among student users in their learning-related activities – the study presents the activities undertaken by University management to encourage the infusion of the learning management system at UNESWA. Data from the Administrator questionnaire is used for this objective.

Thereafter an analysis of the data is presented.

4.2 The Administrator Questionnaire

The first stage focused on the management of the University. The administrator questionnaire was emailed to the key informants, who were the leaders of the two portfolios that directly related to the e-learning system. As highlighted in the methodology chapter, the two officers provide a richer view of the e-learning system from a technical perspective as well as from the quality of learning perspective.

The aim of this phase was to get management's initiatives on the five areas of interest. Specifically, it was to find out the Initiatives University administration had put in place to;

1. Enable students to identify with the university e-learning system
2. Mobilize students to infuse the university e-learning system in their learning activities.
3. Motivate students to infuse the university e-learning system in their learning activities.

4. Reduce barriers that discourage students from infusing the university e-learning system in their learning activities.

5. Encourage students to continue infusing the university e-learning system in their learning activities.

For all the initiatives identified, University administration was also asked to rank their effectiveness.

Having obtained University approval to undertake the study, the researcher made appointments to see the respondents who were to be key informants. The main aim of this was to introduce the study and its objectives. The researcher presented both letter of approval from University authorities as well as the letters of consent, ethical clearance certificate, and hard copy questionnaires for ease of reference during the study introduction.

Having answered questions from the key informants, soft copy questionnaires, which were in Microsoft Word Format, were sent to the officers, as attachments to an email. Part of the attachment included the consent letter and letter of approval. The officers were asked to respond on the questionnaire and email back the filled out questionnaire. The following section addresses the results from these questionnaires.

4.3 Respondents' Profiles

Respondent 1

Respondent 1 is responsible for the University's ICT strategy implementation. The e-Learning platform forms part of this strategy. It is their responsibility to ensure that resources needed in the university are available. Such resources include personnel that provide support across the university units, faculties or centres, as well as training on technology to be implemented by the University. Such training is directed mainly towards university staff and students.

According to the university statutes, the stated objectives of Respondent 1's office include being responsible for but not limited to:

(a) Providing internet access to all the University Campuses;

(b) Providing service to all University internet users; and

(c) Extending the local area network for University internet users.

Respondent 1 is considered a key informant because they are the custodian of the ICT strategy of the institution. As such they are most likely to be at the forefront of initiatives meant to infuse the learning management system within the university.

Respondent 2

Respondent 2's office is responsible for ensuring the teaching and learning across the university meets the required quality standards. They are responsible for not only evaluating courses offered across the university, but also the pedagogical issues associated with delivery of courses. Respondent 2's office is also tasked with training staff on pedagogical issues. Respondent 2 is considered a key informant as their office engages on a regular basis with university faculty on the delivery of courses, including delivery on electronic platforms such as MOODLE.

The administrator questionnaire had 10 questions. Each factor of the research model had two questions assigned to it. The first question asked the key informant to list the initiatives the institution had undertaken (for example, for the identification factor, the key informant was asked to list initiatives that the university had undertaken to promote student identification with MOODLE i.e. students identifying with the LMS). Furthermore the key informants were asked to rank the effectiveness of the initiatives, with 1 being very ineffective; 2 being ineffective; 3 being somewhat ineffective; 4 being effectiveness unknown; 5 being somewhat effective; 6 being effective; and 7 being very effective.

Table 4.1 next summarises the responses from the two key informants. Column 1 is the listing of the initiatives undertaken by the University and column 2 is the average rank score based on the ranking of both key informants.

Table 4.1 – Responses from Administrator Questionnaire

Activities	Mean Score
Activities undertaken to promote student identification with MOODLE 1. Working on putting up strategies in place to promote student identification with MOODLE 2. Online manuals (including videos) have been made available in the LMS to help students 3. MOODLE is introduced and described during the student orientation process. 4. Drafting management memos to all students concerning the importance of MOODLE for the University teaching and learning strategy	5

Activities promoting the availability / use of MOODLE [Mobilization Activities] 1. The availability of online manuals on using MOODLE 2. The use of the LMS is one of the key areas being emphasized during orientation of new students 3. Availability on the Website of guides/handbooks on using MOODLE	5
Activities aimed at motivating students to use MOODLE [Motivation Activities] 1. Currently just the use of online manuals and videos	5
Key challenges associated *with the availability* of MOODLE 1. At the beginning [March 2020] the sudden upsurge in the use of MOODLE caused issues with access as the system would slow down quite significantly and sometimes users would be kicked out of the system 2. Power outages impacts the system as these are a random occurrence and with the server room not having working UPSes this is the biggest challenge 3. Another challenge which is not system based are students forgetting passwords 4. Students not being registered [therefore unable to access the LMS]. 5. Lack of high specification computers that are dedicated to MOODLE use on campus 6. Lack of suitable devices for off-campus use of MOODLE 7. Poor internet access both on campus and country. 8. Poor and expensive internet mobile data off-campus.	Did not require rating
Addressing the challenges associated *with the availability* of MOODLE 1. Through optimization of the settings in MOODLE, the issue of slow access was eventually resolved 2. The power supply issue still persists and the University with its financial challenges is still trying to resolve the issue of UPSes by acquiring new ones which is still proving to be a challenge. 3. A self-service password scheme has been setup which means students do not need to contact Technical staff to have their passwords reset but they need to enable the setup before they can use it. 4. Bandwidth is no longer a problem, especially if students are accessing the system from any place in eSwatini.	6 4

Upcoming initiatives 5. Phase 1 of an investment plan to support online learning is being considered by University Council. It includes re-equipping computer laboratories with higher spec machines, increasing internet speeds on campus, central provision of content creation tools for staff, discussions with mobile ISP to provide zero-rated educational services, and upgrading the digital facilities and resources in the Libraries. 6. Later phases include the creation of new dedicated learning spaces and simulation laboratories.	
Key challenges associated *with the use* of MOODLE 1. The main challenge especially now with the existing pandemic is data for students to access MOODLE form their respective places of residence and also access to the appropriate gadgets i.e. Laptops and Tablets. 2. Lack of access to dedicated PCs, learning spaces and specialized laboratories 3. Incomplete wireless access on all campuses (including student accommodation) 4. Slow internet access speed on campus 5. Cost of mobile data 6. Problems with supporting practical work 7. Authenticating users especially for assessment purposes 8. Lack of staff competence in designing and delivering effective courses on MOODLE's 9. No hardware and software for capturing lectures 10. Limited hardware and software for content creation 11. Student and staff not possessing the appropriate devices for accessing MOODLE off campus	Did not require rating
Addressing the challenges associated *with the use* of MOODLE 4. (University has implemented) Investment Plan for online learning 5. Negotiations with Mobile providers to provide zero rated educational services 6. Negotiations with ICT Ministry and eSwatini Postal and Telecomms Corporation to provide a higher bandwidth for internet access at a fair and affordable cost. 7. The University has engaged the two providers of mobile telecommunication services as they have the broadest coverage in the country 8. Support from UNDP to fund special data packages that enabled students to access MOODLE at highly subsidized rates using their mobile devices	4

Key activities aimed at encouraging students to continue their use of MOODLE? 1. Minimal activities have taken place as indicated above with more effort being spent on staff and students being forced to utilize MOODLE due to the current circumstance. 2. Free mobile access	3

4.4 Summary

This chapter presents the results obtained from the Administrator questionnaire. As highlighted in the previous chapter, this questionnaire was open-ended and asked the respondent to detail activities the university had undertaken under each of the research constructs. The respondent was further asked to rate the effectiveness of the activities that had been put in place.

The results suggest Management has put in place a number of activities, some targeted at students and others targeted at addressing institutional shortcomings. However, from their own ratings, a large number of these activities were not effective. The only group of activities that were rated as being effective was those focused on addressing the challenges management had identified.

In the next chapter I shall present the results from the student questionnaire.

5. Chapter 5 – Results: Students Respondents

5.1 Introduction

In order to address the second objective of this study, which was to examine the activities of students in the infusion process of Learning Management Systems, questionnaires were developed and used to collect data from the students. This chapter will address these results obtained from the student respondents. Specifically, this chapter will address the two research questions that help address this second objective. The two research questions were; what are the perceptions of students towards infusion activities, and how do these activities influence the infusion process.

In order to achieve this, the chapter will first address the first question, that is; what are the perceptions of students towards infusion activities. To do this, first the demographic information of the sample population will be presented. Next, the research model that was proposed in Chapter 2 is tested, with the testing process being described in detail. This testing process included the data preparation process and the hypotheses testing. Thereafter results of this model testing process are presented.

Following that, the chapter will address the second question i.e. how these activities influence the infusion process. Answering this question will lead us to the revised model, which is one of my contributions to knowledge in the infusion of information systems in organisations.

Accordingly, I shall first present the demographic information of the sample population.

5.2 Student Respondents' demographics

Table 5.1 shows the demographic information of the respondents which include their gender, age, the faculty they belong to, and how they access the learning management systems.

Table 5.1 – Respondents Demographics

	Number of respondents	%
Gender		
Female	165	53.9
Male	131	42.8
Prefer not to say	6	2.0
Missing	4	1.3
Faculty		
Commerce	47	15.4
Education	77	25.2
Health Sciences	3	1.0
Humanities	43	14.1
Social Sciences	52	17.0
Science & Engineering	71	23.2
IDE	11	3.6
Missing	2	.7
Year of Study		
2	89	29.1
3	82	26.8
4	109	35.6
5	15	4.9
Missing	13	4.2
Age		
Below 20	18	5.9
20-21	88	28.8
22-24	142	46.4
Above 24	54	17.6
Missing	4	1.3
Device mostly used to access MOODLE		
Mobile Phone	239	77.1
Laptop	46	15.0
Desktop	2	.7
Missing	19	6.2
Total	306	

As noted in Table 1, 53.9% of the respondents were female, and 42.8% male. These numbers are generally not far off the student population, as the Vice Chancellor Report, over the last 5 years has shown an almost similar trend, with almost an even number of male and female students. However, it is possible that more female students were willing to participate in the study, as is the case with similar

studies involving students (Claar, Portolese-Dias, & Shields, (2014), Dube (2020), Chung, Subramaniam, & Dass, (2020)).

A quarter (25.2%) of the responding students were from the Faculty of Education, whilst the Faculty of Science and Engineering had 23.2% of the respondents. The distribution could be influenced by the fact that the research assistants that identified the classes to approach the students were from the three Faculties; Commerce, Education, and Science and Engineering.

Most of the respondents (35.6%) were in their fourth year of study. While this may be purely incidental, it is worth mentioning that the paper-based version was conducted when the fourth year students had come to campus, as the university was using a block release system due to the COVID restrictions.

46.2% of the respondents were aged between 22-24 years old and 28.8% were aged between 20-21 years old. 17.6% were above 24 years of age.

77.1% of the respondents accessed MOODLE through a mobile phone, and 15.0% use a laptop. This is highly expected as many students use a smart phone. Very few have or carry laptops on campus.

Table 5.2 shows the responses per item.

Table 5.2 – Responses per item

Item	[1] Strongly Disagree [%]	[2] Somewhat Disagree [%]	[3] Disagree [%]	[4] Neither Agree or Disagree [%]	[5] Agree [%]	[6] Somewhat Agree [%]	[7] Strongly Agree [%]	Mean	Std. Dev		
ID01. I identify with the students who use MOODLE.	9.8	5.9	3.9	17	10.8	36.9	15.7	4.87	1.848		
ID02. I feel I belong to the group of students that use MOODLE.	12.8	9.2	6.2	9.2	12.5	35.4	14.8	4.65	2.011		
ID03. I consider myself part of the group of students that use MOODLE.	10.5	8.5	8.2	8.5	9.8	38.2	16.3	4.79	1.963		Mean
ID04. I do not feel alienated from students who use MOODLE.	7.8	12.7	7.8	17.3	13.4	31.4	9.5	4.48	1.822	4.53	Agree
ID05. I generally see myself as belonging to the group of students that use MOODLE.	12.7	8.5	9.2	9.5	17	32	11.1	4.5	1.947		
ID06. If asked if I belong to the group of students that use MOODLE, I would say **YES**	11.1	8.2	7.5	9.8	11.4	37.3	14.7	4.73	1.952		
ID07. I have a feeling of connection with students that use MOODLE.	18	18	8.8	17.3	15	15	7.8	3.7	1.95		
MOB01. I think UNESWA has done enough to raise my awareness of MOODLE.	24.2	19	13.7	13.4	13.7	9.8	6.2	3.28	1.911		
MOB02. I believe UNESWA initiatives towards encouraging use of MOODLE are adequate.	20.9	23.5	13.4	15.4	11.4	11.4	3.9	3.23	1.816		
MOB03. I believe UNESWA encourages me to use MOODLE.	20.3	17.6	11.4	14.4	13.4	17	5.9	3.58	1.954		Mean
MOB04. I think UNESWA puts an effort in raising awareness of MOODLE.	20.6	23.5	11.8	12.1	13.1	14.1	4.9	3.35	1.908	3.38	Disagree
MOB05. I believe UNESWA's awareness programmes about MOODLE are adequate.	21.6	22.2	14.7	15.4	11.8	10.5	3.9	3.21	1.802		
MOB06. UNESWA promotes the importance of using MOODLE.	15.7	20.3	13.1	14.1	12.4	17.6	6.9	3.68	1.926		
MOB07. UNESWA has ensured that the role of MOODLE in learning is clear.	23.5	15.4	17.3	14.4	13.1	9.8	6.5	3.34	1.894		

MOT01. I am motivated to use MOODLE in my schoolwork.	21.9	18	12.4	14.4	15	15.7	2.6	3.4	1.866		
MOT02. Using MOODLE is motivating.	29.7	20.3	10.5	17.6	10.1	8.5	3.3	2.97	1.809		
MOT03. My motivation to use MOODLE supersedes challenges associated with using MOODLE.	24.5	18.6	17	17.3	10.8	8.2	3.6	3.1	1.755		Mean
MOT04. MOODLE does not provide adequate motivation.	12.4	14.4	10.1	16	17.6	15	14.4	4.15	1.964	3.38	Disagree
MOT05. I look forward to doing something on MOODLE, even if it is not schoolwork related.	32.7	26.5	12.4	10.5	6.5	8.2	3.3	2.69	1.764		
MOT06. My motivation to using MOODLE is **NOT** related to schoolwork.	32.4	30.1	8.5	10.5	8.5	5.9	4.2	2.67	1.775		
MOT07. My motivation to using MOODLE is related to schoolwork.	14.7	5.9	7.2	11.1	14.4	24.2	22.5	4.67	2.081		
BAR01. UNESWA has put adequate processes in place to ensure I can use MOODLE.	28.8	17	12.4	13.4	8.5	16	3.9	3.2	1.959		
BAR02. There are very few obstacles to using MOODLE.	30.7	20.9	13.7	9.5	10.1	10.5	4.6	2.97	1.903		
BAR03. Most hindrances to using MOODLE have been adequately addressed.	34	22.2	16	13.7	6.9	4.6	2.6	2.61	1.638		Mean
BAR04. Using MOODLE is basically a straightforward exercise.	26.5	17	13.4	14.4	10.8	13.1	4.9	3.25	1.927	2.91	Disagree
BAR05. There are limited challenges to using MOODLE.	27.5	22.2	16.3	11.1	11.1	9.5	2.3	2.94	1.761		
BAR06. UNESWA ensures that challenges related to the use of MOODLE are adequately addressed.	33.3	21.2	18.3	10.1	9.5	5.9	1.6	2.65	1.645		
BAR07. Most challenges, under UNESWA's control, are adequately addressed.	30.1	23.9	14.7	14.4	7.2	6.5	3.3	2.77	1.715		
PAT01. I actively use MOODLE.	13.7	9.8	6.9	17.3	15.7	25.8	10.8	4.32	1.941		
PAT02. I prefer using MOODLE for my schoolwork.	27.8	15	8.5	14.4	11.8	13.7	8.8	3.44	2.085		
PAT03. Using MOODLE is better than not using MOODLE.	23.5	15	11.4	16.7	11.1	15.4	6.9	3.5	1.986		Mean

PAT04. I plan to continue using MOODLE in the near future.	26.5	15	10.8	18.3	8.2	15.4	5.9	3.36	1.981	3.52	Neither Agree or Disagree
PAT05. I am unlikely to stop using MOODLE.	20.9	14.7	8.2	25.5	8.8	15.4	6.5	3.59	1.92		
PAT06. I would like to do more on MOODLE.	28.8	19.3	8.8	16.3	8.2	12.7	5.9	3.18	1.976		
PAT07. I intend participating more on MOODLE in the near future.	29.4	17.3	6.2	17.6	13.4	10.1	5.9	3.22	1.969		

The preceding Table 5.2 shows the results of each item that was used to measure the construct. Five constructs were being measured, namely Identification with MOODLE, Mobilization Efforts, Motivation to use MOODLE, Removal of Barriers, and Participation, which was the proxy for comprehensive use of MOODLE. I shall present the results of each construct next.

Identification construct

The average score across all seven statements (or items in research terminology) was 4.53, suggesting that students generally tend to somewhat agree with the statements regarding their identification with the MOODLE user group. This suggests a moderate level of positive association with the MOODLE user group.

The item that scored the highest was ID01 with an average of 4.87 and a standard deviation that was lower than almost all items save ID04. This item, along with items ID03, ID05, and ID06 yielded similar scores of 4.79, 4.5, and 4.73, suggesting a consistent level of "somewhat agree" for these aspects of identification. Likewise item ID04 "I do not feel alienated from students who use MOODLE" had a slightly neutral sentiment (4.48), which also suggests that some students don't feel isolated from other MOODLE users.

Item ID07 "I have a feeling of connection with students that use MOODLE" yielded the lowest average score (3.7) with a relatively high standard deviation (1.95), which indicates that students, whilst they may be neutral on whether they feel a connection with students that use MOODLE, they generally have a more varied range of responses regarding their feeling of connection with other MOODLE users.

Mobilization Construct

There was a consistent level of disagreeing with UNESWA's efforts to mobilize students to use MOODLE. Specifically items MOB01, MOB02, MOB04, MOB05, and MOB07 yielded scores of 3.38, 3.23, 3.35, 3.21, and 3.34 indicating a consistent level of disagreement with the university's efforts to mobilize them. MOB06, on the other hand had the highest average score (3.68), suggesting a more neutral sentiment to the activities UNESWA engages in to promote the importance of using MOODLE. However, it is important to consider that a neutral score may not necessarily translate to strong endorsement.

Item MOB03 which was "I believe UNESWA encourages me to use MOODLE" was assessing student's perception towards the university's activities meant to encourage them to use MOODLE. The item scored slightly higher (3.58) than the average, which leans to towards a neutral sentiment. However, it

also had the highest standard deviation (1.926), indicating some students felt UNESWA did well in this area, while others disagreed.

This suggests that students, on average, perceive UNESWA's mobilization efforts for MOODLE to be somewhat inadequate. There is a general sense of lukewarm disagreement across most areas measured. The data suggests that students are not fully convinced by UNESWA's efforts to mobilize them towards using MOODLE and therefore perceive the university's mobilization efforts to encourage MOODLE use as somewhat lacking.

Overall, however, it is worth noting that promoting the importance of MOODLE received a slightly more neutral response.

Motivation Construct

The average score across all items was 3.38, which falls on the "somewhat disagree" range of the Likert scale. This suggests that, on average, students are somewhat not motivated to use MOODLE.

MOT01, MOT02, and MOT03 focused on intrinsic motivation to use MOODLE for schoolwork. The average scores for these questions ranged from 2.97 (MOT02) to 3.4 (MOT01), indicating a consistent level of "somewhat disagree" with these intrinsic aspects of motivation.

MOT04 was specific to the MOODLE tool itself and scored an average of 4.15. This suggests the students were indifferent on whether MOODLE itself was motivating enough.

MOT05 and MOT06 explored students' general interest in using MOODLE, even beyond schoolwork. Interestingly, the average scores for these questions were the lowest (2.67 and 2.69), suggesting a more negative sentiment. This would suggest students are not motivated to do anything else outside schoolwork on MOODLE.

MOT07 ("My motivation to using MOODLE is related to schoolwork") addressed whether students' motivation stemmed primarily from schoolwork requirements. It had the highest average score of 4.67, indicating that using MOODLE for schoolwork purposes is the strongest motivator for students. This average score for this question was the highest but also had a high standard deviation (2.08) as well. This suggests that while a significant portion of students (around 47%) agreed that their motivation is related to schoolwork, there is also a notable group (around 20%) who disagreed.

Overall, the data suggests that students at UNESWA are, generally not particularly motivated to use MOODLE. Specifically, the students are lack the intrinsic motivation to use MOODLE. It would seem the primary driver for most students seems to be completing schoolwork requirements

Removal of Barriers Construct

The average score for the seven questions measuring the removal of barriers to MOODLE use is 2.91. Given that the Likert scale ranges from 1 (Strongly Disagree) to 7 (Strongly Agree), an average of 2.91 suggests that students generally disagree that barriers to MOODLE use have been adequately removed. In other words, students perceive significant obstacles hindering their effective use of MOODLE.

All items received average scores below the neutral point (4), indicating a consistent negative perception of barrier removal. This high frequency of "Strongly Disagree" responses across multiple items emphasizes the severity of perceived barriers. Specifically, BAR03, BAR06, BAR07 show particularly low average scores, suggesting strong student dissatisfaction with UNESWA's handling of barriers. The consistently low scores indicate that students perceive these efforts as insufficient. While the overall picture is negative, there are variations in the strength of disagreement across different types of barriers. For instance, questions related to UNESWA's role in addressing challenges (BAR01, BAR06, BAR07) seem to have elicited stronger negative responses compared to questions about the inherent ease of using MOODLE (BAR02, BAR04, BAR05).

These items directly assessed the presence of obstacles and barriers to MOODLE use and the low average score indicates that students perceive these barriers as substantial, and it would seem the students believe UNESWA has not effectively addressed these challenges. Furthermore, the students perceive UNESWA's efforts to address these barriers as insufficient as the items also evaluated UNESWA's actions in removing barriers. The low average suggests that students feel these efforts are inadequate.

These findings suggest that UNESWA may need to prioritize addressing students' concerns about barriers to MOODLE use. It would seem students face significant challenges with MOODLE.

Continuous Use Construct

The average score of 3.52 on the 7-point Likert scale for the continuous use of MOODLE questions indicates that students hold a neutral stance towards the statements. This suggests mixed feelings regarding the continued use of MOODLE, meaning whilst some students may actively use and prefer MOODLE, others may have reservations or uncertainties about its continued use. This neutral stance however, indicates an opportunity for enhancing MOODLE’s appeal and effectiveness to foster increased student engagement

Item PAT01 "I actively use MOODLE" had the highest average score of 4.32. This would suggest students are actively using MOODLE. This item (PAT01), taken with item PAT05 "I am unlikely to stop using MOODLE" which scored the second highest average score of 3.59, shows that the university has an opportunity to improve MOODLE as students have not particularly rejected the LMS. Given also that the university administration has put little effort in raising awareness of MOODLE as a tool of choice, these results suggests the "self-discovery" done by the students has left them on a neutral position. The university will do best to take advantage and push the LMS agenda from this point forward.

To cross-check the accuracy of the frequency distributions presented in Table 5.2, the one-sample t-test was conducted on the data. The One Sample *t*- Test examines whether the mean of a population is statistically different from a known or hypothesized value. The One Sample *t* Test is a parametric test. The test value for each of the 5 variables was a value of 4, which is the centre of the 7-point Likert scale. In the analysis the neutral responses we omitted from the analysis since they have no contribution to agreement and disagreement perceptions, hence the differences in N for Variable IDENTIFICATION and Variable REMOVAL OF BARRIERS. The analysis yielded the following results (Table 5.3 and Table 5.4).

Table 5.3: One-Sample Statistics

One-Sample Statistics				
Variable	N	Mean	Std. Deviation	Std. Error Mean
MOBILIZATION	306	3.3215	1.61717	.09245
PARTICIPATION	306	3.5213	1.75023	.10005
IDENTIFICATION	306	4.5779	1.77724	.10160
REMOVAL OF BARRIERS	305	2.7970	1.51518	.08676
MOTIVATION	297	2.5135	1.47553	.08562

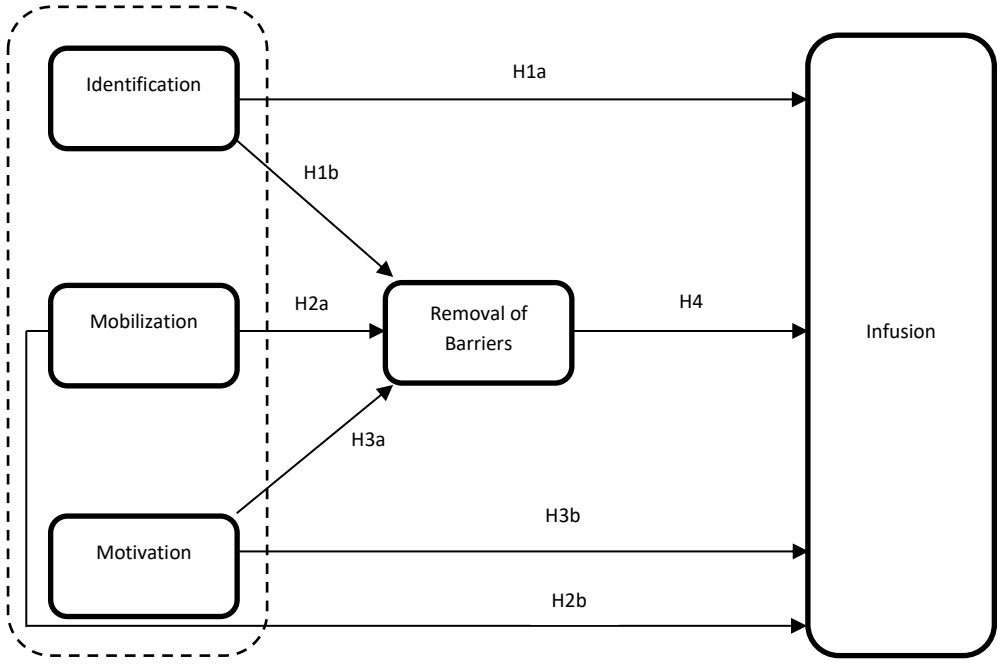
Table 5.4: One-Sample Test

One-Sample Test						
	Test Value = 4					
Variable	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
MOBILIZATION	-7.339	305	.0005	-.67850	-.8604	-.4966
PARTICIPATION	-4.785	305	.0005	-.47874	-.6756	-.2819
IDENTIFICATION	5.688	305	.0005	.57791	.3780	.7778
REMOVAL OF BARRIERS	-13.866	304	.0005	-1.20301	-1.3737	-1.0323
MOTIVATION	-17.362	296	.0005	-1.48653	-1.6550	-1.3180

On average, all factors, except IDENTIFICATION, depict that students had highly significant negative or disagreement perceptions. They only portray a significant agreement or positive perception for IDENTIFICATION. Furthermore, the t-test derived highly significant p-values, hence the differences from the test value is not due to sampling errors but sincere perceptions.

Before testing the model, it is important to test whether the hypothesized relationships hold. To do this it is necessary to conduct both mediator analysis as well as moderator analysis on the hypothesized mediator construct, termed Removal of Barriers in the proposed model. The research model, as presented in Chapter 2, is re-captured again here as Figure 5.1

Figure 5.1 – Research Model Revisited



Mediator Analysis

To examine whether Removal of Barriers (BAR) mediated the effects of identification (ID), mobilization (MOB), and motivation (MOT) on participation (PAT), I conducted mediation analyses using the Baron & Kenny (1986) approach, supplemented by Sobel tests. To this, I first ran a linear regression analysis on SPSS. The output was as follows.

Direct Effects (X → Y)

MOB → PAT: Significant (β = 0.594, $\rho < 0.001$).

MOT → PAT: Significant (β = 0.647, $\rho < 0.001$).

ID → PAT: Significant (β = 0.534, $\rho < 0.001$).

Mediation via BAR (X → BAR → Y)

MOB → BAR → PAT:

Partial mediation (Sobel $z = 5.64$, $\rho < 0.001$).

Indirect effect (a × b) = 0.691 × 0.360 = 0.249 (95% CI: [0.167, 0.331]).

MOT → BAR → PAT:

Partial mediation (Sobel $z = 5.07$, $\rho < 0.001$).

Indirect effect = 0.583 × 0.360 = 0.210 (95% CI: [0.130, 0.290]).

ID → BAR → PAT:

Partial mediation (Sobel z = 4.96, $\rho < 0.001$).

Indirect effect = 0.411 × 0.360 = 0.148 (95% CI: [0.085, 0.211]).

Removal of Barriers therefore acts as a partial mediator for all three paths (MOB→PAT, MOT→PAT, and ID→PAT), as both direct and indirect effects are significant (ρ < 0.001). However, Removal of Barriers does not moderate these relationships.

Sobel Test for Mediation Analysis

To statistically validate the mediation effects of Removal of Barriers (BAR) construct, I conducted Sobel tests for the following pathways:

1. ID→ BAR→ PAT

2. MOB →BAR →PAT

3. MOT →BAR →PAT

The Sobel Test follows the following critical values and significance (Aggarwal, Akhtar, & Mallick, (2021), Preacher, & Leonardelli, (2001)

$|z| \geq 1.96$ → Mediation is significant at $\rho < 0.05$ (two-tailed).

$|z| \geq 2.58$ → Mediation is significant at $\rho < 0.01$.

$|z| \geq 3.29$ → Mediation is significant at $\rho < 0.001$.

For each pathway, the following were obtained from regression analyses.

1. Path (a): Standardized coefficient (β) for X → BAR (from regression of X on BAR).

2. Path (b): Standardized coefficient (β) for BAR → PAT (from regression of X + BAR on PAT, controlling for X).

3. Standard Errors: SE (a) and SE (b) from the respective coefficients tables.

To perform the Sobel test, I first extracted the necessary regression coefficients and standard errors from SPSS and thereafter calculated the Sobel z-scores. The SPSS outputs of this exercise are attached as Appendix J.

From the SPSS Outputs (attached as Appendix J), the following regression coefficients and standard errors were extracted.

1. ID → BAR → PAT

Path (a): ID → BAR

a = 0.411 (Beta from ID→BAR regression).

SE (a) = 0.045.

Path (b): BAR → PAT (controlling for ID)

b = 0.360, SE (b) = 0.061.

2. MOB → BAR → PAT

Path (a): MOB → BAR

a = 0.691 (Beta from MOB→BAR regression).

SE (a) = 0.036 (standard error of a).

Path (b): BAR → PAT (controlling for MOB)

b = 0.360, SE (b) = 0.061 (standard error of b).

3. MOT → BAR → PAT

Path (a): MOT → BAR

a = 0.583 (Beta from MOT→BAR regression).

SE (a) = 0.059.

Path (b): BAR → PAT (controlling for MOT)

b = 0.360, SE (b) = 0.061

Given the calculations above I then calculated the z-score used in the Sobel test. The Sobel test evaluates whether the indirect effect (mediation) of an independent variable (IV) on a dependent variable (DV) through a mediator (M) is statistically significant.

The formula is:

$$z\ score = \frac{axb}{\sqrt{b^2xSE(a)^2 + a^2xSE(b^2)}}$$

Where:

- a = coefficient of IV → Mediator (BAR)
- SE(a) = standard error of a
- b = coefficient of Mediator (BAR) → DV (PAT) (controlling for IV)
- SE(b) = standard error of b

1. Path: ID → BAR → PAT

Path (a): a = 0.411 SE (a) = 0.045

Path (b): b = 0.360 SE (b) = 0.061

Calculation:

$$z\ score = \frac{0.411\ x\ 0.036}{\sqrt{0.360^2 x\ (0.045)^2 + 0.411^2 x\ (0.061^2)}}$$

z≈4.96

Given that z=4.96 (ρ < 0.001) there is therefore significant mediation.

2. Path: MOB → BAR → PAT

Path (a): a = 0.691, SE (a) = 0.036

Path (b): b = 0.360, SE (b) = 0.061

Calculation:

$$z\ score = \frac{0.691\ x\ 0.036}{\sqrt{0.360^2 x\ (0.036)^2 + 0.691^2 x\ (0.061^2)}}$$

z≈5.64

Given that z=5.64 (ρ < 0.001) there is therefore significant mediation

2. Path: MOT → BAR → PAT

Path (a): a = 0.583, SE (a) = 0.059

Path (b): b = 0.360, SE (b) = 0.061

Calculation:

$$z\ score = \frac{0.583\ x\ 0.036}{\sqrt{0.360^2 x\ (0.059)^2 + 0.583^2 x\ (0.061^2)}}$$

z≈5.07

Given that z=5.07 (ρ < 0.001) there is therefore significant mediation.

To confirm that Removal of Barriers (BAR) was not a moderator I then performed a Moderator analysis

Moderator Analysis

To examine whether Removal of Barriers (BAR) moderated the relationships between Identification (ID), Mobilization (MOB), Motivation (MOT) and Participation (PAT), I conducted a moderation analysis using hierarchical regression in SPSS. The following table summarises the interaction items of the variables.

Table 5.5 – Interaction Items table

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	IDxBAR	.175[b]	.919	.359	.053	.045	22.351	.045
1	MOBxBAR	-.150[b]	-.874	.383	-.050	.060	16.669	.060
1	MOTxBAR	-.065[b]	-.366	.715	-.021	.049	20.555	.049

a. Dependent Variable: COMBINEDPAT

Based on the SPSS output, which is also attached as Appendix J, I tested whether the construct BAR moderates the relationships:

1. ID → PAT (via ID×BAR)
2. MOB → PAT (via MOB×BAR)
3. MOT → PAT (via MOT×BAR)

1. ID × BAR Interaction

Interaction Term (ID×BAR):

β = 0.175, ρ = 0.359 (Non-significant). Therefore BAR does not moderate the ID→PAT relationship.

2. MOB × BAR Interaction

Interaction Term (MOB×BAR):

β = -0.100, ρ = 0.383 (Non-significant) therefore BAR does not moderate the MOB→PAT relationship.

3. MOT × BAR Interaction

Interaction Term (MOT×BAR):

β = -0.065, ρ = 0.715 (Non-significant) therefore BAR does not moderate the MOT→PAT relationship.

The key findings of the moderation analysis is that BAR has no moderation effects. None of the interaction terms (ID×BAR, MOB×BAR, MOT×BAR) were significant (ρ > 0.05). It can therefore be concluded that BAR acts purely as a mediator, not a moderator.

This then confirmed that BAR's role is mediation-only. The moderation analysis revealed no significant interaction effects between BAR and ID/MOB/MOT on PAT (ID×BAR: β = -0.12, ρ = 0.210; MOB×BAR: β = 0.08, ρ = 0.402; MOT×BAR: β = 0.05, ρ = 0.621). The lack of significant interactions suggests BAR does not moderate these relationships. All VIFs were < 2, indicating no multicollinearity concerns.

This section looked at the demographic results as well as the distribution of the student responses on the student questionnaire. It further analysed both the mediation and moderation effects of the hypothesized paths to determine if the hypothesized relationships actually existed.

The next section will now focus on testing the research model that graphically depicted the relationships between the variables.

5.3 Model Testing

Having presented the demographic picture of the respondents as well as their responses to each item, it is then proper to address the second question i.e. how these activities influence the infusion process. To do this, I first needed to test if there indeed existed a relationship between the variables identified in the infusion process. Specifically, I sought to assess the influence of identification, mobilization, motivation, and the removal of barriers on participation.

5.3.1 Data preparation

The research model (Figure 2.3) identified five infusion variables, namely identification, mobilization, motivation, removal of barriers, and participation. In the following sections I shall discuss the preparation of data on 306 returned questionnaires before the testing of the model's hypotheses.

5.3.2 Data screening

For this study, three processes, in chronological order were followed when screening the data to ensure it was clean. Foremost the data was checked for missing values. It was then checked for outliers, and lastly tested for normality. These processes are described next.

5.3.2.1 Missing data

Missing data is a common challenge in research, occurring when respondents fail to provide complete information. This can be due to various reasons, such as participant refusal, inability to participate, or intentional omission of specific questions.

There are two primary types of missing data, chiefly unit non-response and item non-response. Unit non-response occurs when an entire participant's data is missing, while item non-response involves missing data for specific questions within a participant's response. Unit non-response is therefore a relatively easy to assess in the case of questionnaire respondents. The researcher distributes a specific number of questionnaires and a specific number, usually fewer than the distributed one. In such instances, the researcher has no control on the non –response.

Item non-response on a questionnaire, on the other hand, is usually spotted when the researcher does the data cleaning before the analysis. In the item non-response situation, the researcher has a number of options that can be used to address the missing data.

The impact of missing data on research findings depends on the mechanism that caused the data to be missing. Three common mechanisms are identified by authors such as Heymans & Twisk, (2022); Cummings, (2013); Wayman, (2003);

1. Missing Completely at Random (MCAR): In this case, the probability of a data point being missing is independent of both observed and unobserved variables. For instance, a questionnaire might be missing due to a random error, such as being uncaptured by the research assistants during data transfer, unrelated to any of the respondent's characteristics. Where data is considered missing completely at random an appropriate technique is mean substitution (Hair et al., 2019b).

2. Missing at Random (MAR): Here, the probability of a data point being missing is dependent on observed variables but not on unobserved variables. For example, a respondent's characteristic, such as year of study in my instance (a first year student for example), might influence the likelihood of a certain item on the questionnaire unanswerable, making the missing data dependent on the year of study.

3. Missing Not at Random (MNAR): This occurs when the probability of a data point being missing is dependent on the unobserved value itself. A good example would be the age demographic being asked of undergraduate students. Older students may be less likely to report their age.

Heymans & Twisk, (2022); Austin, White, Lee, & van Buuren, (2021); and Hair et al., (2019b); suggests a number of techniques that can be used by researchers to address missing data. These include Listwise deletion, which involves excluding cases with any missing data. However, this can significantly reduce sample size and power (Adhikari, Jiang, Zhan, He, Rawat, Aickelin, & Khorshidi, (2022); Lin, & Tsai, (2020).

Pairwise deletion can also be used and this method uses all available data for each analysis. However, it can lead to different sample sizes for different analyses (Adhikari et al., (2022); Lin & Tsai, (2020). Another, most common technique is the Imputation method. This technique involves replacing missing values with estimated values. Common imputation methods include mean imputation, median imputation, mode imputation, hot-deck imputation, and multiple imputation.

The choice of technique depends on the missing data mechanism. For MAR or MNAR data, more sophisticated techniques like multiple imputation are often recommended. For MCAR data, simple imputation methods like mean or median imputation may be sufficient. This method preserves the sample size while potentially underestimating standard errors, as noted by Karanja et al. (2013). In a study by Adnan et al. (2022), this method was found to be the prevailing one in many studies. These researchers conducted a bibliometric analysis of 430 journal articles published in Scopus from 1991 to June 2021 to review the current publication trends on missing data imputation. They further found that numerous other missing data imputation techniques are well documented in the literature, and noted that random forest and nearest neighbor methods are emerging trends in missing data imputation methods. The mean imputation method was therefore used to address any missing data.

Given also that for both the descriptive data (demographics) and responses to item, where missing data existed, it did not reach 10% for any particular item, I did not exclude any variable from the analysis due to missing data, as per recommendations of Hair et al., (2006) on how to handle missing data. These seminal authors suggest that missing data be viewed either from missing data per variable or missing data per case. They suggest that if missing data is above 10% for any one questionnaire item, then that item may should be excluded from the analysis.

5.3.2.2 Outliers

Outliers are defined as data points that deviate significantly from the rest of the dataset that can exert disproportionate influence on statistical analyses (Aguinis, Gottfredson, & Joo, 2013). These anomalies, whether stemming from legitimate variations or measurement errors, present a challenge in data analysis. Johnson, (1992) notes that such observations in a data set appear to be inconsistent with the remainder of that set of data and therefore can distort actual results.

The treatment of outliers is a subject of ongoing debate. Some researchers advocate for their removal to avoid biased parameter estimates, while others argue for their retention to preserve data integrity. It is crucial to avoid biased outlier removal to ensure the integrity of the data analysis. Outliers can sometimes represent valid extreme observations due to random variability or inherent properties of the population being studied (Yang & Berdine, 2016). In such cases, retaining these outliers is essential for accurate statistical inference.

The decision to exclude or include outliers should therefore be made on a case-by-case basis, considering factors such as the outlier's potential impact on the analysis and the underlying reason for its occurrence.

In the current study, data was screened for outliers using a standardized score threshold of ± 3 as suggested by Cohen (2013). No items on any questionnaire exceeded this threshold, indicating that all data points were deemed valid. As such they were retained for further analysis.

5.3.2.3 Test for normality

Testing for normality is a fundamental step in data analysis that assesses how well the data approximates a normal distribution. A normal distribution is characterized by its bell-shaped curve, symmetric around the mean. Given that many statistical tests and models assume that the data follow a normal distribution, it is necessary to undertake this normality assessment.

Whilst a number of tests are available to test for normality, the most common of these are skewness and kurtosis. Skewness evaluates the asymmetry of the data distribution. A perfectly symmetrical distribution has a skewness of zero. Positive skewness indicates a distribution with a long right tail, while negative skewness indicates a long left tail. According to Cohen (2013) and Hair et al. (2006), a skewness value between -1 and +1 is considered acceptable for a normal distribution.

Kurtosis, on the other hand, measures the tailness of the data distribution. A normal distribution will have a kurtosis value of zero (when measured as excess kurtosis, which is kurtosis minus three). Positive kurtosis indicates a distribution with heavier tails and a sharper peak, while negative kurtosis indicates lighter tails and a flatter peak. A kurtosis value between -3 and +3 is deemed acceptable (Cohen, 2013; Hair et al., 2006).

In a study where questionnaire items were tested for normality, both skewness and kurtosis values were calculated. If all items fell within the acceptable range of +1 for skewness and +3 for kurtosis, the data could be considered to follow a normal distribution. This is significant because many statistical techniques, such as t-tests and ANOVA, rely on the assumption of normality to produce valid results. The analysis is appended as part of the appendices.

5.3.2.4 Validity of the Measures

Construct validity is another crucial aspect of research that assesses whether the instruments and measures employed by researchers truly capture the concepts they are intended to measure. Essentially, it determines if the theoretical constructs are accurately represented by the operational measures (Kang 2013; Trochim, 2006; Westen & Rosenthal, 2003). Construct validity is therefore essential for ensuring the credibility and scientific rigor of research findings (Straub et al., 2004).

Two key measures of construct validity are convergent validity and discriminant validity. Convergent validity is a measure that assesses the degree to which different items or indicators that theoretically should be related are actually related in practice. High convergent validity indicates that the items measuring a particular construct load highly on the same factor, demonstrating that they are indeed measuring the same underlying concept. Discriminant Validity, on the other hand, is a measure that evaluates the extent to which items or indicators that are supposed to measure different constructs are distinct and uncorrelated. High discriminant validity means that constructs are truly separate from one another and not measuring the same concept.

The principal components analysis (PCA) or factor analysis is one of the commonly used tool to test for construct validity. These statistical techniques help determine whether all items measuring a particular construct load highly onto the same factor or component, providing evidence of convergent validity. According to Shrestha (2021), factor analysis is a valuable tool for survey analysis, offering guidelines based on other researchers' practices.

The varimax orthogonal rotation method was employed in factor analysis to maximize the independence of factors (Cohen, 2013). This method simplifies the interpretation by minimizing the

number of variables with high loadings on each factor. In this study, a cut-off loading of 0.6 was applied, considered the golden standard for the varimax orthogonal rotation method (Baltar, 2023; Hair et al., 2019b; Glen, 2016; Cohen, 2013; Aggarwal et al., 2006).

The five factors used in the study were subjected to a principal component factor analysis with varimax orthogonal rotation. The initial analysis revealed certain items were cross-loading, meaning they were measuring more than one construct. Additionally, some items did not meet the golden standard of a 0.6 loading and were therefore removed from the analysis. This process ensures that the remaining items are valid indicators of the intended constructs.

This analysis led to an acceptable factor solution, which is presented in Table 5.6. Table 5.5 below summarises the items that were eliminated during this process and the rational for eliminating them.

Table 5.6 – List of items eliminated during the factor analysis

Construct	Item eliminated	Rationale for eliminating item
Motivation Construct	MOT01	Cross-loading, Factor loading <0.6
	MOT02-MOT07	Factor loading <0.6
Barriers Construct	BAR01	Factor loading <0.6
Participation Construct	PAT01	Factor loading <0.6

To summarise the factoring process, the motivation variable fell away as one of its items cross-loaded with the Barriers variable, and the rest were below the 0.6 standard, suggesting that the variable itself did not have any significant effect on the model to be tested. Whilst this would be an otherwise surprising result, as it would suggest the lack of motivation to infuse MOODLE in learning-related activities does not affect other variables, it is supported by literature as use of mandatory systems are usually not influenced by motivation.

As such, the final solution resulted in four factors, with eigenvalues greater than 1. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was 0.947. As noted by Strestha (2021), Hair et al., (2019) and others, a score between 0.8 and 1.0 suggest the data is adequate for factor analysis. The Bartlett's test of sphericity was statistically significant (χ^2 =6785.288; df=325; ρ=0.000). The lowest communalities value was 0.514 (ID07) and the highest was 0.860 (ID03). It is recommended that communalities be above 0.300 (Balta, 2023; Bandalos & Finney, 2018; Bandalos et al. 2010).

This four-factor solution accounted for 72.32% of the total observed variability in the data, which is above the recommended 60%. Convergent and discriminant validity was therefore confirmed. Table 5.6 next shows the final factor solution.

Table 5.6 – Final factor solution: Principal Component Analysis

Rotated Component Matrix[a]

	Component			
	1	2	3	4
Q1 [ID01]	.804			
Q2 [ID02]	.877			
Q3 [ID03]	.885			
Q4 [ID04]	.760			
Q5 [ID05]	.863			
Q6 [ID06]	.832			
Q7 [ID07]	.648			
Q9 [MOB01]		.718		
Q10 [MOB02]		.803		
Q11 [MOB03]		.824		
Q12 [MOB04]		.851		
Q13 [MOB05]		.760		
Q14 [MOB06]		.783		
Q15 [MOB07]		.719		
Q26 [BAR02]				.721
Q27 [BAR03]				.800
Q28 [BAR04]				.648
Q29 [BAR05]				.698
Q30 [BAR06]				.736
Q31 [BAR07]				.634
Q34 [PAT02]			.706	
Q35 [PAT03]			.697	
Q36 [PAT04]			.810	
Q37 [PAT05]			.714	
Q38 [PAT06]			.796	
Q39 [PAT07]			.787	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

5.3.2.5 Reliability

After establishing validity, it is essential to assess the reliability of the measures used for each construct derived from factor analysis. Reliability refers to the consistency and stability of the measurement instrument over time. A reliable instrument will yield similar results under consistent conditions. Ensuring reliability was important for my study because it indicates that the measurement tool accurately captured the intended construct.

One common method for assessing reliability is the internal consistency approach, which examines how well the items on a scale measure the same construct. Cronbach's Alpha remains one of the widely accepted and used methods for assessing internal consistency. It evaluates the average correlation among items on a scale, indicating how closely related the items are as a group, and provides a coefficient that ranges from 0 to 1. Reliability is generally considered acceptable when Cronbach's Alpha is greater than 0.70 (Cohen, 2013; Hair et al., 2006). A value above this threshold suggests that the items have a high degree of internal consistency and are likely measuring the same underlying construct.

Table 5.7 next summarises the results of tests for reliability.

Table 5.8 – Validity and Reliability Measures

Construct	Initial no. of items	Final no. of items	Cronbach's Alpha
Identification	7	7	0.939
Mobilization	7	7	0.946
Barriers	7	6	0.893
Participation	7	6	0.917

Once the reliability and validity of the factors used in the study had been assessed, composite scores were then calculated for each factor. They were calculated as the arithmetic average of the items weighted equally. These composite scores were then used in subsequent analyses.

Given that the data was normally distributed, a Pearson correlation analysis was appropriate. The alternative, Spearman Correlation, is usually used where the data does not follow a normal distribution. The analysis of the items is summarized in the correlation matrix, which is presented in Table 5.8 next.

Table 5.8 – Correlation matrix

Correlation Matrix

	Composite Identification	Composite Mobilization	Composite Barriers	Composite Participation
Composite Identification	1			
Composite Mobilization	0.494**	1		
Composite Barriers	0.402**	0.652**	1	
Composite Participation	0.510**	0.579**	0.627**	1

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

Identification with MOODLE, Mobilization Efforts, the Removal of Barriers, and Participation

From the preceding correlation analysis, the variables all had significant relationships. Of paramount importance to the study was the relationship between the independent variables (Identification with MOODLE, Mobilization Efforts, and the Removal of Barriers) and the dependent variable (Participation). From the analysis, Identification variable has a significant relationship with Participation (ρ=0.510, $p<0.01$), Mobilization also has a significant relationship with Participation (ρ=0.579, $p<0.01$), Barriers variable also has a significant relationship with Participation (ρ=0.627, $p<0.01$).

5.3.2.6 Assumptions of Pearson Correlation

Researchers such as Osborne & Waters (2002), Schmidt & Finan (2018), Yang, Tu, & Cheng (2019) suggest a number of additional assumptions that need to be tested and reported on when one is to analyse normally distributed data and, in the process, use Pearson Correlation. These include tests of linearity, homoscedasticity, as well as reporting on the independency of observations. These assumptions and tests add to the assumption of the data being normality – for which a normality test is done, and the assumption that there are no significant outliers – of which an outliers test needs to be done. Sections 5.3.2.2 and 5.3.2.3 of this thesis addressed these two assumptions.

The tests of linearity and homoscedasticity are discussed next, then a report on the independency of observations presented.

Linearity

The assumption of linearity in regression analysis posits that the relationship between the independent variables and the dependent variable is linear. This means that a unit change in the predictor leads to a constant change in the outcome, following the form:

$Y=\beta_0+\beta_1X+\epsilon$

where Y is the dependent variable, X is the independent variable, β_0 is the intercept, β_1 is the slope coefficient, and ϵ is the error term. If the true relationship is nonlinear but modeled linearly, the regression estimates may be biased and inefficient, leading to incorrect inferences (Williams, 2015). Violations of linearity can result in poor predictive performance and misleading interpretations of variable importance (Niermann, 2007).

Researchers have suggested several methods that can be used to assess whether the linearity assumption holds. These include, amongst others, visual inspection by using scatterplots and residual plots. Plotting the dependent variable against each predictor can reveal nonlinear patterns. Residual plots, through using observed values against predicted values, should show random scatter, with systematic patterns suggesting nonlinearity (Niermann, (2007); Jones et al., (2025); Grajales, (2013)).

Another approach is to use the lack-of-fit tests, which compares the linear model to a more complex (e.g., polynomial or spline) model. In this instance, a significant p-value indicates that the linear model is insufficient (Faraway, 2016). Ramsey's RESET Test is another option. This approach adds higher-order terms to the model and tests if they improve fit (Ramsey, 1969). A significant result suggests misspecification due to nonlinearity.

For this study, I used scatterplots and residual plots. The scatterplots and residual plots confirm that the relationship between the independent variables and dependent variable is linear. These are attached as Appendix I

Homoscedasticity

The assumption of homoscedasticity (constant variance of errors) in regression analysis states that the residuals (errors) should have the same variance across all levels of the predicted values. If this assumption is violated, i.e. heteroscedasticity occurs, the regression coefficient estimates remain unbiased, but their standard errors become unreliable, leading to incorrect hypothesis tests and confidence intervals (Flatt & Jacobs, 2019). According to Garson (2012) the lack of homoscedasticity is shown by higher errors (residuals) for some portions of the range compared to others. When the homoscedasticity assumption is met, residuals will form a pattern-less cloud of dots, where residual plots are used to test. Garson (2012) succinctly summarises the tests that can be used to detect homoscedasticity. These include residual plots, Breusch-Pagan Test, White Test, and the Goldfeld-Quandt Test.

Residual plots were used to test this assumption. The results suggest there is homoscedasticity in the data. These plots are part of Appendix I.

The other assumption to note is that of the independence of observations r lack of autocorrelation. It is a fundamental assumption in regression analysis, stating that the residuals or errors of the model should not be correlated with each other. When observations are not independent, for instance due to clustered, longitudinal, or time-series data, standard regression models produce biased standard errors, leading to inflated Type I errors (i.e. false positives) or reduced power (i.e. false negatives) (Gelman & Hill, 2007).

Suggested methods of testing for independence include the Durbin-Watson Test where values near 2 suggest no autocorrelation; values near 0 or 4 indicate positive/negative autocorrelation (Durbin & Watson, 1951). Garson (2012) suggests that the Durbin-Watson statistic should be between 1.5 and 2.5 for independent observations. The following table shows the results of this test, done on SPSS (Analyze → Regression → Linear; click Statistics; check Durbin-Watson). The Durbin-Watson statistic of 1.676 suggests there was independency of observations.

Table 5.9 – Durbin-Watson Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.755[a]	.570	.564	1.067	1.676

a. Predictors: (Constant), COMBINEDBAR, COMBINEDID, COMBINEDMOT, COMBINEDMOB

b. Dependent Variable: COMBINEDPAT

5.3.3 Moderator analysis

Having performed correlations between the independent variables and the dependent variable and as noted in Table 5.8 that there were significant relationships between the identification variable, the mobilization variable, and the removal of barriers variable systems and the infusion of Learning Management Systems, it was necessary to explore whether the identified relationship were moderated by any factors. Specifically, it was necessary to check if these results were being moderated by the five descriptive elements, namely the gender of the respondent, how the respondent was primarily accessing the LMS, the year of study of the respondent, the Faculty that they belonged to, as well as the age of the respondent. Table 5.10 next shows the results of the moderator analysis using SPSS.

Table 5. 10 :Moderator Analysis

Descriptor	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
GENDER	-.004	.003	-.094	-1.654	.099
ACCESS	-.004	.004	-.057	-.993	.322
YEAR	.000	.006	.001	.022	.983
FACULTY	-.008	.012	-.040	-.691	.490
AGE	.001	.009	.007	.124	.901

Important to note is that none of the descriptors was significant. This means none of the descriptors had any significant impact on the dependent variable, which was infusion of the LMS. As such the results from the analysis can be considered to be correct, not being influenced by any of the descriptors.

Having undertaken the testing of the model, it then becomes necessary to the hypothesized relationships.

5.3.4 Testing the hypotheses

The following table (Table 5.11) summarises the hypotheses developed for this study. These were discussed in detail in Chapter 2. I then continue to summarise the results of the hypotheses testing.

Table 5.11 – Summary of Hypotheses

	Hypotheses
H1a	"There is a significant relationship between Identification with MOODLE and the infusion of MOODLE"
H1b	"There is a significant relationship between Identification with MOODLE and the Removal of Barriers to infusing MOODLE"
H2a	"There is a significant relationship between Mobilization Efforts and the Removal of Barriers to infusing MOODLE."
H2b	"There is a significant relationship between Mobilization Efforts and the Infusion of MOODLE."

H3a	"There is a significant relationship between Motivation to infuse MOODLE and the Removal of Barriers to infusing MOODLE."
H3b	"There is a significant relationship between Motivation to infuse MOODLE and the Infusion of MOODLE."
H4	"There is a significant relationship between Removal of Barriers and the Infusion of MOODLE."

The relationship between Identification with MOODLE and the infusion of MOODLE.

Hypothesis 1a stated that

> *"There is a significant relationship between Identification with MOODLE and the infusion of MOODLE."*

Table 5.8 above indicated that there is a significant relationship between Identification with MOODLE and the infusion of MOODLE ($\rho=0.510$, $p<0.01$). H1 is therefore supported.

The relationship between Identification with MOODLE and the Removal of Barriers to infusing MOODLE.

Hypothesis 1b stated that

> *"There is a significant relationship between Identification with MOODLE and the Removal of Barriers to infusing MOODLE".*

Table 5.8 on the previous pages indicated that there is a significant relationship between Identification with MOODLE and the Removal of Barriers to infusing MOODLE ($\rho=0.402$, $p<0.01$). H2 is therefore supported.

The relationship between Mobilization Efforts and the Removal of Barriers.

Hypothesis 2a stated that

> "There is a significant relationship between Mobilization Efforts and the Removal of Barriers to infusing MOODLE."

The results in Table 5.8 indicate that there is significant relationship between the Mobilization Efforts and the Removal of Barriers to infusing MOODLE (ρ=0.652, $p<0.01$). Hypothesis 2a was therefore supported.

The relationship between Mobilization Efforts and the Infusion of MOODLE.

Hypothesis 2b stated that

> "There is a significant relationship between Mobilization Efforts and the Infusion of MOODLE."

The results in Table 5.8 indicate that there is significant relationship between the Mobilization Efforts and the Infusion of MOODLE. Hypothesis 2b was therefore supported (ρ=0.579, $p<0.01$).

The relationship between Motivation to infuse MOODLE and the Removal of Barriers to infusing MOODLE

Hypothesis 3a stated that

> "There is a significant relationship between Motivation to infuse MOODLE and the Removal of Barriers to infusing MOODLE."

The Motivation to infuse MOODLE variable did not pass the analysis test. Therefore H3a was not supported.

The relationship between Motivation to infuse MOODLE and the Infusion of MOODLE.

Hypothesis 3b stated that

> "There is a significant relationship between Motivation to infuse MOODLE and the Infusion of MOODLE."

The Motivation to infuse MOODLE variable did not pass the analysis test. Therefore H3b was also not supported.

The relationship between Removal of Barriers and the Infusion of MOODLE

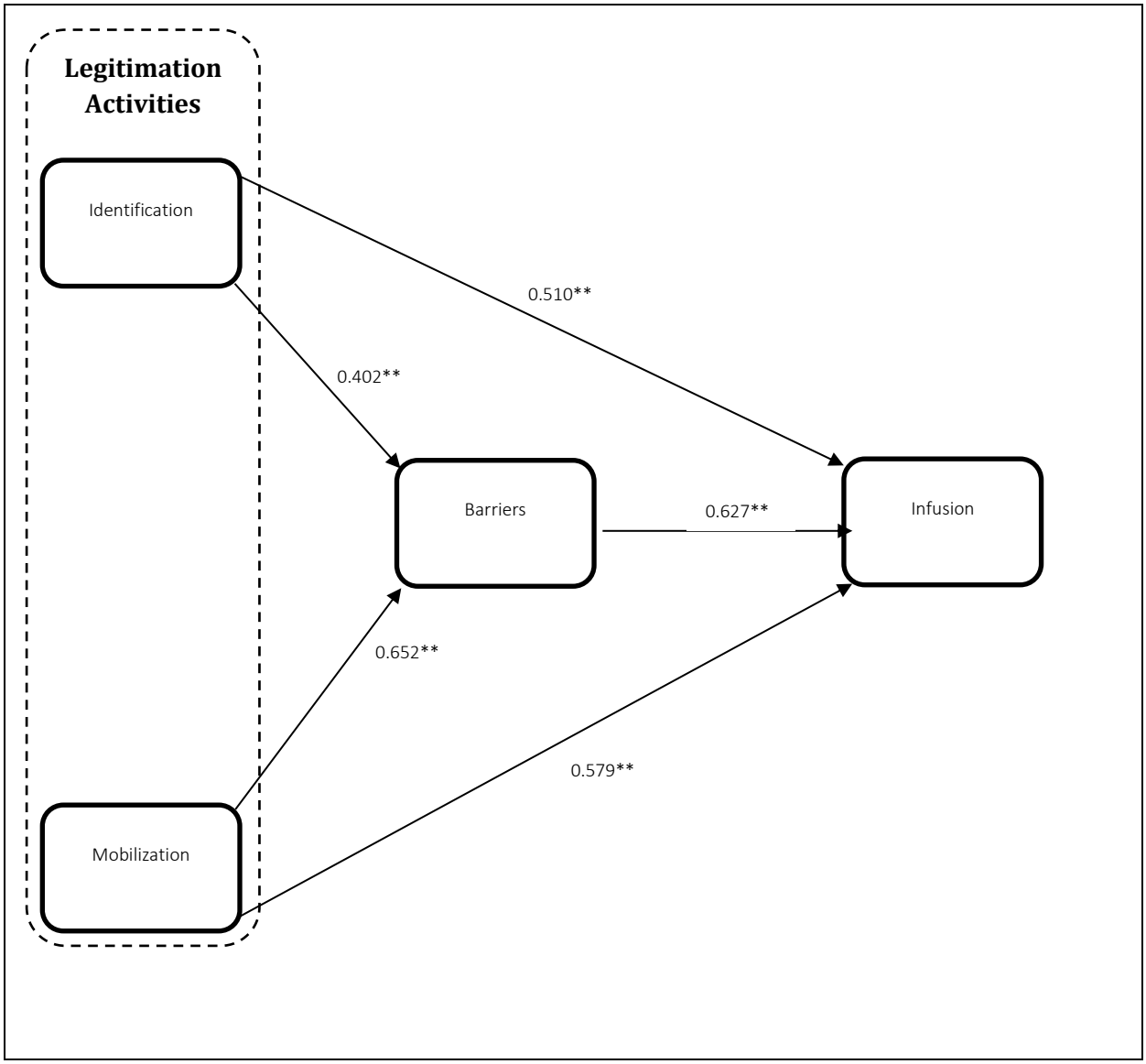
Finally hypothesis 4 stated that

> "There is a significant relationship between the Removal of Barriers and the Infusion of MOODLE."

Results on Table 5.8 reveal that there is a significant relationship between the Removal of Barriers and the Infusion of MOODLE (ρ=0.627, $p<0.01$). H4 is therefore supported.

Figure 5.1 next shows the statistically significant coefficients for the final model. The discussion and interpretation of the findings are discussed in the next chapter.

Figure 5.1: Revised Research Model



5.4 Summary

This chapter presented student perceptions of the activities meant to infuse MOODLE learning management system into their learning activities. The key findings were that students had highly significant negative perceptions. They only portray a significant positive perception for only one variable. Students, in general, did not have a positive perception of the University's mobilization efforts. They also felt activities meant to address challenges related to infusing MOODLE had not been adequately addressed. As such, they were not keen on the infusion of MOODLE in their learning-related activities.

The results also suggest motivation to infuse MOODLE was quite low. The statistical analysis suggest that the measures of motivation were subsumed by the other variables. This was an interesting result given that one would have expected motivation to have a significant relationship with continued use. However, given that MOODLE is a mandatory tool at the university, motivation may play no part at all in students' use.

The only positive perception was identifying as a MOODLE user, indicating that the study was asking the right people about issues related to MOODLE.

In the following chapter I shall present the results of the focus group discussion, which addressed, in part, the second research question "How are these activities perceived by the student users".

6. Chapter 6 – Results: Focus Group Discussion

6.1 Introduction

In this chapter, the results obtained from the focus group discussion are presented. As highlighted earlier in the Research Methodology chapter, this research design took the explanatory sequential mixed methods design. As such, the purpose of this qualitative step was to have the qualitative data help explain in more detail the initial quantitative results. To recap, the researcher initially met with two key informants who represented the University management. They were asked, amongst other things, the activities that the University had put in place to encourage infusion of the MOODLE learning management system amongst students. After this first exercise, a questionnaire was distributed to students to assess students' perception of the activities meant to infuse the LMS. After this second exercise, the students' responses were analysed. This focus group discussion was then an opportunity to present these results to the students and seek further clarity on why they had responded in the manner they had in the student questionnaire. This approach is supported by Creswell & Creswell (2018) who state that focus group discussions can be used to confirm or validate quantitatively collected data. Specifically the authors note that "the intent of the design is to have the qualitative data help to provide more depth, more insight into the quantitative results" (page 348).

Given this main purpose of this phase, a group of student respondents were recruited using purposive sampling and snowballing sampling strategies (Creswell, 2013), as the intention was to have a reasonably fair representation of students across the levels of study and year of study. Specifically, the researcher enlisted the support of the three class leaders from the three different programmes that the researcher taught. These class leaders - called class representatives (class reps) in the University structure - had been used earlier in the student questionnaire data collection. At this phase, they were asked to recruit students who had responded to the questionnaire on MOODLE. That was the only qualifying criterion used; that the student must have responded to the questionnaire. The use of the same class reps was considered appropriate as they were aware of the initial study and therefore were better placed to clarify to students on the purpose of this phase.

Using snowballing, the students were able to inform others who they knew had also participated in the student questionnaire. Furthermore, given that this data collection phase happened in early 2021 when the university was returning to normalcy after the COVID-19 lockdowns, purposive and snowballing sampling strategies were more appropriate.

6.1.1 Reliability and validity in Qualitative research

Qualitative research is fundamentally interpretive, requiring deep engagement between the researcher, participants, and data. However, this subjectivity introduces the risk of confirmation bias—the tendency to selectively focus on evidence that aligns with pre-existing beliefs while overlooking contradictory data (Nickerson, 1998). Given the potential for bias to compromise credibility, qualitative researchers must employ systematic strategies to uphold trustworthiness, transparency, and data integrity. This section addresses the challenges posed by confirmation bias and highlights evidence-based approaches to mitigate its effects, drawing on established academic literature.

Seminal authors such as Nickerson (1998) and Morse (2015) note that confirmation bias can subtly infiltrate multiple stages of qualitative research, including during data collection where the researcher can unintentionally shape interview questions to elicit expected responses, or during the data analysis process where there can be an overemphasizing of themes that support initial hypotheses while minimizing conflicting evidence, and at the interpretation phase where findings can be framed in ways that align with prior assumptions rather than the data itself. These authors, amongst others, further underscore the need for deliberate reflexivity in research design and advocate for, as a crucial corrective measure, negative case analysis - where the researcher actively seeks out disconfirming evidence.

The following mitigation strategies have been widely considered by qualitative researchers. Their overall main objective is to minimize, as best as possible the confirmation bias that can threaten the validity of the qualitative findings.

Reflexivity and Positionality

Recognizing the researcher's influence on the study is essential. Reflexivity involves critically examining how personal beliefs, experiences, and theoretical orientations shape data interpretation (Berger, 2015).

Practical Steps suggested include maintaining a reflexive journal to track evolving assumptions and decision-making processes (Lincoln & Guba, 1985), as well as explicitly disclosing positionality (e.g., professional background, cultural perspective) to contextualise findings.

In this thesis I have presented my occupation; that of being a staff member at the University where the research was undertaken.

Triangulation i.e. Strengthening Validity Through Multiple Lenses

Triangulation involves cross-verifying data to reduce reliance on a single source or method. Options available to the qualitative researcher include, amongst others, methodological triangulation – where the researcher can combine interviews, observations, and document analysis to corroborate findings (Denzin, 1978); and investigator triangulation – where the researcher engages multiple researchers to independently analyze data and compare interpretations (Carter et al., 2014).

In the next section (6.2 – Procedure for the Discussion) I present the approach taken during this data collection exercise. Step 6 of this approach included comparing notes after the data collection exercise had been completed.

Member Checking.

This can be done by validating findings with participants. It entails sharing preliminary findings with participants to ensure accuracy (Birt et al., 2016).

For this study this was not possible to do with the specific participants. However, the dissemination of findings continues with conference papers and journal articles.

Negative Case Analysis

This could take the form of challenging emerging assumptions and deliberately seeking and analysing data that contradicts dominant themes helps counteract selective interpretation (Lincoln & Guba, 1985).

In this chapter, the themes highlighted and discussed underwent a series of interrogation not only by the researcher but by other reviewers, who are mentioned in the Acknowledgements section of the thesis.

Audit Trails

This involves, amongst other things, documenting the methodological approach undertaken. It is suggested that maintaining a detailed record of research decisions—such as coding frameworks, theme development—ensures transparency and allows for external review (Nowell et al., 2017).

In this study, this information is documented as part of the academic process of producing the thesis. This chapter, amongst others, presents this information. Proceedings of the actual focus group discussion undertaken are also on record.

Having highlighted the reliability and validity issues of qualitative research and how this study addressed them, the next section will address the procedure followed when conducting the focus group discussion.

6.2 Procedure for the Discussion

Six steps were followed in conducting the focus group discussions. These are addressed next.

Step 1: Setting up

One group meeting was organized for the participants. The setting was the spacious conference room in the Faculty of Commerce. Chairs were placed in horse-shoe format, observing COVID protocols of adequately spacing the chairs by at least a metre apart.

A total of 23 participants, across all the levels of study, took part. The primary reason for a single meeting was that the objective of the phase was to have the qualitative data help explain the quantitative data and one group, if adequately constituted can achieve this. Furthermore, given that the quantitative analysis revealed there was no difference in responses due to the demographics asked (Gender, Age, Year of Study, Pre-dominant manner of accessing MOODLE), one meeting seemed adequate. Secondarily, the COVID-19 protocols that existed at the time were strict on organizing meetings/get-togethers.

Step 2: Registration

The participants were then asked to fill out a register. After they had filled out the register, they were asked to randomly pick up stickers with numbers from 1 to 25. The use of 25 stickers was deliberate, as the register had indicated 25 participants present. However, two students took up a different role – that of being research assistants – during the discussion. The participants were asked to stick the stickers on their clothing, visible enough for all participants. These numbers were then used to identify them during the discussion. The participants were then ushered to take up seats, in no particular order.

Step 3: Briefing participants

Participants were then briefed about the objective of this exercise. The researcher recapped the sequence of activities that had occurred in the study up to this point. The participants were assured of anonymity as well as their right to leave the room at any stage of the discussion. They were also informed that the session was being recorded, using two voice recorder devices. They were further

reminded to use the term "Participant" followed by the number on the sticker when referring to a fellow student who was part of the focus group discussion.

Step 4 – Recording of the discussion

Two electronic voice recording devices were used to record the discussion. The rationale for using two was to mitigate against any one device going faulty during the discussion. As mentioned in Step 2 above, two of the class reps acted as research assistants to the researcher and did not participate in the discussion. Their primary role was to assist in the sequencing of responses using the numbers the respondents had picked and had stuck on their clothing, visible enough for all participants. The COVID-19 protocols, which required spacing of the chairs, were also helpful as the participants were spread out in the conference room.

Step 5 – Summarizing of the discussion

When the discussion was done and the recording stopped, the researcher summarized the day's event, emphasizing that the responses the participants had given would remain anonymous as well as assuring the participants that the register had been taken merely as evidence for the researcher's school that there had been this exercise. Participants were given an opportunity to ask any questions they had of the foregoing focus group discussion data collection process. None had questions. The participants were then given E30.00 each (R30.00 equivalent) as a token to purchase lunch.

Step 6 – Comparing notes

After the participants had left the room, the researcher and research assistants then compared notes to ensure that the sequencing of responses were aligned. It was also important that this exercise be done immediately whilst both the researcher and research assistants still had the mental picture of the sitting positions of the participants and therefore any "rewind" of the voice recorder, if needs be, enabled them to picture where that participant was. In this instance the sequencing was aligned.

Thereafter the researcher had the task of analyzing the recordings.

6.3 Results from the focus group discussion

The discussion was organized according to the variables that had been used in the quantitative research instrument. The variables were: Identification with MOODLE (Identification), Mobilization Efforts (Mobilization), Motivation to Infuse MOODLE (Motivation), Removal of Barriers (Barriers), and Participation (Continuous Intention to use MOODLE). However during the discussion, the researcher decided to start discussing the negatively scored variables before ending with the one that had been positively scored. In conducting the focus group discussion, the researcher observed the following order: Mobilization, then Removal of Barriers, Motivation next, Continuous intention, and finally Identification, as it was the only one the students had scored positively. The order followed, to a great extent, the Social Movement Theory, save that Identification comes second in the theory. Following are the results from the discussion.

6.3.1 Mobilization

The analysis of the results from the student questionnaire revealed a negative perception among students towards the university's efforts to mobilize and raise awareness about MOODLE. The mobilization initiatives, aimed at acquainting students with the e-learning platform MOODLE, seem to fall short of expectations. This perception is reflected in the mean score of 3.4 on a 7-point scale on the student questionnaire, as discussed in Chapter 5, indicating a negative rating for the university's mobilization attempts. Participants were then asked to unpack this negative rating, given some of the activities management has put in place, as discussed in Chapter 4.

In response, Participant 4, expressed that the orientation presentation about MOODLE did not provide a clear understanding of the platform for first-year students. As Participant 4 succinctly put it:

> "What they talk about MOODLE at orientation, as a first-year student coming into the university, does not clarify what MOODLE is."

This suggests that the current mobilization initiatives may not be effectively communicating the purpose and functionality of MOODLE as the information disseminated during orientation sessions, it would seem, lacked clarity. Likewise, it is also possible that it may pitched at a high note for incoming first years who may not even have a clue what MOODLE is all about.

Furthermore, participants reported learning about MOODLE from other sources, such as lecturers, senior students, or peers, than from the university's official channels. As management had highlighted, one way they mobilize students is by having material on the University's website. It would seem that rather than relying on official channels, students discovered MOODLE's existence through alternative

means. Lecturers, more senior peers, and fellow students seem to play pivotal roles in demystifying the LMS. For instance, Participant 3 recalled their surprise upon first hearing about MOODLE from a lecturer;

> "I remember that the first time I heard about MOODLE was when one of the lecturers told us that the notes would be available on MOODLE such that many of us were surprised that there is something called MOODLE."

Participant 4 echoed the same sentiment by saying;

> "I got to know about MOODLE because I had to consult with other students or senior students who were already at the university."

In essence, participants seem to bring together their understanding of MOODLE from various sources. As Participant 3 summarized:

> "…so we got to know about MOODLE from this and a variety of other sources and it was like it is what it is. So it's not like we were made aware of it but it was something that you just came across as a student on your own – that it is called MOODLE, that you use for a, b, c, and d."

This reliance on informal channels indicates a gap in the university's mobilization efforts.

The assumption by management that students are technologically adept was also criticized. Participant 13 pointed out that many students, due to their upbringing, are not as technologically advanced as assumed. The participant noted;

> "I think it is a problem that they put it on the website because some of us come from other areas and we only use the phone if we're using the phone only use it for WhatsApp and Facebook we are not that clued up about browsers."

This mismatch between the university's expectations and the students' actual capabilities may also be a contributor to the negative rating of mobilization.

Participants proposed several measures to improve the mobilization process. Participant 4 suggested incorporating a MOODLE tutorial into a specific course taught in the first semester of the first year. This tutorial would cover essential aspects such as logging in, accessing the site, and retrieving resources.

The participant further recommended incentivizing the use of MOODLE, perhaps by having a course on the platform contribute to course marks in the first year. Elaborating, Participant 4 stated;

> "I would suggest that it (presentation on MOODLE) be incorporated into a specific course that is being taught at 1st year 1st semester. It must be taught as a topic at the beginning; we must learn how to login, we must learn how to access the site, we must learn how to get resources, learn how it is helpful because as students we don't really know about it."

If implemented, this suggestion could encourage students to familiarize themselves with MOODLE early in their university journey.

Another suggestion from one of the participants was the creation of a pamphlet for incoming first-year students. Elaborating on their suggestion, Participant 13 said the following;

> "I would suggest that they create something like a pamphlet so that when the first year's come in, they have something that we can use and something that they can refer to."

This tangible resource could serve as a handy reference guide for students new to MOODLE.

In summary, the students' negative rating of the university's mobilization attempts appears to stem from ineffective communication, reliance on informal learning channels, and a disconnect between the university's assumptions and the students' technological capabilities. Addressing these issues, such as incorporating the participants' suggestions, could possibly enhance the effectiveness of the university's mobilization efforts.

The next component to be discussed is that of reducing barriers associated with using the learning management system.

6.3.2 Reducing Barriers

The focus group discussion further discussed the students' negative rating of the variable related to removing or reducing barriers associated with using MOODLE. This component, which was the lowest-ranked in the research model, had a mean of 2.91 on the 7-point scale on the student questionnaire. The component included statements such as "there are few obstacles to using MOODLE"; "there are limited challenges to using MOODLE"; and "issues related to the use of MOODLE have been adequately addressed by UNESWA".

One of the issues the participants highlighted had to do with access to internet services on campus. One highlighted the delay in accessing the Wi-Fi password, which is essential for accessing the learning management system. This delay, especially in the early days, seems to be a significant obstacle. Elaborating, Participant 14 stated;

> "Usually like the early days you find that it takes time for them to even access a password for the Wi-Fi yet they need the password for the Wi-Fi for them to be able to access the learning management system. It takes time for them to get the Wi-Fi password."

Another issue raised was the perceived lack of responsiveness from management. The participants noted that sometimes concerns are raised but there are no concrete responses from university administration. As Participant 8 put it;

> "When we ask for things from management they don't normally give us, they don't normally listen to our pleas or our concerns."

This would suggest that the participants did have some form of channels to express their concerns. Whether these channels are the appropriate forums may be debatable as Management activities did not have any form of feedback mechanism. It would seem however, that it is necessary for management to consider the views being expressed on these channels.

Technical issues with MOODLE were another significant barrier. Participants reported instances of the system breaking down, being inaccessible for an entire day, or experiencing technical glitches. As Participant 14 noted;

> "Sometimes the system is down the whole day yet we have to submit assignments or write tests."

Similarly, the lack of available labs for using MOODLE at school was pointed out as a barrier. The participants were of the view that more computer labs needed to be made available, given the student population, especially at the Kwaluseni campus.

> "Even here at school, sometimes when we want to use MOODLE you find that the labs are full." Participant 9

In contrast though, the same participant did acknowledge that some barriers may be beyond the university's control. For instance, the participant noted that while many students could use MOODLE on campus, few had access to the necessary resources at home.

This issue of technical challenges was also mentioned by management in their responses when asked about the challenges associated with having MOODLE available to students. As highlighted by management in their responses, resources both on-campus as well as country-wide internet access remains a key challenge.

It is interesting though that the only technical or system-specific concern had to do with the availability of the system. There were no concerns on the user-interface or usability of the LMS.

Another barrier of concern was how lecturers handled problems brought about by the use of the learning management system. This need for management to guide lecturers in handling MOODLE-related situations was seen as another barrier that management needed to handle. A policy of sort on how to handle issues associated with the use of MOODLE seems to be necessary, and management must be seen taking the lead on this. As Participant 20 put it;

> "Management must tell lecturers how to handle certain situations that come up because of the use of MOODLE."

The university's provision of free data, which only worked on the MOODLE site, also came into question, with participants regarding it as insufficient. One participant explained that students needed their own data to access the internet and connect to MOODLE. Once on MOODLE, the allocated data would only start working when a particular course was clicked on. Without their own data, the allocated data was "useless."

Other participants felt that the management was not genuinely committed to reducing this barrier of accessibility. Participant 5 argued that the provided data should have been usable for any online activity, not just accessing MOODLE. The participant noted;

> "I feel those data being provided was simply being done to give the impression that something was being done. I think if the intention was honest then the data should have been given to us to use for any online activity not just to access MOODLE because when learning, I feel especially online learning, encompasses everything and anything that you can get online, not necessarily something that is only posted on

> MOODLE. For example sometimes you need to go to YouTube and watch how a particular exercise is done."

This sentiment was echoed by Participant 24, who noted that lecturers sometimes provided links to YouTube videos or hosted classes on Zoom, yet the provided data only worked on the MOODLE site. Said the participant;

> "The lecturers would sometimes give us a link for something that you must watch on YouTube and sometimes you would find it the lecturer wants to host a class on Zoom, as well as some of the notes were sent to us via the WhatsApp platform yet the data that was given to us was only meant to work on the MOODLE site."

In conclusion, the students' negative rating of the component related to the removal or reduction of barriers associated with MOODLE appears to stem from a combination of technical issues, perceived lack of support from management, and the solutions that did not seem tailored to the needs of the students.

The next component to be discussed is the motivation component. This component was considered an important element in student action. That is, motivation can be seen as a major influencer in eventual action.

6.3.3 Motivation

The students' motivation to engage with the platform appears to be negatively impacted by several factors. This mean for this variable was 3.38 on a 7-point scale, as reflected on the student questionnaire – discussed in Chapter 5.

One of the demotivating factors raised by the participants was lecturers' actions. Participant 1, expressed frustration with the perception that "students always copy when they do online tests," leading to lecturers implementing numerous restrictions that make the experience "very unpleasant". This sentiment suggests that the punitive measures taken to prevent academic dishonesty may inadvertently create a hostile learning environment. In the participant's own words,

> "There's an impression that students always copy when they do online tests. Some lecturers end up making things hard and come up with a lot of restrictions which make the entire process, the entire experience, very unpleasant for us as students."

This statement highlights the perception of stringent measures imposed by lecturers, which inadvertently create an unfavorable learning environment.

The allocation of time for tests was another issue raised by the same participant (Participant 1). They noted that lecturers often underestimate the time required for multiple-choice tests, especially those involving calculations, due to a lack of familiarity with MOODLE. The participant explained,

> "You find that the lecturer cannot properly or adequately allocate time for a test. He just assumes that since it's a multiple choice type of test, the time will be enough yet there are other things you need to do in the five seconds on the background."

This suggests that the lecturers' unfamiliarity with the Moodle platform and the time it takes to complete tasks on it can lead to unrealistic time constraints for students. This misallocation of time adds unnecessary pressure on the students and hampers their performance. Ultimately this affects their motivation levels when it comes to infusing MOODLE.

The participant (Participant 1) also highlighted the delay in uploading course materials on MOODLE as a demotivating factor. Despite having the outlines and notes ready, lecturers often "take ages to post these things on MOODLE." Elaborating, the participant noted that;

> "What is demotivating is not the big picture; the big picture is beautiful. It looks nice. It is the small things like the fact that lecturers have the outlines and notes ready from the get-go but they will take ages to post these things on MOODLE."

This delay, it would seem, may be hindering the students' ability to prepare adequately for their courses as well as possibly disrupt the students' study schedule and may, in the short term, affect their learning process.

System issues were also identified as a significant demotivating factor. Participants shared their experience of MOODLE getting "stuck and not working" during a test, while others cited usability issues and frequent problems as reasons for avoiding the platform. This inconsistency in the functionality of MOODLE may be contributing to students' lack of motivation.

In support of the system issues raised, Participant 20 noted;

> "I believe the usability of Moodle is the biggest demotivating factor."

This sentiment was echoed by Participant 19 who said,

> "You find yourself always avoiding going to MOODLE because you know there's going to be one problem or the other."

These statements underscore the need for a more user-friendly interface to mitigate students' demotivation and unwillingness to engage with the learning management system. The fear of being "kicked out" or unable to log in during a test was particularly stressful for Participant 10. In their own words;

> "For me as well MOODLE is just not motivating because when I know that I have a test on MOODLE and now I have to start feeling the stress of what will happen if MOODLE kicks me out; what will happen if I can't login; what will happen if I can't access the system during the time of the test so I have to deal with all of these stressors even before I start taking the test or while I'm preparing for it. So MOODLE is; the use of MOODLE is demotivating for me. Personally I don't want to go through that. I don't want to have to deal with what am I going to do when this happens and the lecturer is not going to listen to me. I just want to be able to do my assessment, do my work and get done with it. It is so demotivating. MOODLE is so demotivating."

Furthermore, the lack of supplementary materials, such as explanatory videos, was another concern that added to the lack of motivation. Participant 15 criticized lecturers for merely posting notes on MOODLE without providing any additional explanation or resources;

> "I think another thing that makes us demotivated .....is that lecturers will simply just post notes on MOODLE and think that is all; that they are done. Some don't even send any videos or provide any explanation to the notes."

In terms of suggestions, the participants emphasized the need for both lecturers and students to receive adequate training on using MOODLE. They also called for a platform to address students' concerns and issues promptly.

> "I agree with my fellow colleague that if the University does not train the lecturers to use MOODLE very well, we will continue to be demotivated. If the lecturer is going to be very good at using MOODLE and have a clear understanding of working with it, then maybe we as students would also be motivated to use MOODLE. It is important for the lecturer to have a clear understanding of how to use MOODLE because they are the people that we interact greatly with as opposed to management." (Participant 1)

> "For me as a summary I think management must find a way of teaching lecturers how to use MOODLE as well as teaching students how to use MOODLE and then there must be a platform that ensures that the concerns or issues that student raise are addressed. They must be that platform that allows management to hear what the concerns are; what the problems are; what are the issues that students are facing when it comes to MOODLE and then there must be a way of ensuring that those issues are addressed." (Participant 21)

These suggestions indicate a desire for a more supportive and efficient online learning environment.

In conclusion, the participants' negative rating of motivation appears to stem largely from a combination of lecturers' actions such as restrictive measures, assessments set-up and handling, delayed uploading of materials, and lack of supplementary resources, as well as system-related issues.

6.3.4 Infusion

This particular component was rated as average or neutral, on the quantitative analysis of the student questionnaire, prompting further exploration into the reasons behind this indifference.

The lack of alternatives to MOODLE was highlighted as one of the main reasons for the indifferent rating. Participants noted that even if they did not want to use MOODLE, they had "no choice" as it was the only tool used at the university, particularly for tests. Said participant 3,

> "Even if we did not want to use MOODLE at the end of the day you really have no choice but to use MOODLE. It's the only tool that is being used at the university and therefore we must use MOODLE." (Participant 3)

> "I think using MOODLE is only important when we have online learning. Now that we are back on campus I can even stay the entire semester without consulting MOODLE because my friends will get the information for me and I will get the notes from my friends. So long as I don't have to take any tests any assignment on MOODLE then I will not use MOODLE."(Participant 2)

> "I'd like to add that you find that if I can use MOODLE I can download things from MOODLE but then I share it with my friend such that my friend does not even have to go to MOODLE and gets everything from me such that the only time she will access MOODLE will only be if there's an online test." (Participant 10)

> "We are negative because we feel MOODLE does not work to our benefit as students because we don't have a good experience with MOODLE… many of us don't have a good experience with MOODLE." (Participant 20)

These sentiments indicate that the students' continuous use of MOODLE may be more out of necessity than preference. They suggest that the user experience plays a crucial role in shaping students' intention to continue using MOODLE. These statements also reflect a culture of bypassing MOODLE altogether, obtaining class notes from peers who had downloaded them. This workaround suggests a reluctance to engage with the platform directly. Furthermore, it would seem that MOODLE's importance diminishes in the absence of online learning.

However, the same participants acknowledged MOODLE as a "good tool" that could ensure equal access to information, resources, and knowledge, whether in class or at home.

> "For me I see MOODLE as a good thing, as a good tool. We need to make sure that we push MOODLE to become a tool that ensures that whether you are in class or at home it is the same - you are able to access the same information, the same resources, and the same knowledge. There must be no difference in terms of someone who was sitting in class listening to you learning and the person who was at home learning through the MOODLE system." (Participant 2)

This statement underscores the potential of MOODLE to bridge the gap between in-person and online learning.

When participants were asked if it was better to use MOODLE than not using it at all, the participants agreed, with Participant 1 affirming that;

> "…if used to download notes and then yes it is better to use MOODLE but for the test or online learning I don't think we would have agreed that it is better to use MOODLE for learning or for tests."

This mixed response reflects either the students' varied experiences with different aspects of MOODLE or their view of what the learning management system seems to be doing well.

Despite the issues, there was a sense of optimism among the participants; with one participant expressing that if the problems were properly addressed, they would be very proud to have a tool like MOODLE for online teaching during lockdowns. Said Participant 20;

> "I don't think that we are saying MOODLE is bad or MOODLE should not be used or that we hate MOODLE I do think that University management is trying I mean we are the only institution in the country that during COVID was able to use MOODLE and have online learning but there have been a lot of shortcomings. There are lot of problems that we experience but as a whole if the issues would be properly addressed I think that we will be very proud to be a university that can have a tool like MOODLE and be able to do online teaching during lockdown. I think we are different from other institutions and I think as a university in this country, we are leading in terms of the use of technology during the lockdown periods."

In terms of suggestions, Participant 20 proposed involving students in the development of MOODLE to make it more relevant for young people.

> "I also think that it may be necessary to include others to come in the modelling of MOODLE. We do have students working on apps; speak up and tell us what else must be added onto MOODLE so that it becomes a tool that is relevant for us young people. Something that can be put in to make MOODLE more fun because I believe it can replace apps like WhatsApp as it also has a chat feature. So I think we must involve more of the students."

This suggestion emphasizes the importance of user involvement in shaping a tool that is meant to meet their needs.

In conclusion, the students' indifferent rating of their continuous intention to infuse MOODLE appears to stem from a combination of negative experiences, lack of alternatives, diminished relevance in the absence of online learning, and issues that need to be addressed. However, there is a recognition of MOODLE's potential and a desire for improvements that could enhance its relevance and usability. It would be worth investigating in future if such improvements would yield more positive results in students' continuous intention to infuse MOODLE in their learning activities.

6.3.5 Identification

Finally, the focus group discussion looked at the one research variable 'identification' that received a positive student rating. This rating was not so much a reflection of the management's actions, but rather an indication of the students' self-perception and their sense of belonging within the MOODLE user community. The student questionnaire had asked the respondents whether they identified with MOODLE and with the group of students who use it. Their affirmative responses validate that the

respondents were indeed the appropriate audience for inquiries related to MOODLE. The focus group discussion had very little to add to this validation

One participant's comment summarized this sentiment;

> "….I find myself using MOODLE, clicking on my courses, clicking on the notes just to make sure that I also appear on the logs because one lecturer told me that as lecturers they can tell who has never logged onto MOODLE, who has not accessed any of the resources that they have provided on MOODLE…." (Participant 4)

This statement underscores the students' active engagement with MOODLE and their desire to be recognized as part of its user community, as reflected by the positive rating on the student questionnaire. It also highlights the importance of the 'identification' variable in understanding students' interaction with and perception of MOODLE. Thus, the positive rating of this component confirms the relevance and appropriateness of the surveyed students in discussing matters related to MOODLE.

Having engaged the students on the research variables, the focused group discussion yielded some emerging themes. It was important to generate these themes as the discussion itself, although meant to validate results obtained through a quantitative process, yielded other key issues which the quantitative study had not taken into account. Table 6.1 summarises the themes and sub-themes. Thereafter a discussion on these themes follows.

Table 6.1 – Themes and sub-themes

Respondent	Submission	Theme
Participant 4 Participant 13	"I got to know about MOODLE because I had to consult with other students…" "What they talk about MOODLE at orientation, as a first-year student coming into the university, does not clarify what MOODLE is." "I think it is a problem that they put it on the website because some of us come from other areas and we only use the phone if we're using the	Training for Students

	phone only use it for WhatsApp and Facebook we are not that clued up about browsers."	
Participant 4	"I would suggest that it (presentation on MOODLE) be incorporated into a specific course that is being taught at 1st year 1st semester. It must be taught as a topic at the beginning; we must learn how to login, we must learn how to access the site, we must learn how to get resources, learn how it is helpful because as students we don't really know about it."	
Participant 10	".....the pamphlet must tell us everything, all the benefits, all the information about MOODLE must be available at one place - on the pamphlet that we can refer to."	
Participant 1	"If the lecturer is going to be very good at using MOODLE, then maybe we as students would also be motivated to use it".	Training for Educators
Participant 16	"I also think that they do not take into account the time aspect when they set tests online."	
Participant 1	"... for instance you find that the lecturer cannot properly or adequately allocate time for a test. He just assumes that since it's a multiple choice type of test, the time will be enough yet there are other things you need to do in the five seconds on the background."	
Participant 21	"I think management must find a way of teaching lecturers how to use	

Participant 1	MOODLE" "My wish is for lecturers to enhance the notes, add videos and other things and other resources to the notes that they will then post on MOODLE. Lecturers must add links and other resources that we can then access."	
Participant 20 Participant 8 Participant 11 Participant 20 Participant 5	"…no one takes time to find out if the initiatives are working. No one finds out if the initiatives are serving the purpose." "Whatever we ask from management they don't normally give us" "I think they do not do a thorough job when it comes to addressing issues that are brought about, especially issues related to MOODLE. They just do the little they can do and to us as students it comes across as these people are not at all interested in solving our problems" "Also, there must be someone who is responsible for MOODLE. There must be someone who ensures that problems related to MOODLE are addressed. Someone must take care of the obstacles because as it is, this study is being done….." "I feel those data being provided was simply being done to give the impression that something was being done. I think if the intention was honest then the data should have been given to us to use for any	Management Support

	online activity not just to access MOODLE because when learning, I feel especially online learning, encompasses everything and anything that you can get online, not necessarily something that is only posted on MOODLE. For example sometimes you need to go to YouTube and watch how a particular exercise is done."	
Participant 19	"You find yourself always avoiding going to MOODLE because you know there's going to be one problem or the other"	System Issues
Participant 20	"I believe the usability of MOODLE is the biggest demotivating factor"	
Participant 4	"What will then happen is we then get to find other ways of getting the information. Some of the students will access MOODLE, download the notes, and then we will get the note from the students who downloaded without necessarily going into MOODLE ourselves"	
Participant 1	"…if used to download notes and then yes it is better to use MOODLE but for the test or online learning I don't think we would have agreed that it is better to use MOODLE for learning or for tests."	
Participant 20	"At a glance when you look at MOODLE, MOODLE looks simple, MOODLE has everything as courses are clear, everything it looks simple. Wait until you have to write a test then you will see the issues."	

Participant 6 Participant 8	"…even if you are writing a test and time runs out we'll just take the approach that afterall our management and lecturers are against us as students because of our current demands." "Judging from the current relationship between management and students, I think there is a bias because when we ask for things from management they don't normally give us, they don't normally listen to our pleas or our concerns..."	Relationship between Students and LMS Leaders
Participant 9 Participant 9	"….sometimes when we want to use MOODLE you find that the labs are full so it is difficult to use MOODLE even on campus because even if you want to use them on campus the labs are always full." "….when we are home few of us have access to the resources we need to use MOODLE."	Resources Availability
Participant 1 Participant 20	"And also because there's an impression that students always copy when they do online tests, some lecturers end up making things hard and come up with a lot of restrictions which make the entire process, the entire experience very unpleasant, for us as students." "….it is also our experience with MOODLE that makes us negative. We are negative because we feel MOODLE does not work to our benefit as students because we don't	User Experience

Participant 10	have a good experience with MOODLE… many of us don't have a good experience with MOODLE." "….when I know that I have a test on MOODLE and now I have to start feeling the stress of what will happen if MOODLE kicks me out; what will happen if I can't login; what will happen if I can't access the system during the time of the test so I have to deal with all of these stressors even before I start taking the test or while I'm preparing for it. So MOODLE is; the use of MOODLE is demotivating for me. Personally I don't want to go through that. I don't want to have to deal with what am I going to do when this happens and the lecturer is not going to listen to me. I just want to be able to do my assessment, do my work and get done with it"	

6.4 Emerging Themes

6.4.1 Theme 1: Training for Students and Educators

One critical issue that is exposed by the focus group discussion is the inadequate training for both educators and students.

6.4.1.1 Training for students

The analysis of results from focused group discussion revealed a concerning reality that many students are discovering MOODLE through informal means, such as resorting to peers and seniors for guidance. This lack of formal introduction leaves them unprepared and uncertain, as evidenced by Participant 4's statement: "I got to know about MOODLE because I had to consult with other students…" This highlights the need for structured approach to equipping the students with the necessary skills from their first day at university. Seminal authors in technology adoption, such as Thompson et al., (1991);

& Venkatesh et al., (2003) also note that if appropriate facilitating conditions are in place, the user is likely to feel empowered in dealing with the new IS, with such empowerment conditions being ongoing training and user support. Muller (2020) argues that successful technology integration requires systemic change within institutions. A more proactive approach, as suggested by Participants 4 and 13, could involve comprehensive pamphlets that act as a reference point for the first year student, and this should be made available on the first day of entry into the university premises; as well as introductory courses within the programme of study, so as to ensure everyone starts on the same page.

6.4.1.2 Training for educators

The concern extends to educators as well. Participant 1 expresses their frustration with lecturers' limited Moodle proficiency, impacting aspects like time allocation for quizzes. This aligns with Maphalala & Adigun's (2021) study, where academics reported feeling unprepared and unsupported in implementing e-learning tools. This lack of expertise can lead to demotivation among students, as Participant 1 further emphasizes: "If the lecturer is going to be very good at using MOODLE, then maybe we as students would also be motivated to use it". This reveals a need for lecturer development initiatives in e-learning to optimize the LMS's potential. These results are consistent with Winston & Dologite (1999) who proposed a series of infusion determinants, including end-user training, involvement, and incentives. Macharia & Pelser (2014) also note the need for training and support to Higher Institution information systems users, irrespective of the fact that universities are seen as knowledge centres.

6.4.2 Theme 2: Management Support

The focus group discussion also brought out the crucial role of management. Participant 4, for instance, criticizes the assumption by Management that students are capable of navigating MOODLE intuitively. This necessitates a shift in perspective from management, acknowledging the need for ongoing support and training. This support should extend beyond the initial orientation presentation – which typically lasts an hour - and include readily available resources, such as the suggested pamphlets, troubleshooting assistance, and dedicated support personnel. Although dated, Damsgaard & Scheepers, (1999) study of a South African telecommunications company that was introducing an intranet, provides some insightful tips on how to mobilize users into infusing a technology. In that study, management came up with interesting initiatives, such as posting users pictures on the new intranet, thereby influencing people to go and view the intranet for daily photo uploads. The use of

incentives for users who go beyond the mandatory requirements has been noted by a number of authors, such as Kim & Gupta, (2014), Karimikia et al., (2020) as another critical aspect to the infusion of information systems. Kim & Gupta (2014), specifically note that one barrier to IS infusion may be "that organisations' reward systems do not recognize the efforts of an individual who tries to use the system beyond mandated usage" (Kim & Gupta, 2014:656). Such individuals, as noted by these authors, usually incur the loss of any personal time when they devote themselves to such efforts.

Management at the university also need to be mindful of the generation of users they are dealing with and come up with tactics that will garner these 21st century users to infuse the LMS.

The discussion also highlighted the need for management to be seen to be acting on student concerns. Participant 8's statement that "Whatever we ask from management they don't normally give us" points to a non-responsive management. Likewise the concern that "I think they do not do a thorough job when it comes to addressing issues that are brought about, especially issues related to MOODLE. They just do the little they can do and to us as students it comes across as these people are not at all interested in solving our problems" (Participant 11) further emphasizes the point that, in the eyes of the students, management is not doing enough.

The need for management support is consistent with past studies. For instance, Ramamurthy, Sen, and Sinha, (2008) note that top management support and commitment are needed in systems success. Most previous studies typically restrict themselves to arguing the importance of top management support. Likewise, Eder & Igbaria (2001) found that infusion was positively related to various organisational factors such as earliness of adoption, top management support, IT infrastructure, amongst other things.

ERP systems research also note the importance of management support. Escobar-Rodriguez, Escobar-Perez, & Monge-Lozano, (2014), note that lack of management support in the failure of a hospital ERP system whilst Erkayman et al., (2018) found management support to be amongst other factors that made ERP systems successful.

6.4.3 Theme 3 – System Issues

The focus group discussion also highlighted a critical theme regarding system reliability and its impact on student satisfaction with MOODLE. Students did express their frustration with technical glitches and outages at times, and this emphasizes the need for a stable and dependable MOODLE experience. The

sentiments shared by Participant 19 “You find yourself always avoiding going to MOODLE because you know there's going to be one problem or the other” reveal a picture of a system always dogged by technical issues.

Furthermore, as Participant 20 highlighted “I believe the usability of MOODLE is the biggest demotivating factor”, it is imperative that system issues be adequately addressed. These finding are consistent with Cavus et al., (2021) who identify ease of use as a significant factor in learning management system sustainability. In their study they noted that system reliability directly influences ease of use, impacting student satisfaction and overall LMS adoption. Likewise Macharia & Pelser (2014) also noted that technological issues significantly affect the infusion of ICT.

These system issues may also be the cause of the workarounds that students then create. As noted by Participant 4 “what will then happen is we then get to find other ways of getting the information. Some of the students will access MOODLE, download the notes, and then we will get the note from the students who downloaded without necessarily going into MOODLE ourselves", these workarounds become a norm. As such the intended objective of MOODLE is lost and students’ move across the levels of study without infusing the LMS in their learning-related activities.

The students did suggest ways to address these system issues. For instance one participant called for a platform where issues related to MOODLE could be addressed (Participant 20). Another did speak to the need for people or unit that is dedicated to solving MOODLE issues (Participant 22). A third suggestion was on involving young people like themselves in the customization of MOODLE (Participant 20).

6.4.4 Theme 4 - Relationship between Students and LMS Leaders

The focus group discussion revealed a concerning theme regarding the perceived relationship between students and LMS leaders, including management and potentially IT personnel responsible for MOODLE. The students expressed feelings of mistrust and negativity towards these leaders. This may be impacting their overall perception and engagement with the system.

The student quotes that highlight this negative relationship include "…even if you are writing a test and time runs out we'll just take the approach that afterall our management and lecturers are against us as students because of our current demands." (Participant 6) as well as "Judging from the current relationship between management and students, I think there is a bias because when we ask for things from management they don't normally give us, they don't normally listen to our pleas or our concerns..." (Participant 8).

The not-so-good relationship could be a result of unmet demands, which might leave students feeling their requests and concerns regarding MOODLE are not adequately addressed. This would potentially lead to frustration and resentment. It is also possible that the lack of communication from management on MOODLE issues could also be a contributor. As noted in the previous chapter, most of the activities that Management states to have put in place to encourage MOODLE infusion lack the mechanism for feedback.

A number of studies have noted the importance of facilitating conditions in the infusion of information systems. Venkatesh et al., 2003 seminal work on User Acceptance of Information Systems highlights the role of facilitating conditions in influencing users' acceptance of information systems. Likewise other authors such as Cavus, Mohammed, & Yakubu (2021) and Alkhateeb & Abdalla (2021) also draw our attention to the effects of facilitating conditions on student's use and satisfaction of learning management systems.

Specifically, Karimikia et al., (2020) argue that users succeed in infusing new systems into their activities when they positively interact with the leaders of the IS function as this interaction, amongst other things, "allows users to observe the actions of IS professionals and receive knowledge and guidance from them" (Karimikia et al., 2020: 429), suggesting the need for some stable relationship between the users and IS function.

6.4.5 Theme 5 – Resources Availability

Another theme that emerges from the discussion is that of resource availability. Without sufficient resources available to users, infusion of the information systems may be hindered (O'Connor & O'Reilly, 2018). The discussion reveals two forms of challenges associated with this theme. There is a resources issue within the university itself, such as labs not being enough, as noted by Participant 9; as well as a resources issue within the country. Information systems research notes that technological resources and support are key elements for system usage (Venkatesh et al., 2008; O'Connor & O'Reilly, 2018).

The discussion pointed out that some of the solutions that had been put in place during the full-time online learning period, were not ideal for the country set-up because, for instance, they as students, did not have good telecom networks at home (Participants 2, 16). Furthermore, these solutions required them to have their own data to connect to the zero-rate MOODLE site (Participants 7, 12, 20, 22).

The issue of facilitating conditions becomes a recurring theme. Previous studies such as Macharia & Pelser (2014), Ventakesh et al., (2008), Cooper & Zmud (1990) have highlighted the need for availability of resources in the process of diffusing and infusing systems in organisations. Whilst some of it may not be under the control of the university administration, (such as the quality of telecommunications at national level), the university needs to address the resources issue where they can, for instance with regards to availability of computer labs across the campus. That said, I am fully cognizant of the challenges faced by public universities, given that it is one of the influences of this study's problem statement.

6.4.6 Theme 6 – User Experience

The last theme that emerges from the discussion is that of user experience. Participants did express that their negativity may stem from the negative experiences they have had with the learning management system. These experiences are either encapsulated in system issues or in educators' handling of problems brought about by the use of the learning management system. As Participant 20 pointed out "it is also our experience with MOODLE that makes us negative. We are negative because we feel MOODLE does not work to our benefit as students because we don't have a good experience with MOODLE...", users seem to have faced or continue to face challenges which are unresolved, leading to a negative perception.

The importance of the user experience in information systems acceptance and use is consistent with other previous studies such as Macharia & Pelser (2014), Hirata & Hirata (2012), Abdulaziz (2011). These studies, amongst many others, highlight the importance of ensuring the systems being put in place provide an enriching experience for the user as this motivates the user to continuously seek to engage with the systems being put in place. A negative experience will have the opposite effect.

It will be necessary therefore for management to ensure the user experience is a positive one, as literature suggests a positive user experience leads to better outcomes – which in this instance would be continuous use of the learning management system.

6.5 Summary

This chapter presented the results of the focus group discussion. The aim of the focus group discussion was to make sense of the quantitative results that had been obtained from the questionnaire, as well as allow the students to reflect on the results of the data that had been collected from the administrators. The results reveal a number of issues that seem to influence the

negative perceptions. These include the lack of training, the lack of management support, the dysfunctional relationship between the LMS leaders and the students, the lack of resources, as well as the negative user experience. These results provide insights into some of these silent issues that may have to be addressed.

In the next chapter I discuss the results of all three data results; the management data presented in Chapter 4, the students quantitative results presented in Chapter 5 and the students' qualitative results presented in this 6th Chapter.

7. Chapter 7 – Discussion of findings

7.1 Introduction

The preceding three chapters have presented the results obtained from the respondents. This chapter will discuss these results in relation to the research objectives and research questions. Foremost the chapter will discuss the results of the management responses. Thereafter, the chapter discusses the results of tests of hypotheses and research model and the implications of the findings. Furthermore, in this chapter I discuss the results of the focus group discussions and the key themes that emerge from that exercise. In discussing the results, I reflect on literature to further explain the results. The chapter also reflects on the two social theories that underpinned the study and presents the lessons learnt and how these can help in understanding the infusion of learning management systems (LMS) in higher education institutions. Finally, based on the results, an improved research model that I developed is presented as a major contribution of this study.

7.2 The Research Objectives

The main objectives of the study were to;

(a) Examine the actions by which University management sought to encourage the infusion of learning management systems among student users in their learning-related activities.
(b) Examine the activities of students in the infusion process of learning management systems.
(c) Investigate how social theories contribute to the understanding of the infusion process.

In order to achieve the first objective, the study addressed one research question, chiefly what activities are undertaken by University Management to encourage the infusion of learning management systems among student users in their learning-related activities. This is discussed next in line with the study results.

7.2.1 What activities are undertaken by University Management to encourage the infusion of learning management systems among student users in their learning-related activities?

The underpinning models suggest that infusion is influenced by actions of leaders of the organization. The Legitimation Activity Model by Hussain et al., (2004) suggests that leaders seek legitimation by continuously assessing the information systems project and its impact on the intended users. This continuous assessment is necessary to ensure that all concerns and issues are addressed so as to

ensure the success of the information systems project. Likewise, the infusion of systems is a continuous project and therefore requires legitimation seekers to undertake activities that would promote and encourage the infusion of said systems.

Based on the theoretical lens that the study used, which was the Social Movement Theory (SMT) and the Legitimation Activity Model (LAM), management was asked to provide activities they undertook in an effort to encourage the infusion of learning management systems (LMS) among student users in their learning-related activities under five components, namely:

(1) How they mobilized students to infuse the LMS in their learning related activities;

(2) How they motivated students to infuse the LMS in their learning-related activities;

(3) How they encouraged students to identify with the LMS;

(4) How they addressed the challenges associated with the comprehensive use of the learning management system in place;

(5) How they addressed the challenges that impacted activities put in place to help encourage continuous use of the LMS.

As a way of evaluation, management was also asked to evaluate the effectiveness of their activities. In the proceeding sections, I shall discuss these activities in detail.

7.2.1.1 Identification

The university's efforts to cultivate student identification with MOODLE seem ineffective. While management highlights their initiatives, none seem to actively involve students in meaningful ways in the process. The current strategies at the university, primarily relying on management memos, videos, and online manuals, lack engagement potential. These passive methods fail to create a space for student participation, ultimately affecting the sense of identification.

The role of identity in IS use has been greatly explored by researchers such as Mishra et al., (2012), Carter & Grover (2015), with the latter noting the identity associated with an information technology can ultimately affect previously established behaviours as users continuously engage and interact with the IT in question. University management needs to actively look for ways that will entrench a sense of identity with the learning management system. Researchers such as Leso, Cortimiglia, & Ten Caten (2022), amongst others, emphasize this need as they note that identification with a project thrives on active involvement.

The study highlights the need for alternative mechanisms that empower students to contribute and shape the LMS. Students feel excluded from shaping the LMS. One focus group participant directly addressed this issue, suggesting that involving students in the design and customization of the system would be crucial.

7.2.1.2 Mobilization efforts

The University of Eswatini's current approach to encouraging students' use of MOODLE appears insufficient. Students are not given any formal orientation about how to navigate through MOODLE and how to use MOODLE to perform various activities yet the LMS is part of their virtual synchronous/asynchronous lessons as academic staff use MOODLE to teach a number of courses across the different programmes. Students primarily learn about MOODLE through informal channels like peers, seniors, and lecturers who partly use MOODLE to deliver their lessons. This suggests a need for audience-specific strategies to enhance the effective use of MOODLE in the teaching and learning activities at UNESWA. The university relies on "how-to" videos and short messages posted on the home page of the MOODLE portal on the university website to orient students on how to use MOODLE. Unfortunately, this approach lacks engagement and feedback mechanisms. This is in contrast with successful examples such as one provided by Damsgaard & Scheepers (1999) where a telecoms company successfully promoted intranet usage by using tactics like employee photos, raffles, and sponsored events – all tailored to the target audience. Furthermore, the use of incentives for users who go beyond the mandatory requirements has been noted by a number of authors, such as Kim & Gupta, (2014), Karimikia et al., (2020) as another critical aspect to the infusion of information systems.

So the implementation of a target audience orientation to the use of MOODLE at UNESWA needs to be introduced.

Furthermore, the study highlights a crucial element: understanding the target audience. The current mobilization efforts seem to assume a higher level of technical ability among students than may be present. However, the situation on the ground indicates that there is a mismatch between expectations and reality which renders the current approach ineffective. A student's comment emphasizes the potential disconnect:

"*Management is using an assumption that students are capable of doing a lot of things on MOODLE yet when you look at the technological background, our upbringing, many of us are not that advanced. It's only a few of us who are that much technically informed*."

This, along with the statement about "*getting to know about MOODLE from varied sources,*" underscores the need for tailored messaging that resonates with students.

For the university to succeed in its mobilization efforts it may be necessary to focus on audience-specific strategies that consider students' backgrounds and preferences. This will ensure the efforts reach the intended target audience. Furthermore, it may be necessary to implement engaging tactics that go beyond static "how-to" resources. The current mobilization efforts fall short and the university needs to establish feedback mechanisms that enable them know whether their efforts are getting the desired results.

Hussain et al., (2004) Legitimation Activity Model (LAM) is a good example of how legitimation seekers are constantly engaging their legitimation providers for feedback on activities undertaken. This feedback mechanism will also help university management objectively assess the effectiveness of their efforts.

7.2.1.3 Motivation

The results also reveal there are insufficient motivational strategies. The results reveal that the university's administration relies primarily on online manuals and videos, which are arguably ineffective, as evidenced by low student motivation scores. In fact management had only one activity listed under the motivation activities. As such, as this study reveals, there is a significant lack of student motivation to use the learning management system (LMS). This demotivation stems from a combination of factors, primarily related to the university's handling of the platform.

Firstly, the administration's reliance solely on online manuals and videos falls short of providing adequate incentives for students to engage with MOODLE. These resources do little to address the inherent obstacles that students encounter, such as those discussed under 7.2.1.4 below. Hence, the scores awarded for the variable on 'motivation' in this study were low.

Secondly, students explicitly expressed a lack of motivation to utilize MOODLE. While this can be partially attributed to the specific ways some lecturers utilize the platform, a larger part comes from the administration's handling of MOODLE-related issues. Students raise concerns about the lack of

policies addressing common problems, such as how lecturers handle MOODLE-related issues or technical issues like system downtime or network problems. This perceived lack of management intervention and a seemingly apathetic attitude towards addressing student concerns significantly contributes to demotivation. As one student clearly stated, "*They just do the little they can do ... it comes across as these people are not at all interested in solving our problems*."

The study highlights the critical role of the university administration in motivating students' engagement with MOODLE. This requires moving beyond passive resources like online manuals and implementing meaningful incentives, such as identifying super-users from the students who will act as trainers for incoming students, as well as addressing student concerns proactively by establishing, among other things, clear policies and actively resolving issues. It is also necessary for university management to demonstrate a genuine commitment to student needs. Kim & Gupta, (2014), as well as Karimikia et al., (2020) also found that management support, sometimes through structural changes, did create a motivating factor amongst users of organisational information systems.

7.2.1.4 Removal of Barriers

The research findings highlight a critical disconnect between management's perception of MOODLE challenges and the reality faced by students. While management focuses on technical issues like lack of devices, software, and high-spec computers, student scoring of the activities meant to reduce or remove barriers to the availability and use of MOODLE suggests these might not be the primary barriers.

Management's focus lies on technical infrastructure (devices, software, processing power), which might not directly reflect the student experience. The low score on the university's attempts at reducing or removing barriers implies students face significant challenges beyond the technical issues identified by management. These challenges seem to be related to student specific issues identified in previous literature (for example Maphalala & Adigun (2021); Cavus et al., (2021); Cavus & Yakubu (2021); Alkhateeb & Abdalla (2021)) such as user interface, content quality, lack of training, lecturer effects, or pedagogical approaches to using MOODLE, amongst other things. For instance pedagogical issues may include lecturers using only multiple-choice self-marked tests which do not consider other options which the lecturer might have considered if they were marking the test, especially in content courses.

It is therefore vital for management to have that inside information on students' challenges in order to respond effectively to the attempt to remove both perceived and existing barriers.

The disconnect between how management rates the effectiveness of their attempts at reducing/removing barriers and the low score that students rate the attempts underscores the critical need for management to gather students' feedback. This feedback should explore the specific difficulties students encounter when using MOODLE, including the usability and effectiveness of the learning activities offered. A more comprehensive understanding of students' challenges, beyond just technical infrastructure, is crucial to improve their MOODLE experience and ultimately, their willingness to continue using MOODLE for learning-related activities.

7.2.1.5 Infusion

Management could only list a very few activities meant to encourage the comprehensive use of MOODLE within the University. These few activities suggest that even University Management did not have a strategy in place for a concerted effort to infuse the LMS within teaching and learning related activities. However, it can be argued that University Management did not have a framework like the one used in this study to help them understand the direction that needed to be followed, to provide guidance to their plans, and to help them evaluate their course of action.

Literature suggests Management has a critical role to play in the infusion of systems by virtue of them being decision-makers who can effect change. Infusion relies heavily on the role played by standards set and implemented within the organisation, including the role of institutional structures' influence on the direction that the company takes (Gharavi, Love, & Sor, (2005). Eder & Igbaria (2001) found that infusion was positively related to various organizational factors, including top management support. Therefore, if the infusion of the LMS is to occur at the university, Management initiatives need to be decisive.

7.2.2 How are University Management's activities perceived by the student users?

The second research question examined students' perceptions towards the activities by management in the students' use of MOODLE in their learning. This section addresses this research question.

Generally the perception of students towards legitimization activities were negative, save for items that asked of their identifying with the learning management system. The following variables show each activity and its mean score, on a seven-point scale.

7.2.2.1 Identification (Mean: 4.53)

This relatively high score indicates students are aware of MOODLE and understand that it is the learning management system used by the university. The positive score also suggests the group of students who answered the questionnaire were the right people to speak on MOODLE related issues as they were part of the group of users who use the learning management system.

However, a high score does not necessarily indicate active or engaged use. Students might be forced to access MOODLE for administrative tasks, such as course assessments, but not necessary for actual learning. In fact the focus group discussion highlighted that students felt they were "forced" to use the university's learning management system because of the lack of an alternative. Where possible, they avoided using MOODLE.

7.2.2.2 Motivation (Mean: 3.38)

The motivation to infuse MOODLE in learning related activities also scored low, suggesting students disagree with the university's efforts to get them actively using and engaged with MOODLE. Again, the key issue with management activities is that they lack feedback mechanisms. There also seems to be no way of knowing whether the efforts being put in place are effective.

Students, for instance, noted in the focus group discussion that many lecturers simply re-post notes that had been presented in class. They noted that there were usually little or no added resources to boost the material covered in class. If students know they would get the same material on the platform, then what motivation do they have to go to the platform? Whilst this may be more of a lecturer issue than a management issue, the university management needs to know that uninspiring content or activities within the MOODLE platform is demotivating to students, and should therefore provide training and incentives for lecturers to provide engaging content so that students are encouraged to use the MOODLE platform. There is therefore a need for appropriate platforms that provide feedback to management to take crucial to improve the situation on the ground.

7.2.2.3 Mobilization (Mean: 3.38)

The mobilization efforts of the University to infuse MOODLE in learning related activities also scored low, suggesting as well that students feel University Management is not doing enough to mobilize them to infuse MOODLE in their learning related activities. What does stand out from the University's initiatives is that the activities are largely informational as opposed to engaging. Furthermore, the platforms used by management are not necessarily the go-to platforms for students. For instance, management noted that they place how-to guides on the university website as well as use the orientation sessions to brief students about MOODLE. Students, on the other hand, feel at orientation none of them can relate to the learning management system being introduced to them. It is when they start attending classes that the use of MOODLE becomes apparent.

The qualitative analysis emphasizes the crucial role of management support in fostering positive student perceptions. Students highlighted the need for leadership engagement in addressing MOODLE challenges and advocating for its effective use. They noted that management's efforts are basically misplaced, as management uses platforms that are not effective. This suggests a gap in communication and understanding between administration and students. The lack of feedback mechanisms was also highlighted in the qualitative analysis.

The analysis further brought up the need for clear policies regarding faculty engagement with MOODLE. Efforts to mobilize students must not be thwarted by punitive use by faculty of the learning management system. Students expressed their frustrations when having to address issues around the use of MOODLE, citing lack of lecturers' willingness to hear them out, amongst other things.

7.2.2.4 Removal of Barriers (Mean: 2.91)

This was the lowest score, signifying strong student discontentment towards university management's actions to addressing barriers to infusing MOODLE. Students feel the university is not effectively addressing challenges hindering the use of the MOODLE LMS. The results suggests a disconnect between how management perceives students' needs and the reality of students experiences.

Such a disconnect should be expected as the university's efforts lack the necessary feedback mechanisms. The activities put in place are simply one-sided, used primarily as information sharing than for engagement. Furthermore the information is placed on platforms that are not widely used by the students. As it is, the targeted audience does not even access the information being shared.

Whilst the university may be addressing challenges associated with the availability and use of the LMS, they are not addressing the challenges that affect students.

In the focus group discussion, the negative experiences with doing assessments uploaded on the LMS emerged as a significant theme. Network and system issues during time constrained (synchronous) assessments caused significant frustration and concerns about fairness. For instance, as highlighted in Chapter 6, students expressed concerns on limited time to respond to the questions, lecturers forgetting to consider the fact that many students cannot type fast, so answering questions on the LMS is more demanding than when writing the solution in a class test. On MOODLE, you need to think of the solution, then type it, and then proofread it, before clicking next to the next question. Besides the technological phobia that does occur, the timed tests are generally not completed by many students. Furthermore, they complained about poor bandwidth/ slow network /intermittent network, and that once the LMS "kicks out" the student, the student may sometimes not be able to login again, especially where only one attempt is given to avoid students' copying.

Students further highlighted the lecturers' unwillingness to engage when such issues cropped up.

This requires the university to make investment in robust technical infrastructure as well as have contingency plans for network disruptions, amongst other things. As highlighted previously, the need for policy to guide on how to handle issues around the learning management system is evident. Further, it may be necessary for the University to promote pedagogical training for lecturers in online assessment practices. This training will help lecturers to have a grasp of the issues related to online assessments – issues such as the fact that that when answering a question the student may have to type their answer, then proofread it; which is time-consuming than and different from tackling a paper-based question.

Finally, the training will help in emphasizing the need to be responsive to student challenges.

7.2.2.5 Participation (Mean: 3.52)

This neutral score suggests student indifference towards continued and comprehensive MOODLE use. It may also suggest students were unsure about whether they would continue using MOODLE actively. This indecisiveness might have stemmed from the aforementioned issues with mobilization, motivation, and barrier removal. There may have also been a lack of perceived value or benefit from using MOODLE compared to other learning methods, most probably the traditional method many

grew up using. Furthermore, they might be using alternative learning resources they find more effective.

The decision to use MOODLE at present seems driven largely by factors outside their control as students, such as mandatory requirements (e.g. for assessment taking), or such as lecturers' preferences, amongst other things. As noted by some students during the focus group discussion, some lecturers prefer to use other platforms such as ZOOM and WhatsApp. In those instances, students are likely to use the platform preferred by the lecturer.

7.2.3 What are the effects of the infusion activities on the infusion process

Although the perceptions of students towards infusion activities were negative, the statistical analysis suggests all the activities, save for one, have a significant effect on the infusion process. Specifically, the statistical analysis suggests that identification, mobilization, as well as removal of barriers have a significant effect on infusion.

Motivation was found to have no direct influence in the process. The statistical analysis showed that the motivation measures were subsumed by the other measures. Whilst this particular finding may be of interest, it may be explained by the fact that the learning management system at this University is a mandatory tool and therefore students are forced to use it. These findings are in line with previous studies such as Brown, Massey, Montoya-Weiss, & Burkman, (2002), Park & Hwang (2018), Tamilmani, Rana, Prakasam, & Dwivedi, (2019) who note that, in mandatory settings, motivation plays an insignificant part. Specifically Park & Hwang (2018) found that involuntary motivation had no statistically significant impact on the infusion of information systems[7].

7.2.4 What lessons can be drawn from the Social Movement Theory and the Legitimation Activity Model and used in the infusion of LMS?

The last question posed by the study focused on the theories that had been used as a lens to view the infusion process. These theories were used to primarily categories the activities and secondarily explain how the concepts of the study related. This section discusses the last research question which is aligned to the third and last objective. This last objective of the study was to describe in greater

[7] In Park and Hwang (2018): A study on the infusion of public administrative information systems: Focusing on the social security information system. *Informatization Policy*, *25*(2), page 46

detail how the social theories that have been used in this study can contribute to our understanding of the infusion of information systems.

This study used two social theories, namely Klandermans' Social Movement Theory and Hussain et al.'s Legitimation Activity Model and in the following paragraphs I will elaborate how each of these theories help us understand the infusion process.

7.2.4.1 Social Movement Theory

Klandermans' Social Movement Theory (SMT) provides a valuable lens for understanding the infusion of information systems (IS) in organizations. Here, I will discuss some of the lessons that we can learn from this theory and how these lessons can be applied to the infusion of information systems.

Mobilization

Klandermans emphasizes the importance of mobilization efforts in generating collective action. In the Social Movement Theory, mobilizing individuals plays a critical role in ensuring eventual participation or in achieving a particular social cause. By replacing collective action with IS infusion, we can begin to understand how the infusion of systems can be seen as a social cause.

Critical in mobilization attempts is raising awareness of both the social issue at hand and the need for action. Whilst social movements may use various methods of raising awareness, such as public campaigns and social media campaigns, what is in the heart of these methods is using platforms that can be accessed by those the social movements are targeting to understand the social issue as well as participate in the collective action.

In IS infusion, this translates to the need for appropriate strategies to be used to raise awareness. Strategies like training and continuous communication have been found to be very effective in raising awareness and addressing any inertia that the IS users may have. Training was found to also reduce the anxiety brought about by using information systems that one was not familiar with in a number of studies such as Maphalala & Adigun's (2021), Macharia & Pelser (2014), Winston & Dologite (1999). Training therefore could prove to be very useful for incoming first year students at the University.

However, forceful mobilization attempts, like mandatory training can also trigger resistance to the change that the University may be trying to foster. It therefore becomes important that mobilization efforts have a feedback mechanism that will allow the leaders to gauge reactions and immediately take appropriate action. In the university case, their mobilization efforts or activities did not provide

any feedback mechanism. Infact their activities were more of pushing out information than engaging the potential users.

Mobilization efforts in social movements are also aimed at encouraging participation. Participation is the collective action, or end result. Encouraging participation in information systems involves incentivizing early adopters. In other words, encouraging users to engage with the system being infused requires University management to put up incentive programmes that will encourage users to want to actively use the learning management system. The use of incentives to encourage users is consistent with findings from Kim & Gupta, (2014), Karimikia et al., (2020), amongst others. This was absent in this particular university. There were no incentives at all for those that actively use the LMS. In the study on the introduction of an intranet at a telecommunications company (Damsgaard & Scheepers, 1999), project leaders ran competitions and rewarded departments that had active users.

Klandermans Social Movement Theory further suggests mobilization attempts help greatly in raising awareness, overcoming inertia, initial resistance, as well as competing agendas. Likewise infusing an information system such as a learning management system requires mobilization efforts aimed at overcoming such feelings of lack of control, as seems to be the case with the students who feel resigned to being made to use a learning management system that they cannot offer input on; well as overcoming resistance from those who may not see the benefit of infusing the learning management system, as is the case with the students who hold the view that the LMS is only helpful during lockdown periods; and also overcoming competing priorities, such as the students' and in some instances, lecturers desire to use other platforms.

Framing

Klandermans SMT further highlights the importance of framing, where actors define the situation and motivate participation. Leaders of the cause play an important role in exposing what is possibly not right about the current situation and what the possible benefits will be, if the current situation is changed. As noted earlier in Chapter 2, framing is usually aligned to the value systems of the individuals. In information systems, and in learning management systems in particular, framing the IS infusion as essential for efficiency, competitiveness, or improved collaboration, amongst other benefits, can influence user perceptions and participation. These benefits have been discussed in greater detail in Chapter 2, where the learning management system was unpacked.

In the university situation, there seems to be a lack of intention to portray the LMS as a necessary and useful tool. Instead management seems to rely more on the mandatory aspect of the tool. The idea of

efficiency and benefits of the LMS are not exposed. Instead, the LMS is presented as the tool that "must" be used. SMT teaches us that leaders should be actively involved in selling the LMS, by amongst other things, showing how a situation without the tool is not beneficial.

Furthermore, we can learn from the SMT that the framing must be aligned to the mobilization potential's value systems. In the LMS infusion instance that may mean assuring the students that the LMS is a non-intrusive tool, as well as a cost saver – issues that resonate with students.

In a nutshell, we can learn from the SMT that there is a need to present the IS in a way that resonates with users' values and needs, thus creating a sense of urgency or benefit.

Collective Identity

Klandermans further argues that individuals are more likely to participate when they identify with a collective movement. Likewise, creating a collective identity amongst the users of the learning management system can play a critical role in its infusion. It allows the organization to frame the infusion process as a shared journey towards a better future. If done properly, many students would prefer to be known as users or adopters of the learning management system, the same way many of them prefer to be known as users of social media apps such as WhatsApp, or Facebook. Not identifying with such apps tends to present one as not belonging to a particular culture or group. The University can use such an understanding to implement activities that foster a sense of collective identity among users, in the process promoting engagement with the learning management system.

Resource Mobilization

Klandermans notes the importance of resources for sustaining movements.

Similarly, successful learning management systems infusion requires adequate resources for funding the activities as well as providing the necessary technical infrastructure and support.

The activities aimed at raising awareness for example, require funding. Continuous training of staff and students – new incoming students and current students – needs to be done on a regular basis. Studies, such as Ssekakubo et al., (2011) have shown that one of the factors affecting LMS uptake from the lecturers' is the lack of support, such as the training and guidance.

Incentives also require funding. Likewise ensuring the technical infrastructure and support is up to speed requires resources. As highlighted by the students in their focus group discussion, one of the main challenges they faced was network issues. The University needs to mobilize resources that will

ensure this, and other similar types of challenges, do not become a barrier to participation, or in our case, to infusion. Technical expertise to troubleshoot and address user issues must be made available for the infusion process to happen smoothly. Resource availability can significantly impact user adoption, use, infusion, and satisfaction about the learning management system.

Another critical resource that must be mobilized is management buy-in and commitment to ensure long-term infusion. The leaders of the learning management system project need to ensure management is on board and actively engaged in the exercise of availing MOODLE. One of the issues brought up by the students in the focus group discussion was their observation that University management seemed to care less about the issues or challenges around the use of the learning management system. Management buy-in and commitment is a critical resource to the success of the infusion of the learning management system.

Opportunity Structures

Klandermans also argues that existing structures influence movement success. This also relates to the type of leadership the movement has. Leaders of movements are usually expected to live the values of the movement.

Similarly, organisational structures and policies can affect IS infusion. The leadership within the organisation must be seen to be living the values of the information system they are encouraging users to use. In the University instance, students did highlight how they thought there was no management support. Furthermore, it was noted that policies related to the handling of issues around the learning management system were lacking. We can learn from the Social Movement Theory that our organisational structures and policies must align with our objectives of the learning management system, in order to have less resistance.

Political Process

Furthermore, Klandermans Social Movement Theory views social movements as engaging in a political process with various actors and interests. While the intentions of these engagements are largely for the fulfilment of the social goal, they speak to the need to understand the power dynamics in that situation.

Similarly, IS implementation and infusion involves navigating different stakeholder groups with varying needs and concerns. In our context, these stakeholder groups range from students to lecturers to University management. The SMT helps us understand that engaging with these various stakeholders

is a political process, with power dynamics that cannot be ignored. Just like how social movements engage with their networks to build coalitions and leverage existing social structures to garner support and diffuse information about their cause, University management also needs to understand the networks available at their disposal and how these can be used to effectively promote the infusion agenda of the learning management system.

The ability to skillfully navigate this terrain is paramount, if the University is to have a successful infusion of the learning management system.

Intrinsic and Extrinsic Motivation

Klandermans discusses both intrinsic and extrinsic motivations for participation in social movements. Intrinsic motivations are usually personal, such as someone participating in a protest action because of the effect that the issue of concern has had on them or people known to them. Extrinsic motivations, on the other hand, may not be personal, such as the wish for a just society. These different forms of motivations contribute significantly to sustained engagements with the social movement.

Similarly, users might be motivated to use IS because of its inherent benefits (intrinsic) or external rewards (extrinsic). For instance, a user may see the use of the information systems as a way of improving productivity and in the process, improving their individual performance, which could lead to monetary rewards for good performance. Addressing both types of motivation can enhance long-term utilization.

In the Damsgaard & Scheepers, (1999) study, project leaders encouraged users to use the system by regularly posting pictures of users on the intranet as well as running weekly competitions that had prizes. By simply posting pictures of users on the intranet, project leaders were able to generate some enthusiasm from the users, who would look forward to seeing pictures of themselves or of people who were known to them.

It is also necessary to shape user perceptions about the benefits associated with the IS. Whilst it is important for University management to do well in highlighting the shortcomings of existing systems or processes to motivate change, they need be manage the outcome expectations of users from the system. This will ensure that users do not have higher than possible outcome expectations, as this may lead to disappointments, and eventual loss of interest in the information system.

Likewise clearly articulating the risks associated with the learning management system allows users to have a clear picture so that their motivation to engage with the information system is based on an informed perspective.

7.2.4.2 Legitimation Activity Model

The Legitimation Activity Model (LAM) by Flynn & Hussain offers a valuable lens to understand the comprehensive use of systems in organizations. It focuses on the social and organizational processes through which systems gain acceptance and become embedded within organizational practices.

So what lessons can we learn from the LAM about system infusion?

Understanding Systems infusion

The LAM helps us understand systems infusion by focusing on the social and organisational factors influencing adoption, not just the system's features. It highlights the dynamic interaction between various actors and their motivations in shaping foremost, how a system is ultimately used, and secondarily, the depth of use.

Understanding the Social Context

LAM emphasizes the social and organisational context in which system adoption and use occurs. It recognises that users are not isolated individuals but act within groups with their own norms, values, and power dynamics. This helps us understand how these factors influence user perceptions and behaviors towards the system. The LAM considers the perspectives of seekers and providers, uncovering potential conflicts or misalignments in expectations. Whilst this may give the impression that system acceptance is a rational and linear process – i.e. it assumes the legitimation seekers put up activities and the providers respond to the acts of legitimising when in reality, system adoption might be more iterative and providers may react to different stimuli that have not been part of the activities initiated by the seekers - the LAM provides an opportunity for a concerted look at the different roles of the actors.

Furthermore, the LAM recognises that these different actors (e.g., users, managers, IT staff) engage in various activities (e.g., training, communication, demonstrations) to build legitimacy for the system. This helps analyze the dynamics and strategies involved in getting people to use the system effectively. While it may be seen as a limitation that the LAM primarily focuses on the user perspective and may not fully capture the perspectives of other stakeholders, such as system developers or managers, it

does provide a lens to how other aspects brought about by the different actors can affect the legitimisation process. For instance, a system might be readily adopted by a specific department due to strong leadership support and clear benefits, while facing resistance in another department due to cultural differences or lack of training.

Analysing Legitimation Processes

LAM focuses on the process of legitimation, where the system gains acceptance and becomes embedded within organisational practices. This requires ongoing efforts to demonstrate the system's value, address concerns, and align it with organizational goals and values. While it may be challenging to operationalise and measure the various components of the model, this focus on the process, and not outcome, gives us an opportunity to use the LAM to analyse the ongoing process of building legitimacy, not just the final acceptance or rejection of the system.

By analysing these processes, LAM helps us understand how systems become integrated into the organisation's fabric, influencing workflows, decision-making, and ultimately, organisational performance.

Beyond Technology Acceptance

LAM goes beyond traditional technology acceptance models by considering the social and organisational dynamics involved. It recognizes that system use is not just about individual user preferences but also about broader social and organisational forces. So the LAM helps us understand that we need to go beyond assessing technical suitability to explore how the system aligns with existing values, norms, and power dynamics within the organisation. LAM goes beyond technical functionality, emphasizing the social and organisational factors that influence how systems are perceived, accepted, and ultimately used. This aligns with the reality that systems are often met with resistance, sometimes lack of interest, and competing priorities, requiring active efforts to gain legitimacy.

This holistic approach helps us identify and address the various factors that influence comprehensive system use, leading to more successful and sustainable system implementations. It further assists in exploring user resistance and identifying why users might not adopt a system despite its technical capabilities as well as managing change by understanding how the organisational context and power dynamics influence system implementation and comprehensive use of the system.

Framework for studying systems

The LAM is, in fact, a theory for studying systems within organisations. It can be used, as has been used in this study, to provide a structured approach for looking at systems. This systematic framework is ideal for studying and analyzing the complex process of system legitimation. This helps researchers design research questions, collect data, and interpret findings in a structured manner.

7.3 Summary

In this chapter, the research questions posed at the beginning of the study were re-visited. Results from the research process were used to direct the discussions in this chapter. These findings reveal the following, in summary;

Foremost, the results of this study reveal a critical gap in the university administration's commitment to fully integrating the Learning Management System (LMS) into learning activities. While an LMS exists, its utilisation was confined to the bare minimum. This lack of leadership buy-in aligns with Dlamini & Ndzinisa's (2020) findings, who note that higher education institutions leaders had a low level of commitment towards online learning.

While this research commenced pre-pandemic, the COVID-19 lockdowns served as a crucial test of the university's online learning support initiatives. It provided an opportunity to assess if initiatives meant to infuse the LMS had been adequate. The heavy reliance on the LMS during this period exposed deficiencies in the university's ICT infrastructure and processes. Ndzinisa, Mthembu, & Nsibande (in press) meticulously document UNESWA's lack of preparedness, detailing the absence of crucial initiatives such as training and device provision during the lockdowns. This compelling evidence suggests the university administration had not prioritized LMS infusion even before the pandemic's unforeseen disruptions.

Secondly, these findings further identified a reliance on top-down communication methods for LMS infusion. University administration primarily used instructive memos and guidelines, neglecting meaningful engagement with stakeholders, particularly students and lecturers. While the urgency of the pandemic later provided justification for this approach, it ultimately proved ineffective. Notably, the results suggest that LMS adoption and infusion wasn't a priority until the lockdowns forced a shift. This aligns with Ndzinisa & Dlamini's (2022) observations and the World Bank's 2022 report on remote learning in rural areas, highlighting LMS as a reactive solution to the lockdown requirements. However,

at the University of Eswatini, this solution lacked a well-defined, proactive strategy as advocated by Adam (2003), Ndzinisa et al., (in press), Makumane & Mpungose (2022), and others.

Thirdly, the findings also highlight the negative attitudes expressed by students towards the LMS. These attitudes stem from a number of factors, primarily the lack of administrative support, training opportunities, adequate infrastructure, and positive experiences with the LMS itself. This resonates with research conducted by Weerasena & Jayathilaka (2023), Adi-Badiozamm, Ng, & Mung-Ling (2023), Zhang et al., (2022), and others who emphasize the importance of student perceptions and attitudes in ensuring successful ICT integration and positive learning outcomes.

The lack of support from the administration, implying a lack of commitment, has resulted in unmet requests, needs, and expectations. The absence of a clear LMS integration strategy and the use of non-participatory, top-down initiatives have yielded unsatisfactory results. As key stakeholders, students' receptiveness to the LMS is crucial for successful integration.

Fourthly, the findings show that having the necessary skills, often termed digital skills, is another necessary component in the infusion of the LMS. Several researchers, including Ndzinisa et al. (in press), Weerasena & Jayathilaka (2023), and Ben Youssef, Dahmani, & Ragni, (2022), identify the lack of necessary digital skills as a significant impediment to LMS integration. Weerasena & Jayathilaka (2023) specifically point out computer literacy as a major factor influencing student acceptance of learning management systems. Should they lack these skills, students are most likely to be non-receptive of the LMS or face significant challenges.

Finally, these findings highlight the need for investment in resources such as infrastructure and technical support, as observed by researchers like Zhang, Mingyue Gu, Sun, & Jin, (2024).

The findings therefore reveal a compelling need for a comprehensive approach that addresses administrative commitment, stakeholder engagement, infrastructure development, and digital skills training at the University of Eswatini in order to make the LMS a seamless and valuable tool for enhanced learning experiences. The Social Movement Theory and the Legitimation Activity Model could provide valuable guidance on how this comprehensive approach may be undertaken.

Having discussed the findings, the final chapter will discuss the summary and conclusions.

8. Chapter 8 – Summary and conclusion

8.1 Introduction

Using a mixed-methods approach, I set out with an aim of providing a picture of the infusion of a learning management system in a higher institution, using the University of Eswatini as my setting. In this last chapter I summarise the research work done to address the study's research questions and objectives. I also summarise key findings and the implications of these findings to a number of stakeholders, chiefly amongst them, researchers, universities, industry practitioners, and material developers such as educators. The contribution of social theories is also highlighted. Towards the conclusion of the chapter, I also highlight the study's limitations and propose opportunities for future research.

8.2 Research questions revisited

The study set out to address one main aim, namely to understand how Learning Management Systems (LMS) can be infused in learning-related activities at a higher education institution. To do this I focused on three objectives. The first objective was to examine the actions by which University management seeks to encourage the infusion of learning management systems among student users in their learning-related activities. The second objective was to examine the actions of student users which influence the infusion of learning management systems at an institution of higher education. The third sub-objective was to understand how social theories can help us understand the infusion process.

To address the first objective, the research question posed was

8.2.1 What activities are undertaken by University Management to encourage the infusion of learning management systems among student users in their learning-related activities?

This was an exploratory question, and it aimed to get as much information on the activities undertaken at the institution of higher learning. Results revealed many of the activities the university was engaging in were simply not effective, largely because they were one way – from management to students – with limited or no forms of interactive engagement. Furthermore, the results revealed that there seemed to be no specific objective of the actions except to inform. Whilst some activities, such as those aimed at addressing challenges or at ensuring MOODLE is available may have specific objectives, may be undertaken without much interaction with students, a number of activities require

some form of engagement with the intended beneficiaries. The university seemed to lack the processes that would allow for this interaction and engagement.

8.2.2 What are the perceptions of students towards infusion activities?

The results revealed that, generally, students were negative towards the activities aimed at encouraging infusion of MOODLE in their learning related activities. They only showed a positive perception to their identification with MOODLE. A qualitative approach was further undertaken to further understand the reasons behind the negative perceptions. In the ensuring focus group discussion, students expressed their frustrations at not being given the necessary support that would improve their impression of MOODLE. A detailed analysis of the responses from the focus group discussion revealed some key themes. These were;

1. The lack of management support of MOODLE usage. This theme highlighted the need for decisive leadership in the infusion of MOODLE. Sub-themes that emerged were Leadership Engagement and Training Support for both lecturers and students. Overall, students noted the need for management to commit itself to addressing issues around the use of MOODLE, including having in place policies to guide lecturers on how they ought to respond to MOODLE-related challenges. Students also noted the need for continuous training initiatives, aimed at lecturers and students.
2. Technical issues with MOODLE, with sub-themes being system reliability and usability issues of MOODLE. Students highlighted that the MOODLE system was usually unreliable. Whilst it may be understood that other issues result from the current state of the country's telecommunication network, they noted that there was a need for more interventions aimed at improving the service offered by MOODLE. Furthermore, they also noted that MOODLE was not necessarily user friendly, even suggesting that students like themselves be engaged and be involved in the re-design of MOODLE to make it more appealing and relevant to their age-mates.
3. Another theme that emerged was the user experience with MOODLE and sub-theme here was the relationship students had with the learning management system leaders, be they administration or lecturers. Students highlighted their negative experiences with MOODLE, most negative experiences stemming from assessments undertaken on MOODLE. Students had experienced negative outcomes either due to network issues or system issues. There were also concerns that most of the time lecturers also contributed in the sense that they [lecturers] were not considerate when students faced these challenges.

8.2.3 What are the effects of these activities on the infusion process?

The results suggest that identification, mobilization efforts, and removal of barriers, have a significant effect on the infusion of MOODLE. Motivation did not have any significant effect on infusion of MOODLE.

8.2.4 How can social theories contribute to our understanding of the infusion process?

Klandermans' Social Movement Theory offers a valuable lens to analyze the complex dynamics of IS infusion in organisations, affording us the opportunity to understand the social and organizational dynamics involved in the infusion of IS in organisations. By understanding and focusing the factors influencing mobilization, identity, user motivation, and addressing challenges or barriers, it provides us with insights and guidance on how to frame possible strategies and activities aimed at encouraging infusion of the learning management system.

The Legitimation Activity Model, on the other hand, provides a valuable lens for understanding the comprehensive use of systems in organizations. By considering how leaders need to engage in activities that seek to legitimise the technology being implemented, the LAM allows us to understand the social and organizational factors at play, and helps us move beyond a purely technical perspective and delve deeper into the complex dynamics that shape successful system infusion. While limitations exist, it remains a useful tool for researchers, practitioners, and policymakers looking to optimize the way systems are integrated and ultimately embraced within organizations. The LAM allows us to understand that infusion is not a destination but a continuous process that results in continuous configurations which have to be well and consistently managed so they embed the technology into the core processes that the technology has been implemented to support.

8.3 Key implications of findings

The study revealed that the infusion of learning management systems is not just a technical process confined to the technology. There are other social issues that can be manipulated or need careful attention to ensure successful infusion. Management needs to put in place activities that are interactive with the intended targets and allow for feedback.

Further research may be necessary to help categories activities into frameworks like the Social Movement Theory. This would help university administration have an idea on what activities to use for particular objectives.

The results also offer insights on what students expect from leaders of learning management systems implementers, if comprehensive use is to be achieved. Of significance is the need for commitment to the cause. Learning Management Systems are a very relevant and practical tool, it is the contextual issues that crop up that can derail their infusion.

Overall, the results suggest that we do best to consider the infusion of technology and the learning management system in particular, in its holistic form. Not only focused on the technology itself but the other non-technical issues, such as our ability to mobilize the potential users, to motivate them to embrace the technology, and to remove barriers that may be hindering users from embracing the technology.

In the next section I will discuss the key contributions that this study makes.

8.4 Contributions of the study

This research study delves into the complexities of leading Learning Management System (LMS) infusion within a higher education context. Its contributions extend across various spheres, including theory, academia, practice, and the specific setting of the study. In a nutshell, the study makes the following contributions;

8.4.1 Contribution to theory

The study breaks new ground by operationalizing a social theory into quantifiable variables suitable for empirical testing. This paves the way for further refining of these variables, enabling researchers to bridge the gap between social constructs and measurable phenomena. This advancement can significantly enrich existing social theories within the information systems domain, particularly those exploring technology infusion in educational settings.

Secondly, the study presents a parsimonious theory to test the effects of management activities on the infusion process. Future researchers can build from this and provide more insights on how organisations can infuse information systems within their settings.

8.4.2 Contribution to Academia

The study offers a combined understanding of the activities, perceptions, and motivations surrounding LMS infusion in higher education. By unpacking the multi-dimensional nature of this process, the research contributes to the growing body of knowledge on technology integration in educational institutions. This deeper understanding can inform future research directions and guide the development of more effective LMS infusion strategies.

Likewise, the study's reference to Klanderman's Social Movement Theory, the research shows the potential of engagements between information systems researchers, educational theorists, and social scientists to develop a more holistic understanding of LMS infusion, as Owlikowski & Iacona's (2001) seminal work on the IT artefact rightly acknowledged the social, political, and economic dimensions of technology integration.

8.4.3 Contribution to Practice

The study provides valuable insights for leaders spearheading LMS implementation efforts. By identifying key concerns related to the various aspects of the process, the research equips leaders with a comprehensive guide to addressing challenges and optimizing the infusion process. Additionally, the study's findings on student perceptions offer valuable guidance for tailoring communication and support strategies towards the targeted group as one attempts to promote user engagement with the LMS.

Furthermore, the in-depth analysis of the existing activities, their perceived effectiveness, and underlying motivations provides valuable context-specific guidance for the studied institution. This information allows for targeted interventions and adjustments to existing practices, leading to a more effective and sustainable LMS infusion approach.

8.4.4 Contribution to the Context of the Study

The study shines a light on the previously unseen dynamics underlying LMS infusion within the University of Eswatini. This comprehensive analysis empowers the institution to make informed decisions about future technology integration efforts, tailoring them to address the specific needs and challenges of their unique context.

Finally, by providing a comprehensive understanding of the concerns and motivations of the two key stakeholders – being administrators and students, the research can be used to facilitate communication and collaboration between the two, as well as lecturers. This increased level of engagement can lead to a more inclusive and successful LMS infusion process.

8.4.5 Further Considerations and Future Research:

In conclusion, this research study offers a valuable contribution to understanding and leading LMS infusion in higher education. Its findings have the potential to inform theory, academia, practice, and the specific context of the study, paving the way for more effective and sustainable technology integration within educational institutions.

In the next section I shall highlight some of the limitations of this study.

8.5 Limitations of this study

While the study makes valuable contributions, it is important to acknowledge some limitations and potential avenues for future research. For instance, parts of the study were correlational and cross-sectional and as such the responses were obtained at one point in time. This presents a limitation for the establishment of causality because no time-based precedence can be confirmed.

This cross-sectional nature of the study also presents a limitation as there was a significant time gap between data gathering and eventual publication of the results. Given certain aspects of the phenomenon that was being explored, such as perceptions, this time gap may be important. This is because the perceptions, especially of the student respondents, may have now changed.

Secondly, the study's findings might not be generalisable to all higher education contexts due to inherent differences in institutional cultures and structures. The university that was used as a case study is a state institution, funded wholly through government subvention. As such one of its limitations could be the lack of financial resources to engage at the level it may be aware it needs to engage at. As such, a different institution with more financial resources may be able to address many of the issues that have been highlighted by the study.

Thirdly, the research could benefit from a longitudinal approach to track the long-term impact of the LMS infusion on student learning outcomes and institutional practices. Future research could also explore the effectiveness of specific interventions designed to address the identified concerns and enhance user adoption.

Finally, there is a possibility of subjective responses by key informants. This was partially addressed by using two management respondents, in an attempt to reduce common method bias. However, data collected from self-reports tend to be subjective, compared to objective data. This is much the case in subjective measures such as how they would rate the effectiveness of their efforts / activities, whose data was gathered from management rather than from the students themselves.

Having looked at the limitations of the study, I shall present my recommendations for future research.

8.6 Future research recommendations

Future researchers should consider replicating this study in diverse contexts. While this study focused on a university wholly funded by the government and operating in a third-world country, future research could yield valuable insights by examining institutions in developed countries, or universities privately funded within the developing countries. This comparative approach could highlight contextual differences and similarities in the implementation and impact of learning management systems (LMS).

Moreover, this study introduced a revised theoretical model that future researchers may want to empirically test. Validating this model across various settings would enhance its generalisability and applicability, providing a more robust framework for understanding LMS infusion in higher education.

Furthermore, this study operationalized concepts from social movements. This framework gives leaders of higher institutions a guide on how to categorise the activities they put in place. It will be of interest to find out what other higher institution leaders put in place as activities to infuse LMS in their institutions.

A longitudinal study is also recommended to address one of the limitations of this study. Such an approach would offer deeper insights into the specific activities that management can undertake to foster LMS infusion. Given that LMS infusion evolves over time, with its levels dynamically changing within an organisation, a longitudinal study could reveal how different management actions influence these changes. This dynamic perspective would be invaluable for developing strategies that support continuous improvement in LMS implementation.

Additionally, more qualitative studies exploring the lived experiences of students subjected to online assessment practices, particularly in developing countries, would be beneficial. Understanding the impact of online assessments on student stress, academic performance, and overall well-being could provide a more comprehensive view of the challenges and benefits associated with LMS. Such studies could inform the design of more effective and supportive online learning environments.

8.7 Conclusion

As I conclude, I note the following - the demand for higher education will continue to rise. Constraints such as space and financial resources will continue to be more pronounced. Learning management systems therefore offer a huge opportunity for universities to continue providing their core business, albeit the above-mentioned constraints.

This study contributes to our understanding of the journey towards LMS infusion into student learning-related activities. Through this thesis I also make my contribution to this journey.

9. References

1. Abdullah, M., & Ali, N. A. A. (2016). E-learning standards. In Communication, management and information technology (pp. 653–662). CRC Press.
2. Adam, L. (2003). Information and communication technologies in higher education in Africa: Initiatives and challenges. Journal of Higher Education in Africa, 1(1), 195–221.
3. Adhikari, D., Jiang, W., Zhan, J., He, Z., Rawat, D. B., Aickelin, U., & Khorshidi, H. A. (2022). A comprehensive survey on imputation of missing data in Internet of Things. ACM Computing Surveys, 55(7), 1–38.
4. Adi Badiozaman, I. F., Mung Ling, V., & Ng, A. (2024). University students' experiences and reflection on their transition to HyFlex learning during post-COVID times. Journal of Educational Technology Systems, 52(3), 00472395231226407.
5. Adi Badiozaman, I. F., Ng, A., & Mung Ling, V. (2024). "Here we go again": Unfolding HE students' hybrid experience and resilience during post-COVID times. Asia Pacific Journal of Education. Advance online publication.
6. Adnan, F. A., Jamaludin, K. R., Wan Muhamad, W. Z. A., & Miskon, S. (2022). A review of the current publication trends on missing data imputation over three decades: Direction and future research. Neural Computing and Applications, 34(21), 18325–18340.
7. Aggarwal, K., Akhtar, N., & Mallick, H. (2021). Sleep quality mediates the relationship between risk of obstructive sleep apnea and acute stress in young adults. medRxiv. https://doi.org/10.1101/2021.03.
8. Aggarwal, K. K., Singh, Y., Kaur, A., & Malhotra, R. (2006). Empirical study of object-oriented metrics. Journal of Object Technology, 5(8), 149–173.
9. Aguinis, H., Gottfredson, R. K., & Joo, H. (2013). Best-practice recommendations for defining, identifying, and handling outliers. Organizational Research Methods, 16(2), 270–301. https://doi.org/10.1177/1094428112470848
10. Ain, N., Kaur, K., & Waheed, M. (2016). The influence of learning value on learning management system use: An extension of UTAUT2. Information Development, 32(5), 1306–1321.
11. Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Prentice-Hall.
12. Akhter, S. (2022). Key informants' interviews. In Principles of social research methodology (pp. 389–403). Springer Nature Singapore.

13. Albalawi, F. (2020). Overcoming the digital divide: Implementing ICT learning in Al-Ula district [Doctoral dissertation, University of Arizona]. ProQuest Dissertations Publishing.
14. Albanna, H., Alalwan, A. A., & Al-Emran, M. (2022). An integrated model for using social media applications in non-profit organizations. International Journal of Information Management, 63, 102452.
15. Alharahsheh, H., & Pius, A. (2020). A review of key paradigms: Positivism vs interpretivism. Global Academic Journal of Humanities and Social Sciences, 2(3), 39–43.
16. Alharbi, S., & Drew, S. (2014). Using the technology acceptance model in understanding academics' behavioural intention to use learning management systems. International Journal of Advanced Computer Science and Applications, 5(1), 143–155.
17. Alkhateeb, M. A., & Abdalla, R. A. (2021). Factors influencing student satisfaction towards using learning management system MOODLE. International Journal of Information and Communication Technology Education, 17(1), 138–153.
18. Aparicio, M., Bacao, F., & Oliveira, T. (2016). An e-learning theoretical framework. Journal of Educational Technology & Society, 19(1), 292–307.
19. Arkorful, V., & Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. International Journal of Instructional Technology and Distance Learning, 12(1), 29–42.
20. Ash, J. (1997). Organizational factors that influence information technology diffusion in academic health sciences centers. Journal of the American Medical Informatics Association, 4(2), 102–111.
21. Asmussen, C. B., & Møller, C. (2020). Enabling supply chain analytics for enterprise information systems: A topic modelling literature review and future research agenda. Enterprise Information Systems, 14(5), 563–610.
22. Austin, P. C., White, I. R., Lee, D. S., & van Buuren, S. (2021). Missing data in clinical research: A tutorial on multiple imputation. Canadian Journal of Cardiology, 37(9), 1322–1331.
23. Babbie, E. (1999). The basics of social research. Wadsworth.
24. Baltar, C. (2023). Using principal component regression analysis to explore professional competence of mathematics teachers. Journal of Education and Innovation, 25(1), 335–346.
25. Bandalos, D. L., & Finney, S. J. (2018). Factor analysis: Exploratory and confirmatory. In The reviewer's guide to quantitative methods in the social sciences (pp. 98–122). Routledge.
26. Bandalos, D. L., Finney, S. J., Hancock, G. R., & Mueller, R. O. (2010). The reviewer's guide to quantitative methods in the social sciences. Routledge.

27. Bandara, W., Furtmueller, E., Gorbacheva, E., Miskon, S., & Beekhuyzen, J. (2015). Achieving rigor in literature reviews: Insights from qualitative data analysis and tool-support. Communications of the Association for Information Systems, 37(1), 8.
28. Basdevant, O., Benicio, D., Mircheva, B., Mongardini, J., Verdier, G., Yang, S., & Zanna, L. F. (2011). The design of fiscal adjustment strategies in Botswana, Lesotho, Namibia, and Swaziland. IMF Working Papers, 11(1), 1–38.
29. Basias, N., & Pollalis, Y. (2018). Quantitative and qualitative research in business and technology: Justifying a suitable research methodology. Review of Integrative Business and Economics Research, 7, 91–105.
30. Baturay, M. H. (2015). An overview of the world of MOOCs. Procedia-Social and Behavioral Sciences, 174, 427–433.
31. Beaudry, A., & Pinsonneault, A. (1999). Advancing the theory of infusion: An appropriation model of the infusion process. Cahier du GreSI.
32. Ben Youssef, A., Dahmani, M., & Ragni, L. (2022). ICT use, digital skills and students' academic performance: Exploring the digital divide. Information, 13(3), 129.
33. Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. MIS Quarterly, 11(3), 369–386.
34. Berger, R. (2015). Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. Qualitative Research, 15(2), 219–234.
35. Bhattacherjee, A. (2012). Social science research: Principles, methods, and practices.
36. Binyamin, S. S., Rutter, M. J., & Smith, S. (2019). Extending the technology acceptance model to understand students' use of learning management systems in Saudi higher education. International Journal of Emerging Technologies in Learning, 14(3).
37. Biresselioglu, M. E., Demir, M. H., Kaplan, M. D., & Solak, B. (2020). Individuals, collectives, and energy transition: Analysing the motivators and barriers of European decarbonisation. Energy Research & Social Science, 66, 101493.
38. Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member checking: A tool to enhance trustworthiness or merely a nod to validation? Qualitative Health Research, 26(13), 1802–1811.
39. Blumenthal, D., & Tavenner, M. (2010). The "meaningful use" regulation for electronic health records. New England Journal of Medicine, 363(6), 501–504. https://doi.org/10.1056/NEJMp1006114

40. Boggs, C., & Van Baalen-Wood, M. (2018). Diffusing change: Implementing a university-wide learning management system transition at a public university. In Leading and managing e-learning (pp. 115–128). Springer.
41. Bogna, F., Raineri, A., & Dell, G. (2020). Critical realism and constructivism: Merging research paradigms for a deeper qualitative study. Qualitative Research in Organizations and Management, 15(4), 461–484.
42. Bradley, N. (1999). Sampling for internet surveys: An examination of respondent selection for internet research. Journal of the Market Research Society, 41(4), 387–395.
43. Brown, S. A., Massey, A. P., Montoya-Weiss, M. M., & Burkman, J. R. (2002). Do I really have to? User acceptance of mandated technology. European Journal of Information Systems, 11(4), 283–295.
44. Bryman, A. (1984). The debate about quantitative and qualitative research: A question of method or epistemology? British Journal of Sociology, 35(1), 75–92.
45. Carter, M., & Grover, V. (2015). Me, myself, and I(T). MIS Quarterly, 39(4), 931–958.
46. Cavus, N., Mohammed, Y. B., & Yakubu, M. N. (2021). Determinants of learning management systems during COVID-19 pandemic for sustainable education. Sustainability, 13(9), 5189.
47. Christensen, G., Steinmetz, A., Alcorn, B., Bennett, A., Woods, D., & Emanuel, E. J. (2013). The MOOC phenomenon: Who takes massive open online courses and why? SSRN Electronic Journal.
48. Chung, E., Subramaniam, G., & Dass, L. C. (2020). Online learning readiness among university students in Malaysia amidst COVID-19. Asian Journal of University Education, 16(2), 46–58.
49. Claar, C., Portolese Dias, L., & Shields, R. (2014). Student acceptance of learning management systems: A study on demographics. Issues in Information Systems, 15(1).
50. Coates, H., James, R., & Baldwin, G. (2005). A critical examination of the effects of learning management systems on university teaching and learning. Tertiary Education and Management, 11(1), 19–36.
51. Cohen, J. (2013). Statistical power analysis for the behavioral sciences. Routledge.
52. Cohen, L., Manion, L., & Morrison, K. (2000). Action research. In Research methods in education (5th ed., pp. 226–244). RoutledgeFalmer.
53. Cooper, R. B., & Zmud, R. W. (1990). Information technology implementation research: A technological diffusion approach. Management Science, 36(2), 123–139.
54. Cossham, A., & Johanson, G. (2019). The benefits and limitations of using key informants in library and information studies research. Information Research, 24(3).

55. Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Practical Assessment, Research, and Evaluation, 10(7), 1–9.
56. Creswell, J. W. (2003). Research design: Qualitative, quantitative, and mixed methods approaches (2nd ed.). Sage.
57. Creswell, J. W. (2009). Research design: Qualitative, quantitative, and mixed methods approaches (3rd ed.). Sage.
58. Creswell, J. W. (2013). Steps in conducting a scholarly mixed methods study. DBER Speaker Series, 48, 1–54.
59. Cummings, P. (2013). Missing data and multiple imputation. JAMA Pediatrics, 167(7), 656–661.
60. Dabbagh, N. (2005). Pedagogical models for e-learning: A theory-based design framework. International Journal of Technology in Teaching and Learning, 1(1), 25–44.
61. Dagger, D., Wade, V., & Conlan, O. (2002). Towards a standards-based approach to e-learning personalization using reusable learning objects. In Proceedings of E-Learn 2002 (pp. 210–217). AACE.
62. Damsgaard, J., & Scheepers, R. (1999). A stage model of intranet technology implementation and management. In Proceedings of the European Conference on Information Systems (pp. 99–116).
63. Dar, I. B., Khan, M. B., Shafiq, M., & Ali, M. (2021). Marketing analytics capability and ERP systems implementation: Theoretical framework and case study. Journal of Contemporary Issues in Business and Government, 27(1), 4137–4150.
64. Darke, P., Shanks, G., & Broadbent, M. (1998). Successfully completing case study research: Combining rigour, relevance and pragmatism. Information Systems Journal, 8(4), 273–289.
65. De Smet, C., Valcke, M., Schellens, T., De Wever, B., & Vanderlinde, R. (2016). A qualitative study on learning and teaching with learning paths in a learning management system. Journal of Social Science Education, 15(1), 27–37.
66. Dias, S. B., & Diniz, J. A. (2014). Towards an enhanced learning management system for blended learning in higher education incorporating distinct learners' profiles. Journal of Educational Technology & Society, 17(1), 307–319.
67. Dlamini, R., & Coleman, E. (2017). Guest editorial: ICT in education. South African Computer Journal, 29(2), i–iv.

68. Dobre, I. (2015). Learning management systems for higher education—An overview of available options for higher education organizations. Procedia-Social and Behavioral Sciences, 180, 313–320.
69. Donnelly, C., Janssen, A., Shah, K., Harnett, P., Vinod, S., & Shaw, T. J. (2023). Qualitative study of international key informants' perspectives on the current and future state of healthcare quality measurement and feedback. BMJ Open, 13(6), e073697.
70. Dube, B. (2020). Rural online learning in the context of COVID-19 in South Africa: Evoking an inclusive education approach. REMIE: Multidisciplinary Journal of Educational Research, 10(2), 135–157.
71. Eder, L. B., & Igbaria, M. (2001). Determinants of intranet diffusion and infusion. Omega, 29(3), 233–242.
72. Engeström, Y. (1999). Activity theory and individual and social transformation. In Y. Engeström, R. Miettinen, & R.-L. Punamäki (Eds.), Perspectives on activity theory (pp. 19–38). Cambridge University Press.
73. Erkayman, B., Khorshidi, M., & Usanmaz, B. (2018). An integrated fuzzy approach for ERP deployment strategy selection under conflicting criteria. Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi, 32(3), 807–823.
74. Escobar-Rodriguez, T., Escobar-Pérez, B., & Monge-Lozano, P. (2014). Technical and organisational aspects in enterprise resource planning systems implementation: Lessons from a Spanish public hospital. Enterprise Information Systems, 8(5), 533–562.
75. Etikan, I., & Bala, K. (2017). Sampling and sampling methods. Biometrics & Biostatistics International Journal, 5(6), 00149.
76. Faden, R. R., Beauchamp, T. L., & Kass, N. E. (2014). Informed consent, comparative effectiveness, and learning health care. New England Journal of Medicine, 370(8), 766–768.
77. Fageeh, A. I. (2011). EFL students' readiness for e-learning: Factors influencing e-learners' acceptance of the Blackboard in a Saudi university. The JALT CALL Journal, 7(1), 19–42.
78. Fazlıoğulları, O. (2012). Scientific research paradigms in social sciences. International Journal of Educational Policies, 6(1), 41–55.
79. Ferketich, S. (1990). Internal consistency estimates of reliability. Research in Nursing & Health, 13(6), 437–440.
80. Flatt, C., & Jacobs, R. L. (2019). Principle assumptions of regression analysis: Testing, techniques, and statistical reporting of imperfect data sets. Advances in Developing Human Resources, 21(4), 484–502.

81. Flynn, D., & Du, Y. (2012). A case study of the legitimation process undertaken to gain support for an information system in a Chinese university. European Journal of Information Systems, 21(3), 212–228.
82. Flynn, D., & Hussain, Z. (2004). Seeking legitimation for an information system: A preliminary process model. In Proceedings of the European Conference on Information Systems (p. 27).
83. Francom, G. M. (2020). Barriers to technology integration: A time-series survey study. Journal of Research on Technology in Education, 52(1), 1–16.
84. Garson, G. D. (2012). Testing statistical assumptions. Statistical Associates Publishing.
85. Geiger, R. (2015). Impact of the financial crisis on higher education in the United States. International Higher Education, 59, 5–7.
86. Glen, S. (2016). Kaiser-Meyer-Olkin (KMO) test for sampling adequacy. Statistics How To. https://www.statisticshowto.com/kaiser-meyer-olkin/
87. González-Pernía, J. L., Guerrero, M., & Jung, A. (2018). Economic recession shake-out and entrepreneurship: Evidence from Spain. BRQ Business Research Quarterly, 21(3), 153–167.
88. Govindasamy, T. (2002). Successful implementation of e-learning: Pedagogical considerations. The Internet and Higher Education, 4(3–4), 287–299.
89. Grajales, C. (2013). Assumptions of multiple regression: Correcting two misconceptions. Practical Assessment, Research & Evaluation, 18(11), 1–14.
90. Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. Educational Evaluation and Policy Analysis, 11(3), 255–274.
91. Gregor, S. (2006). The nature of theory in information systems. MIS Quarterly, 30(3), 611–642.
92. Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research (pp. 105–117). Sage.
93. Gupta, N., Shaw, J. D., & Delery, J. E. (2000). Correlates of response outcomes among organizational key informants. Organizational Research Methods, 3(4), 323–347.
94. Guraya, S. S., Harkin, D. W., Yusoff, M. S. B., & Guraya, S. Y. (2023). Paradigms unfolded—Developing, validating, and evaluating the medical education e-professionalism framework from a philosophical perspective. Frontiers in Medicine, 10, 1230620.
95. Hagerty, B. M., Lynch-Sauer, J., Patusky, K. L., Bouwsema, M., & Collier, P. (1992). Sense of belonging: A vital mental health concept. Archives of Psychiatric Nursing, 6(3), 172–177.
96. Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Multivariate data analysis (6th ed.). Pearson Prentice Hall.
97. Hair, J. F. (2009). Multivariate data analysis (7th ed.). Prentice Hall.

98. Hair, J. F., Gabriel, M. L. D. S., da Silva, D., & Braga Junior, S. (2019). Development and validation of attitudes measurement scales: Fundamental and practical aspects. RAUSP Management Journal, 54(4), 490–507. https://doi.org/10.1108/RAUSP-05-2019-0098
99. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2–24.
100. Hamid, Z., Bisschoff, C., & Botha, C. (2015). An analysis of the Swaziland public educational environment and its role-players. Problems and Perspectives in Management, 13(2), 129–142.
101. Harrell, F. E., Jr. (2015). Regression modeling strategies: With applications to linear models, logistic and ordinal regression, and survival analysis (2nd ed.). Springer.
102. Henderson, M., Selwyn, N., & Aston, R. (2015). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. Studies in Higher Education, 42(8), 1567–1579.
103. Heylighen, F., Kostov, I., & Kiemen, M. (2013). Mobilization systems: Technologies for motivating and coordinating human action. In The new development paradigm: Education, knowledge economy and digital futures (pp. 1–20). Routledge.
104. Heymans, M. W., & Twisk, J. W. (2022). Handling missing data in clinical research. Journal of Clinical Epidemiology, 151, 185–188.
105. Higgins, A., Vidolov, S., Frößler, F., & Mullaney, D. (2008). IFIP international federation for information processing, volume 287, open IT-based innovation: Moving towards cooperative IT transfer and knowledge diffusion. In G. León, A. Bernardos, J. Casar, K. Kautz, & J. DeGross (Eds.), Open IT-based innovation (pp. 197–209). Springer.
106. Hiidenhovi, H., Laippala, P., & Nojonen, K. (2001). Development of a patient-orientated instrument to measure service quality in outpatient departments. Journal of Advanced Nursing, 34(5), 696–705.
107. Hirschheim, R. (1992). Information systems epistemology: An historical perspective. In R. Galliers (Ed.), Information systems research: Issues, methods and practical guidelines (pp. 39–58). Blackwell Scientific.
108. Hovorka, D. S., & Lee, A. S. (2010). Reframing interpretivism and positivism as understanding and explanation: Consequences for information systems research. In Proceedings of the International Conference on Information Systems (p. 188).
109. Hsu, P. S. (2016). Examining current beliefs, practices and barriers about technology integration: A case study. TechTrends, 60(1), 30–40.

110. Hussain, Z., Taylor, A., & Flynn, D. (2004). A case study of the process of achieving legitimation in information systems development. Journal of Information Science, 30(5), 408–417.
111. Instructional Management Systems Global Consortium. (n.d.). Homepage. https://www.imsglobal.org/
112. Islam, A. N., & Azad, N. (2015). Satisfaction and continuance with a learning management system: Comparing perceptions of educators and students. The International Journal of Information and Learning Technology, 32(2), 109–123.
113. Jaja, I. R., Idoniboye, O., & Amadi, C. C. (2022). A critique of the positivist paradigm in human sciences. International Journal of Research and Innovation in Social Science, 6(3), 224–229.
114. Jha, A. K., DesRoches, C. M., Campbell, E. G., Donelan, K., Rao, S. R., Ferris, T. G., Shields, A., Rosenbaum, S., & Blumenthal, D. (2009). Use of electronic health records in U.S. hospitals. New England Journal of Medicine, 360(16), 1628–1638.
115. Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. Educational Researcher, 33(7), 14–26.
116. Jones, L., Barnett, A., & Vagenas, D. (2025). Common misconceptions held by health researchers when interpreting linear regression assumptions, a cross-sectional study. PLoS ONE, 20(6), e0299617.
117. Joo, J., & Shin, M. M. (2020). Resolving the tension between full utilization of contact tracing app services and user stress as an effort to control the COVID-19 pandemic. Service Business, 14(3), 461–478. https://doi.org/10.1007/s11628-020-00424-7
118. Junjie, M., & Yingxin, M. (2022). The discussions of positivism and interpretivism. Online Submission, 4(1), 10–14.
119. Kang, H. (2013). A guide on the use of factor analysis in the assessment of construct validity. Journal of Korean Academy of Nursing, 43(5), 587–594.
120. Karanja, E., Zaveri, J., & Ahmed, A. (2013). How do MIS researchers handle missing data in survey-based research: A content analysis approach. International Journal of Information Management, 33(5), 734–751.
121. Karimikia, H., Safari, N., & Singh, H. (2020). Being useful: How information systems professionals influence the use of information systems in enterprises. Information Systems Frontiers, 22(2), 429–453.
122. Kelly, C., & Breinlinger, S. (1996). The social psychology of collective action: Identity, injustice and gender. Taylor & Francis.

123. Kelly, M., Dowling, M., & Millar, M. (2018). The search for understanding: The role of paradigms. Nurse Researcher, 25(4), 9–13.
124. Kim, H. W., & Gupta, S. (2014). A user empowerment approach to information systems infusion. IEEE Transactions on Engineering Management, 61(4), 656–668.
125. Kim, H. W., Chan, H. C., & Gupta, S. (2016). Examining information systems infusion from a user commitment perspective. Information Technology & People, 29(1), 173–199.
126. Kimmons, R. (2022). Mixed methods. Educational Researcher, 63(5), 631–641.
127. Kivunja, C., & Kuyini, A. B. (2017). Understanding and applying research paradigms in educational contexts. International Journal of Higher Education, 6(5), 26–41.
128. Klandermans, B. (1997). The social psychology of protest. Blackwell.
129. Klandermans, B. (1984). Mobilization and participation: Social psychological expansions of resource mobilization theory. American Sociological Review, 49(5), 583–600.
130. Klandermans, B., & Oegema, D. (1987). Potentials, networks, motivations, and barriers: Steps towards participation in social movements. American Sociological Review, 52(4), 519–531.
131. Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. Computers & Education, 59(4), 1109–1121.
132. Kraemer, K. L., Dedrick, J., Melville, N., & Zhu, K. (2006). Global e-commerce: Impacts of national environments and policy. Cambridge University Press.
133. Kroeze, J. H. (2012). Interpretivism in IS—A postmodernist (or postpositivist?) knowledge theory. South African Computer Journal, 49(1), 32–39.
134. Kruger, D., Inman, S., Ding, Z., Kang, Y., Kuna, P., Liu, Y., ... & Wang, Y. (2015). Improving teacher effectiveness: Designing better assessment tools in learning management systems. Future Internet, 7(4), 484–499.
135. Kumar, N., Stern, L. W., & Anderson, J. C. (1993). Conducting interorganizational research using key informants. Academy of Management Journal, 36(6), 1633–1651.
136. Lakshman, M., Sinha, L., Biswas, M., Charles, M., & Arora, N. K. (2000). Quantitative vs qualitative research methods. The Indian Journal of Pediatrics, 67(5), 369–377.
137. Lam, P., Lo, J., Lee, J., & McNaught, C. (2012). Evaluations of online learning activities based on LMS logs. In Higher education institutions and learning management systems: Adoption and standardization (pp. 75–93). IGI Global.
138. Lee, A. S. (1991). Integrating positivist and interpretive approaches to organizational research. Organization Science, 2(4), 342–365.

139. Lin, H. F. (2008). Determinants of successful virtual communities: Contributions from system characteristics and social factors. Information & Management, 45(8), 522–527.
140. Lin, W. C., & Tsai, C. F. (2020). Missing value imputation: A review and analysis of the literature (2006–2017). Artificial Intelligence Review, 53(2), 1487–1509.
141. Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. Sage.
142. Little, R. J., & Rubin, D. B. (2019). Statistical analysis with missing data (3rd ed.). Wiley.
143. Lonn, S., & Teasley, S. D. (2009). Saving time or innovating practice: Investigating perceptions and uses of learning management systems. Computers & Education, 53(3), 686–694.
144. MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. Psychological Methods, 4(1), 84–99.
145. Macharia, J. K. N., & Pelser, T. G. (2014). Key factors that influence the diffusion and infusion of information and communication technologies in Kenyan higher education. Studies in Higher Education, 39(4), 695–709. https://doi.org/10.1080/03075079.2012.729033
146. Mafusire, A. (2015). Assessing Swaziland's fiscal sustainability and policy options. Economics Research International, 2015, 1–10.
147. Makumane, M. A., & Mpungose, C. B. (2022). Digital divide: Secondary school learners' experiences of using educational technologies. Alternation, 29(1), 1–22.
148. Manti, S., & Licari, A. (2018). How to obtain informed consent for research. Breathe, 14(2), 145–152.
149. Maphalala, M. C., & Adigun, O. T. (2021). Academics' experience of implementing e-learning in a South African higher education institution. International Journal of Higher Education, 10(1), 1–13.
150. Marshall, M. N. (1996). The key informant technique. Family Practice, 13(1), 92–97.
151. Mason, R., & Rennie, F. (2006). E-learning: The key concepts. Routledge.
152. Migiro, S. O., & Magangi, B. A. (2011). Mixed methods: A review of literature and the future of the new research paradigm. African Journal of Business Management, 5(10), 3757–3764.
153. Miles, M. B., & Huberman, A. M. (1984). Qualitative data analysis: A sourcebook of new methods. Sage
154. Mishra, A. N., Anderson, C., Angst, C. M., & Agarwal, R. (2012). Electronic health records assimilation and physician identity evolution: An identity theory perspective. Information Systems Research, 23(3-part-1), 738–760.
155. Mitchell, M., Palacios, V., & Leachman, M. (2015). States are still funding higher education below pre-recession levels. Journal of Collective Bargaining in the Academy, 10, 71.

156. Miyazoe, T., & Anderson, T. (2013). Interaction equivalency in an OER, MOOCS and informal learning era. International Review of Research in Open and Distributed Learning, 14(4), 167-184.

157. Mohamed, M., Higgins, C., Ferguson, M., & Kanaroglou, P. (2016). Identifying and characterizing potential electric vehicle adopters in Canada: A two-stage modelling approach. Transport Policy, 52, 100–112.

158. Mpungose, C. B. (2024). Digital skills: Academics at a South African university in post-COVID-19 era. South African Journal of Higher Education, 38(3), 176–192.

159. Mtebe, J. (2015). Learning management system success: Increasing learning management system usage in higher education in Sub-Saharan Africa. International Journal of Education and Development using ICT, 11(2).

160. Muth, L., & Peter, C. (2023). Social media influencers' role in shaping political opinions and actions of young audiences. Media and Communication, 11(3), 164–174.

161. Myers, M. D. (1999). Investigating information systems with ethnographic research. Communications of the Association for Information Systems, 2(1), 23.

162. Myers, M. D. (2019). Qualitative research in business and management. Sage.

163. Ndzinisa, N., & Dlamini, R. (2022). Responsiveness vs. accessibility: Pandemic-driven shift to remote teaching and online learning. Higher Education Research and Development, 41(7), 2262–2277.

164. Ndzinisa, N., Mthembu, M. V., & Nsibande, G. N. (in press). Exploring academic readiness for ICT integration pedagogy at the University of Eswatini. In Higher education ICT integration in Africa (pp. 121–139). Routledge.

165. Neill, J. W., & Johnson, D. E. (1984). Testing for lack of fit in regression—a review. Communications in Statistics—Theory and Methods, 13(4), 485–511.

166. Ng'ambi, D., & Rambe, P. (2008). Barriers to students' use of electronic resources during lectures. South African Computer Journal, 12(1), 47–53.

167. Ng'ambi, D., Brown, C., Bozalek, V., Gachago, D., & Wood, D. (2016). Technology enhanced teaching and learning in South African higher education—A rearview of a 20 year journey. British Journal of Educational Technology, 47(5), 843–858.

168. Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. Review of General Psychology, 2(2), 175–220.

169. Niermann, S. (2007). Testing for linearity in simple regression models. AStA Advances in Statistical Analysis, 91(2), 129–139.

170. O'Connor, Y., & O'Reilly, P. (2018). Examining the infusion of mobile technology by healthcare practitioners in a hospital setting. Information Systems Frontiers, 20(6), 1297–1317.
171. Oegema, D., & Klandermans, B. (1994). Why social movement sympathizers don't participate: Erosion and non-conversion of support. American Sociological Review, 59(5), 703–722.
172. Oliveira, P. C. D., Cunha, C. J. C. D. A., & Nakayama, M. K. (2016). Learning management systems (LMS) and e-learning management: An integrative review and research agenda. JISTEM-Journal of Information Systems and Technology Management, 13(2), 157–180.
173. Oliver, P. E., & Marwell, G. (1992). Mobilizing technologies for collective action. In A. Morris & C. Mueller (Eds.), Frontiers in social movement theory (pp. 291–308). Yale University Press.
174. Orlikowski, W. J., & Baroudi, J. J. (1989). IS research paradigms: Method versus substance. The Journal of Management Information Systems, 6(4), 5–28.
175. Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. Information Systems Research, 2(1), 1–28.
176. Osborne, J. W., & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. Practical Assessment, Research, & Evaluation, 8(1).
177. Padayachee, V. (2016). Global economic recession: Effects and implications for South Africa at a time of political challenges. Claves de la Economia Mundial, 26, 111–117.
178. Park, S. M., & Hwang, K. T. (2018). A study on the infusion of public administrative information systems: Focusing on the social security information system. Informatization Policy, 25(2), 46–66.
179. Park, Y. S., Konge, L., & Artino, A. R., Jr. (2020). The positivism paradigm of research. Academic Medicine, 95(5), 690–694.
180. Pedroni, J. A., & Pimple, K. D. (2001). A brief introduction to informed consent in research with human subjects. In K. D. Pimple (Ed.), Scientist and subjects: A report on the ethical responsibilities of scientists studying human subjects (pp. 11-18). Poynter Center for the Study of Ethics and American Institutions.
181. Pituch, K. A., & Lee, Y. K. (2006). The influence of system characteristics on e-learning use. Computers & Education, 47(2), 222–244.
182. Pituch, K. A., & Stevens, J. P. (2015). Applied multivariate statistics for the social sciences: Analyses with SAS and IBM's SPSS. Routledge.

183. Preacher, K. J., & Leonardelli, G. J. (2001). Calculation for the Sobel test. Retrieved from http://quantpsy.org

184. Rahman, M. M., Tabash, M. I., Salamzadeh, A., Abduli, S., & Rahaman, M. S. (2022). Sampling techniques (probability) for quantitative social science researchers: A conceptual guidelines with examples. Seeu Review, 17(1), 42–51.

185. Ramamurthy, K., Sen, A., & Sinha, A. P. (2008). Data warehousing infusion and organizational effectiveness. IEEE Transactions on Systems, Man, and Cybernetics—Part A: Systems and Humans, 38(4), 976–994.

186. Rashid, Y., Rashid, A., Warraich, M. A., Sabir, S. S., & Waseem, A. (2019). Case study method: A step-by-step guide for business researchers. International Journal of Qualitative Methods, 18, 1–11.

187. 187. Reese, H. W., & Fremouw, W. J. (1984). Normal and normative ethics in behavioral sciences. American Psychologist, 39(8), 863.

188. 188. Rogers, L., & Newton, L. (2001). Integrated learning systems—an 'open' approach. International Journal of Science Education, 23(4), 405–422.

189. 189. Ross, S. M. (2020). Technology infusion in K-12 classrooms: A retrospective look at three decades of challenges and advancements in research and practice. Education Tech Research Dev, 68, 2003–2020. https://doi.org/10.1007/s11423-020-09756-7

190. 190. Ruiz, J. G., Mintzer, M. J., & Leipzig, R. M. (2006). The impact of e-learning in medical education. Academic Medicine, 81(3), 207–212.

191. Sackstein, S., Matthee, M., & Weilbach, L. (2023). Theories and models employed to understand the use of technology in education: A hermeneutic literature review. Education and Information Technologies, 28(5), 5041–5081.

192. Samarawickrema, G., & Stacey, E. (2007). Adopting Web-based learning and teaching: A case study in higher education. Distance Education, 28(3), 313–333.

193. Saunders, M., Lewis, P., & Thornhill, A. (2012). Research methods for business students. Pearson.

194. Schofield, J. W. (2002). Increasing the generalisability of qualitative research. In A. M. Huberman & M. B. Miles (Eds.), The qualitative researcher's companion (pp. 171–203). Sage Publications.

195. Schunk, D. H., Meece, J. L., & Pintrich, P. R. (2014). Motivation in education: Theory, research, and applications (4th ed.). Pearson.

196. Scotland, J. (2012). Exploring the philosophical underpinnings of research: Relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms. English Language Teaching, 5(9), 9–16.

197. Selwyn, N. (2021). Education and technology: Key issues and debates. Bloomsbury Publishing.

198. Sharma, G. (2017). Pros and cons of different sampling techniques. International Journal of Applied Research, 3(7), 749–752.

199. Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. Education for Information, 22(2), 63–75.

200. Shrestha, N. (2021). Factor analysis as a tool for survey analysis. American Journal of Applied Mathematics and Statistics, 9(1), 4–11.

201. Sierra, J. L., Moreno-Ger, P., Martínez-Ortiz, I., López-Moratalla, J., & Fernández-Manjón, B. (2005). Building learning management systems using IMS standards: Architecture of a manifest driven approach. In P. Kommers & G. Richards (Eds.), International conference on web-based learning (pp. 144–156). Springer.

202. Simon, B., Loewy, M., Stürmer, S., Weber, U., Freytag, P., Habig, C., & Spahlinger, P. (1998). Collective identification and social movement participation. Journal of Personality and Social Psychology, 74(3), 646.

203. Singh, A. S., & Masuku, M. B. (2014). Sampling techniques and determination of sample size in applied statistics research: An overview. International Journal of Economics, Commerce and Management, 2(11), 1–22.

204. Singleton, R., & Straits, B. C. (2005). Approaches to social research (4th ed.). Oxford University Press.

205. Siponen, M., & Tsohou, A. (2018). Demystifying the influential IS legends of positivism. Journal of the Association for Information Systems, 19(7), 1334–1369.

206. Smith, H. W. (1975). Strategies of social research: The methodological imagination. Prentice Hall.

207. Ssekakubo, G., Suleman, H., & Marsden, G. (2011). Issues of adoption: Have e-learning management systems fulfilled their potential in developing countries? In Proceedings of the South African Institute Of Computer Scientists and Information Technologists Conference on Knowledge, Innovation and Leadership in a Diverse, Multidisciplinary Environment (pp. 231–238). ACM.

208. Van Stekelenburg, J., & Klandermans, B. (2009). Social movement theory: Past, present and prospect. In S. Ellis & I. Van Kessel (Eds.), Movers and shakers: Social movements in Africa (Vol. 8, pp. 17–44). Brill.

209. Straub, D., Boudreau, M. C., & Gefen, D. (2004). Validation guidelines for IS positivist research. Communications of the Association for Information Systems, 13(1), 380–427.

210. Straub, E. T. (2009). Understanding technology adoption: Theory and future directions for informal learning. Review of Educational Research, 79(2), 625–649.

211. Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. Academy of Management Review, 20(3), 571–610.

212. Surry, D. W., Ensminger, D. C., & Haab, M. (2005). A model for integrating instructional technology into higher education. British Journal of Educational Technology, 36(2), 327–329.

213. Tamilmani, K., Rana, N. P., Prakasam, N., & Dwivedi, Y. K. (2019). The battle of brain vs. heart: A literature review and meta-analysis of "hedonic motivation" use in UTAUT2. International Journal of Information Management, 46, 222–235.

214. Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. Perioperative Nursing, 7(3), 155–163.

215. Thompson, R. L., Higgins, C., & Howell, J. M. (1991). Personal computing: Toward a conceptual model of utilization. MIS Quarterly, 15(1), 125–143.

216. Tornatzky, L. G., Eveland, J. D., Boylan, M. G., Hetzner, W. A., Johnson, E. C., Roitman, D., & Schneider, J. (1983). The process of technological innovation: Reviewing the literature. National Science Foundation.

217. Tremblay, M.-A. (1982). The key informant technique: A non-ethnographic application. In R. G. Burgess (Ed.), Field research: A sourcebook and field manual (pp. 98–104). Allen and Unwin.

218. Trochim, W. M. (2006). Introduction to validity. Social Research Methods. https://socialresearchmethods.org/kb/validity.php

219. United Nations International Children's Emergency Fund. (2019, March 22). UNICEF Eswatini 2019 National Budget Brief. https://www.unicef.org/esaro/UNICEF-Eswatini-2019-National-Budget-Brief.pdf

220. United Nations. (2019, April 4). Swaziland releases population count from 2017 housing and population census. http://sz.one.un.org/content/unct/swaziland/en/home/news-centre/news/swaziland-releases-population-count-from-2017-housing-and-popula.html

221. University of eSwatini. (2019, March 31). History. http://www.uniswa.sz/uniswainfo/history

222. Van Dijk, J. (2020). The digital divide. John Wiley & Sons.

223. Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. MIS Quarterly, 37(1), 21–54.

224. Venkatesh, V., Brown, S. A., & Sullivan, Y. W. (2016). Guidelines for conducting mixed-methods research: An extension and illustration. Journal of The Association for Information Systems, 17(7), 546–584.

225. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478.

226. University of Eswatini. (2020, May). Vice-Chancellor's report 2018/2019. http://www.uneswa.ac.sz/wp-content/uploads/2020/05/vc-report-2019.pdf

227. Walsham, G. (1995). Interpretive case studies in IS research: Nature and method. European Journal of Information Systems, 4(2), 74–81.

228. Wang, Y., & Chen, N. S. (2009). Criteria for evaluating synchronous learning management systems: Arguments from the distance language classroom. Computer Assisted Language Learning, 22(1), 1–18.

229. Watson, W., & Watson, S. L. (2007). An argument for clarity: What are learning management systems, what are they not, and what should they become? Journal of the Association for Learning Technology, 15(3), 291–305.

230. Wayman, J. C. (2003). Multiple imputation for missing data: What is it and how can I use it? In Annual meeting of the American Educational Research Association, Chicago, IL (Vol. 2, pp. 1–16).

231. Weerasena, A., & Jayathilaka, R. (2023). Is the best option still in low adoption? An investigation on factors affecting the adoption of online school education in rural areas in Sri Lanka. Educational Technology Research and Development, 71(3), 1371–1390.

232. Westen, D., & Rosenthal, R. (2003). Quantifying construct validity: Two simple measures. Journal of Personality and Social Psychology, 84(3), 608–618.

233. Winston, E. R., & Dologite, D. G. (1999). Achieving IT infusion: A conceptual model for small businesses. Information Resources Management Journal, 12(1), 26–38.

234. World Health Organization & World Bank. (2011). World report on disability. WHO Press.

235. Yamane, T. (1967). Statistics: An introductory analysis (2nd ed.). Harper and Row.

236. Yang, S., & Berdine, G. (2016). Outliers. The Southwest Respiratory and Critical Care Chronicles, 4(13), 52–56.

237. Yin, R. K. (1994). Case study research: Design and methods (2nd ed.). Sage.

238. Yueh, H. P., & Hsu, S. (2008). Designing a learning management system to support instruction. Communications of the ACM, 51(4), 59–63.

239. Zhang, S., Gu, M., Sun, W., & Jin, T. (2024). Digital literacy competence, digital literacy practices and teacher identity among pre-service teachers. Journal of Education for Teaching, 50(3), 464–478.

240. Zhang, Z. (2016). Missing data imputation: Focusing on single imputation. Annals of Translational Medicine, 4(1), 9.

241. Zhu, K., Dong, S., Xu, S. X., & Kraemer, K. L. (2006). Innovation diffusion in global contexts: Determinants of post-adoption digital transformation of European companies. European Journal of Information Systems, 15(6), 601–616.

242. Zmud, R. W., & Apple, L. E. (1992). Measuring technology incorporation/infusion. Journal of Product Innovation Management, 9(2), 148–155.

10. Appendices

APPENDIX A – MANAGEMENT QUESTIONNAIRE

This questionnaire solicits information on the actions of Management in the infusion of Learning Management Systems at UNESWA. The overall objective of this questionnaire is to help in data collection for my study that is looking at the collective actions of both Management and Students in the infusion of Learning Management Systems at a Higher Institution. Infusion is defined as the continuous and comprehensive use of the Learning Management System. For UNESWA, the Learning Management System in place is MOODLE.

Kindly take time to look at this questionnaire and respond accordingly.

1. What activities do you, as an institution, undertake to promote student identification with MOODLE i.e. students identifying with the LMS?

_____

_____

_____

2. How would you rate the effectiveness of these activities – 1 being very ineffective; 2 = ineffective; 3= somewhat ineffective; 4 = effectiveness unknown 5= somewhat effective 6 = effective; and 7 being very effective

3. What are the key activities specifically targeting students related to the availability / use of MOODLE at UNESWA?

_____

_____

_____

4. How would you rate the effectiveness of these activities – 1 being very ineffective; 2 = ineffective; 3= somewhat ineffective; 4 = effectiveness unknown 5= somewhat effective 6 = effective; and 7 being very effective

5. What are the key activities aimed at motivating students to use MOODLE at UNESWA?

_____

_____

_____

6. How would you rate the effectiveness of these activities – 1 being very ineffective; 2 = ineffective; 3= somewhat ineffective; 4 = effectiveness unknown 5= somewhat effective 6 = effective; and 7 being very effective

7. What are the key challenges associated *with the availability* of MOODLE at UNESWA?

8. How is UNESWA addressing these challenges?

9. How would you rate the effectiveness of these strategies used to address the challenges identified – 1 being very ineffective; 2 = ineffective; 3= somewhat ineffective; 4 = effectiveness unknown 5= somewhat effective 6 = effective; and 7 being very effective

10. What are the key challenges associated *with the use* of MOODLE at UNESWA?

11. How is UNESWA addressing these challenges?

12. How would you rate the effectiveness of these strategies used to address the challenges identified – 1 being very ineffective; 2 = ineffective; 3= somewhat ineffective; 4 = effectiveness unknown 5= somewhat effective 6 = effective; and 7 being very effective

13. What are the key activities aimed at encouraging students to continue their use of MOODLE?

14. How would you rate the effectiveness of these activities – 1 being very ineffective; 2 = ineffective; 3= somewhat ineffective; 4 = effectiveness unknown 5= somewhat effective 6 = effective; and 7 being very effective

APPENDIX B – STUDENT QUESTIONNAIRE

STUDENT QUESTIONNAIRE [PAPER VERSION]

This questionnaire aims to solicit your opinion on a number of matters related to the MOODLE LMS.

Please tick on the rating you deem most fitting for the following statements on MOODLE.

If you wish to read The Participant Information Sheet, it is available with the person collecting the data.

By filling in the questionnaire you are agreeing to participate in the study.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1. I identify with the students who use MOODLE.							
2. I feel I belong to the group of students that use MOODLE.							
3. I consider myself part of the group of students that use MOODLE.							
4. I do not feel alienated from students who use MOODLE.							
5. I generally see myself as belonging to the group of students that use MOODLE.							
6. If asked if I belong to the group of students that use MOODLE, I would say **YES**							
7. I have a feeling of connection with students that use MOODLE.							
8. I find MOODLE useful.							
9. I think UNESWA has done enough to raise my awareness of MOODLE.							
10. I believe UNESWA initiatives towards encouraging use of MOODLE are adequate.							
11. I believe UNESWA encourages me to use MOODLE.							
12. I think UNESWA puts an effort in raising awareness of MOODLE.							
13. I believe UNESWA's awareness programmes about MOODLE are adequate.							
14. UNESWA promotes the importance of using MOODLE.							
15. UNESWA has ensured that the role of MOODLE in learning is clear.							
16. I find MOODLE easy to navigate.							
17. I am motivated to use MOODLE in my schoolwork.							
18. Using MOODLE is motivating.							
19. My motivation to use MOODLE supersedes challenges associated with using MOODLE.							
20. MOODLE does not provide adequate motivation.							
21. I look forward to doing something on MOODLE, even if it is not schoolwork related.							
22. My motivation to using MOODLE is **NOT** related to schoolwork.							

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
23. My motivation to using MOODLE is related to schoolwork.							
24. I find MOODLE pleasant to use.							
25. UNESWA has put adequate processes in place to ensure I can use MOODLE.							
26. There are very few obstacles to using MOODLE.							
27. Most hindrances to using MOODLE have been adequately addressed.							
28. Using MOODLE is basically a straightforward exercise.							
29. There are limited challenges to using MOODLE.							
30. UNESWA ensures that challenges related to the use of MOODLE are adequately addressed.							
31. Most challenges, under UNESWA's control, are adequately addressed.							
32. I find MOODLE easy to learn.							
33. I actively use MOODLE.							
34. I prefer using MOODLE for my schoolwork.							
35. Using MOODLE is better than not using MOODLE.							
36. I plan to continue using MOODLE in the near future.							
37. I am unlikely to stop using MOODLE.							
38. I would like to do more on MOODLE.							
39. I intend participating more on MOODLE in the near future.							
40. I find MOODLE helpful in the learning process							

Main Access to MOODLE Mobile ☐ Laptop/Computer ☐ **Year**: 2☐ 3☐ 4☐ 5☐

Faculty: Agriculture ☐ Consumer Sciences. ☐ Health Sciences ☐ Social Sciences ☐

Science & Eng. ☐ Commerce ☐ Education ☐ Humanities ☐

IDE ☐

Age: 18 -20 ☐ 20-21 ☐ 22-24 ☐ above 24 ☐ **Gender**: F ☐ M ☐

STUDENT QUESTIONNAIRE [ONLINE VERSION]

This questionnaire aims to solicit your opinion on a number of matters related to the MOODLE LMS.

Please tick on the rating you deem most fitting for the following statements on MOODLE.

If you wish to read The Participant Information Sheet, it has been sent as an attachment with the link.

Do note that by completing and submitting the survey it is taken to mean consent to participate.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1. I identify with the students who use MOODLE.							
2. I feel I belong to the group of students that use MOODLE.							
3. I consider myself part of the group of students that use MOODLE.							
4. I do not feel alienated from students who use MOODLE.							
5. I generally see myself as belonging to the group of students that use MOODLE.							
6. If asked if I belong to the group of students that use MOODLE, I would say **YES**							
7. I have a feeling of connection with students that use MOODLE.							
8. I find MOODLE useful.							
9. I think UNESWA has done enough to raise my awareness of MOODLE.							
10. I believe UNESWA initiatives towards encouraging use of MOODLE are adequate.							
11. I believe UNESWA encourages me to use MOODLE.							
12. I think UNESWA puts an effort in raising awareness of MOODLE.							
13. I believe UNESWA's awareness programmes about MOODLE are adequate.							
14. UNESWA promotes the importance of using MOODLE.							
15. UNESWA has ensured that the role of MOODLE in learning is clear.							
16. I find MOODLE easy to navigate.							
17. I am motivated to use MOODLE in my schoolwork.							
18. Using MOODLE is motivating.							
19. My motivation to use MOODLE supersedes challenges associated with using MOODLE.							
20. MOODLE does not provide adequate motivation.							
21. I look forward to doing something on MOODLE, even if it is not schoolwork related.							
22. My motivation to using MOODLE is **NOT** related to schoolwork.							

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
23. My motivation to using MOODLE is related to schoolwork.							
24. I find MOODLE pleasant to use.							
25. UNESWA has put adequate processes in place to ensure I can use MOODLE.							
26. There are very few obstacles to using MOODLE.							
27. Most hindrances to using MOODLE have been adequately addressed.							
28. Using MOODLE is basically a straightforward exercise.							
29. There are limited challenges to using MOODLE.							
30. UNESWA ensures that challenges related to the use of MOODLE are adequately addressed.							
31. Most challenges, under UNESWA's control, are adequately addressed.							
32. I find MOODLE easy to learn.							
33. I actively use MOODLE.							
34. I prefer using MOODLE for my schoolwork.							
35. Using MOODLE is better than not using MOODLE.							
36. I plan to continue using MOODLE in the near future.							
37. I am unlikely to stop using MOODLE.							
38. I would like to do more on MOODLE.							
39. I intend participating more on MOODLE in the near future.							
40. I find MOODLE helpful in the learning process							

Main Access to MOODLE Mobile ☐ Laptop/Computer ☐ **Year**: 2☐ 3☐ 4☐ 5☐

Faculty: Agriculture ☐ Consumer Sciences. ☐ Health Sciences ☐ Social Sciences ☐

Science & Eng. ☐ Commerce ☐ Education ☐ Humanities ☐

IDE ☐

Age: 18 -20 ☐ 20-21 ☐ 22-24 ☐ above 24 ☐ **Gender**: F ☐ M ☐

APPENDIX C – INTERVIEW GUIDE: FOCUS GROUP DISCUSSION

Focus Group Discussion Guide

Welcome. My name is Bheki Gule. I am a PhD student at WITS University. With me are my Research Assistants [names supplied at discussion].

The intention of this discussion is to reflect on the research study results on the Infusion of MOODLE at UNESWA. At the beginning of the study, two sets of questionnaires were distributed to two groups, chiefly Students and Management. The objective of the student questionnaire was to examine the actions through which students, as a collective, infuse the LMS in their learning-related activities. The objective of the Management questionnaire was to examine the actions by which University management seeks to encourage the infusion of learning management systems among student users in their learning-related activities.

I would like us have a discussion on the preliminary results. I have planned for a 45-60 minutes session. One of my research assistants will be recording this session. Please note that by continuing to participate you are consenting to participation in the study. You have the right to exit the discussion anytime you feel like. By participating you are also consenting to this recording.

Preliminary results show the following;

1. Students generally express a negative view of activities undertaken by Management to encourage the infusion of MOODLE.
2. Management has generally provided a somewhat neutral view of the effectiveness of their activities meant to encourage the infusion of MOODLE.

Our discussion will focus on these summary results. I will ask specific questions and use the figures generated from the data analysis, which will be projected as well to remind us.

APPENDIX D – CONSENT LETTER: STUDENTS

CONSENT LETTER - STUDENTS

13 August, 2021

Title of Study	: The Learning Management System Infusion Process in a Higher Education Institution; An investigation of the collective actions of University Management, and Students at the University of eSwatini.

Name of Student / Researcher	: Bheki S. Gule Division of Educational Information & Engineering Technology, School of Education University of the Witwatersrand, Johannesburg, South Africa. Tel: +268 7904 2006. Email: 572986@students.wits.ac.za or bhekigule@gmail.com
Name of Supervisor	: Dr. Reuben Dlamini Division of Educational Information & Engineering Technology, School of Education University of the Witwatersrand, Johannesburg, South Africa. Tel: +2711 717 3007. Email: Reuben.Dlamini@wits.ac.za

My name is Bheki Gule. I am a PhD Degree student at the School of Education, University of the Witwatersrand, Johannesburg. I am conducting a study that aims to investigate the collective actions of University Management and Students in the infusion process of Learning Management Systems. My research site is the University of eSwatini [UNESWA].

To do this, I am using a questionnaire that asks about initiatives that UNESWA administration has undertaken and their perceived effectiveness from the students' perspective.

You are invited to participate in the study by completing the attached questionnaire, which takes about 20 minutes to complete.

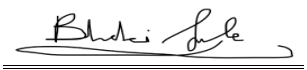
The results of this study will help us understand how ***the collective actions of the two key stakeholders [University Management and Students] influence the infusion process of an LMS in the eSwatini context***.

Participation is voluntary, and there is no loss of benefit whether or not you choose to participate. Responses are anonymous and you are not asked to disclose your name. Results will be reported only in an aggregate manner. Your name will be identified anywhere in the research report. All data collected in the study will be kept confidential and will not be used other than for the purposes of this research study.

This research has been approved unconditionally by the University of Witwatersrand Human Research Ethics Committee. The protocol number is H21/06/09. It has also been approved by the University of eSwatini Administration [see attached letter].

By completing and returning the questionnaire, you acknowledge that you have read this information and have consented to participating in this research, with the knowledge that you are free to withdraw your participation at any time without any risk or loss of benefit.

Yours Sincerely



Bheki S. Gule

APPENDIX E – CONSENT LETTER: MANAGEMENT

CONSENT LETTER - MANAGEMENT

13 August, 2021

Title of Study	: The Learning Management System Infusion Process in a Higher Education Institution; An investigation of the collective actions of University Management, and Students at the University of eSwatini.

Name of Student / Researcher : Bheki S. Gule
Division of Educational Information & Engineering Technology, School of Education
University of the Witwatersrand, Johannesburg, South Africa.
Tel: +2687904-2006. Email: 572986@students.wits.ac.za or bhekigule@gmail.com

Name of Supervisor : Dr. Reuben Dlamini
Division of Educational Information & Engineering Technology, School of Education
University of the Witwatersrand, Johannesburg, South Africa.
Tel: +2711- 717 3007. Email: Reuben.Dlamini@wits.ac.za

My name is Bheki Gule. I am a PhD Degree student at the School of Education, University of the Witwatersrand, Johannesburg. I am conducting a study that aims to investigate the collective actions of University Management and Students in the infusion process of Learning Management Systems. My research site is the University of eSwatini [UNESWA].
To do this, I am using an interview instrument that asks about the initiatives that UNESWA has / is undertaking, such initiatives targeted at students. The instrument also requires you to rate the effectiveness of these initiatives.

You are invited to participate in the study by availing yourself for a recorded interview with the researcher, which will take about 30 minutes. You are receiving this invitation as you have been identified as the best possible respondent to speak on UNESWA initiatives aimed at students with respect to the MOODLE Learning Management System that UNESWA has in place.

The results of this study will help us understand how ***the collective actions of the two key stakeholders [University Management and Students] influence the infusion process of an LMS in the eSwatini context***. You may also find the results relevant and valuable to your University.

Participation is voluntary, and there is no loss of benefit whether or not you choose to participate. Whilst responses in this context require your response based on organizational position, the research report will not disclose your name or position title. All data collected in the study will be kept confidential and will not be used other than for the purposes of this research study.

This research has been approved unconditionally by the University of Witwatersrand Human Research Ethics Committee. The protocol number is H21/06/09. It has also been approved by the University of eSwatini Administration [see attached letter].

By agreeing to participate in the interview, you acknowledge that you have read this information and have consented to participating in this research, with the knowledge that you are free to withdraw your participation at any time without any risk or loss of benefit.

Yours Sincerely

Bheki S. Gule

APPENDIX F – ETHICAL CLEARANCE CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Gule

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H21/06/09**
PROJECT TITLE	The Learning Management System Infusion Process in a Higher Education Institution; An investigation of the collective actions of University Management, and Students at the University of eSwatini
INVESTIGATOR(S)	Mr B Gule
SCHOOL/DEPARTMENT	Education/
DATE CONSIDERED	18 June 2021
DECISION OF THE COMMITTEE	Approved Risk Level: Minimal
EXPIRY DATE	16 August 2024

DATE 17 August 2021 **CHAIRPERSON** _____
(Professor J Knight)

cc: Supervisor : Dr R Dlamini

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to submit an amendment of the protocol to the Committee. **I agree to completion of a regular progress report. For Minimal and Low studies, this is due annually on 31 December. For Medium and High Risk studies, this is due twice annually on 30 June and 31 December.**

_____ 23 / 08 / 2021
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX G – APPROVAL LETTER: UNIVERSITY OF ESWATINI

UNIVERSITY OF ESWATINI

Private Bag No 4, Kwaluseni M201, Eswatini
Tel: (+268) 2517 0000 Ext 70108 Fax: (+268) 2517 0001
E-Mail: registrar@uniswa.sz
Website: www.uniswa.sz

REGISTRAR'S OFFICE

7th December, 2020

Mr. Bheki S. Gule
Department of Business Administration
Faculty of Commerce
UNESWA

Dear Mr. Gule

RE: PERMISSION TO COLLECT RESEARCH DATA FROM UNIVERSITY STUDENTS AND THE DIRECTOR – ICT

Your letter dated 7th December, 2020 refers.

Having fully considered your request to collect data on Campus as part of your research, I am pleased to inform you that you are granted permission to collect data at the University of Eswatini.

We wish you success in your studies.

Yours sincerely

Dr. S.S. Simelane
REGISTRAR

APPENDIX H – MEDIATOR AND CONTROL VARIABLE SPSS OUTPUT

A. Mediator Analysis Output

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	405.536	3	135.179	91.501	.000[b]
	Residual	446.161	302	1.477		
	Total	851.698	305			

a. Dependent Variable: Composite of Infusion Variable

b. Predictors: (Constant), Interaction_Item, Composite of Barriers Variable, Composite of Identification Variable.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.203	.220		.922	.357
	CompositeID	.333	.048	.329	6.880	.000
	CompositeBARRIERS	.566	.056	.482	10.087	.000
	Interaction_Item_ID	.112	.077	.065	1.447	.149

Dependent variable: Composite Score of Infusion

Predictors: (Constant): Interaction_Item_ID, Composite Score of Barriers Variable, Composite Score of Identification Variable

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	377.957	3	125.986	80.313	.000[b]
	Residual	473.740	302	1.569		
	Total	851.698	305			

a. Dependent Variable: Composite Score of Infusion

b. Predictors: (Constant), Interaction_Item_MOB, Composite Score of Barriers Variable, Composite Score of Mobilization Variable

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.797	.353		5.089	.000
	CompositeBARRIERS	.559	.134	.476	4.185	.000
	CompositeMOBILIZATION	.495	.095	.296	5.234	.000
	Interaction_Item_MOB	-.018	.041	-.046	-.426	.670

Dependent variable: Composite Score of Infusion

Predictors: (Constant), Interaction_Item_MOB, Composite Score of Barriers Variable, Composite Score of Mobilization Variable

B. Moderating Effects of Control Variables (Demographics)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.381	.102		33.150	.000
	YEAROFSTUDY	.000	.006	.001	.022	.983
Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.434	.122		28.127	.000
	FACULTY	-.008	.012	-.040	-.691	.490
Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.377	.102		33.133	.000
	AGE	.001	.009	.007	.124	.901
Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.461	.107		32.472	.000
	GENDER	-.004	.003	-.094	-1.654	.099
Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.413	.100		34.045	.000
	ACCESS	-.004	.004	-.057	-.993	.322

APPENDIX I – PEARSON CORRELATION ASSUMPTION TESTS: SPSS OUTPUT

Pearson Correlation Assumption Tests

Tests for Normality

Linearity Graphs

Outlier Box Plots

Homoscedasticity Graphs

COMBINED ID (Identification) Construct

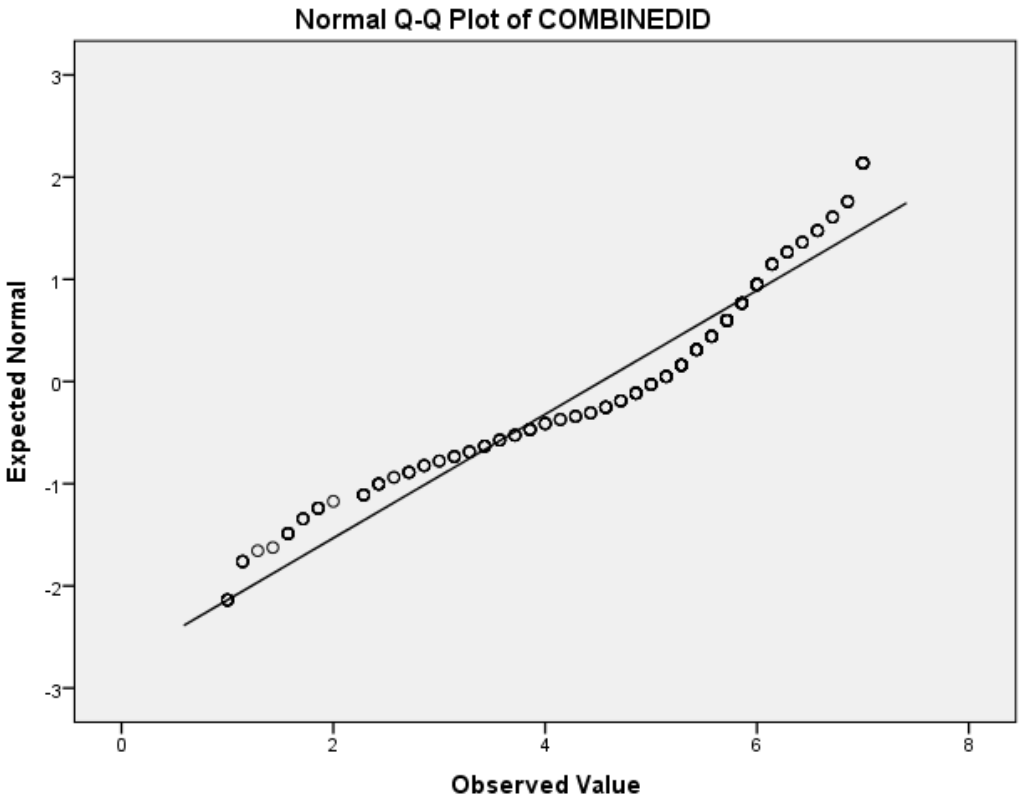
Case Processing Summary

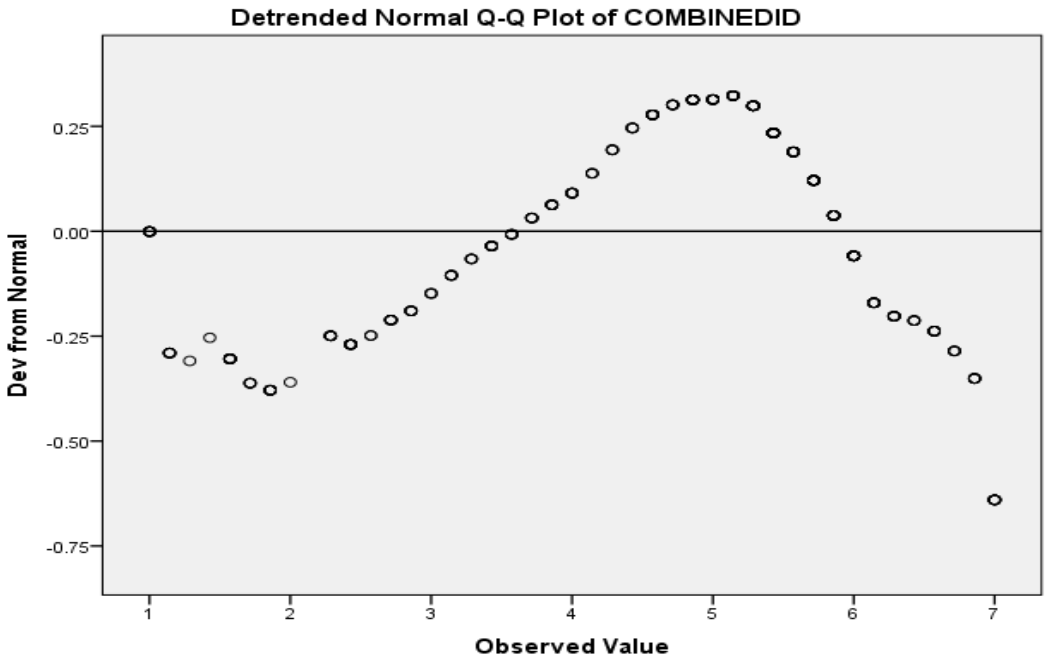
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
COMBINEDID	306	100.0%	0	0.0%	306	100.0%

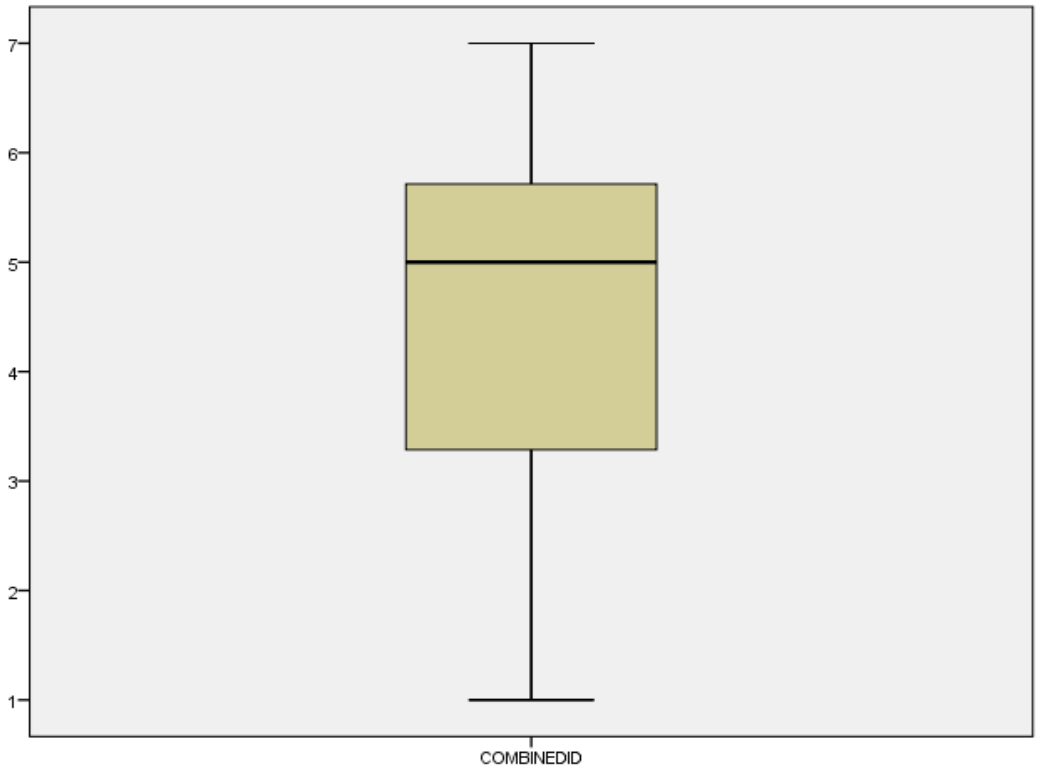
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
COMBINEDID	.144	306	.000	.925	306	.000

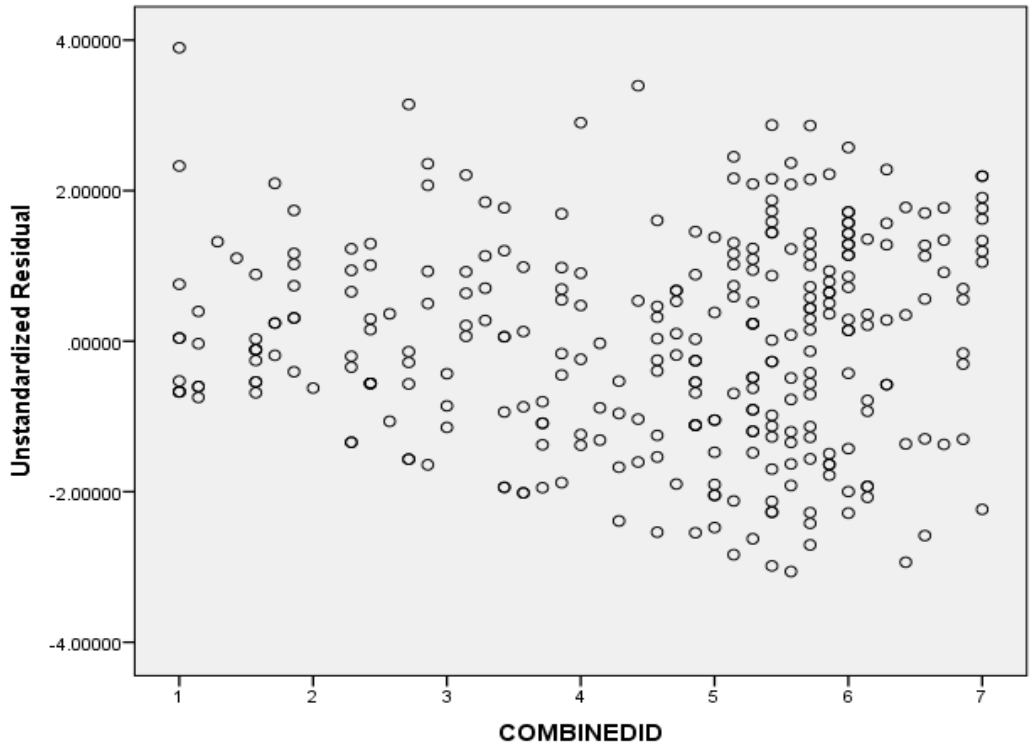
a. Lilliefors Significance Correction


Normal Q-Q Plot of COMBINEDID
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
0
2
4
6
8


Detrended Normal Q-Q Plot of COMBINEDID
Dev from Normal
Observed Value
0.25
0.00
-0.25
-0.50
-0.75
1
2
3
4
5
6
7



Homoscedasticity test – Identification Variable



COMBINED MOB (Mobilization) Construct

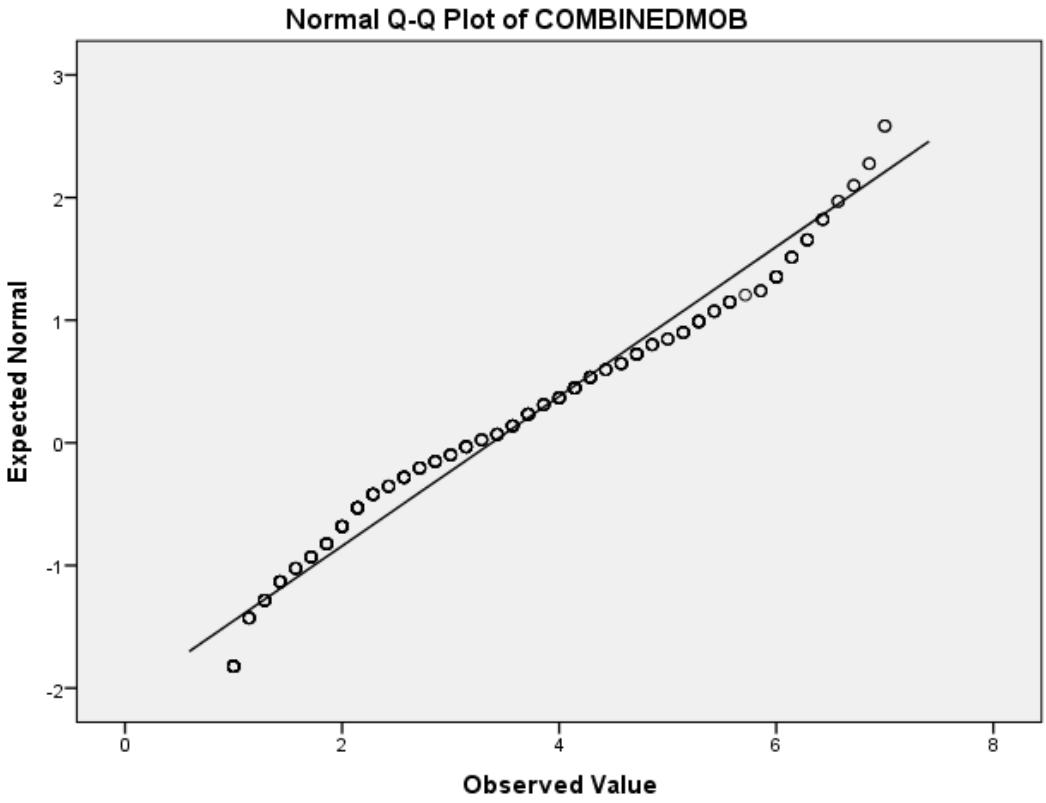
Case Processing Summary

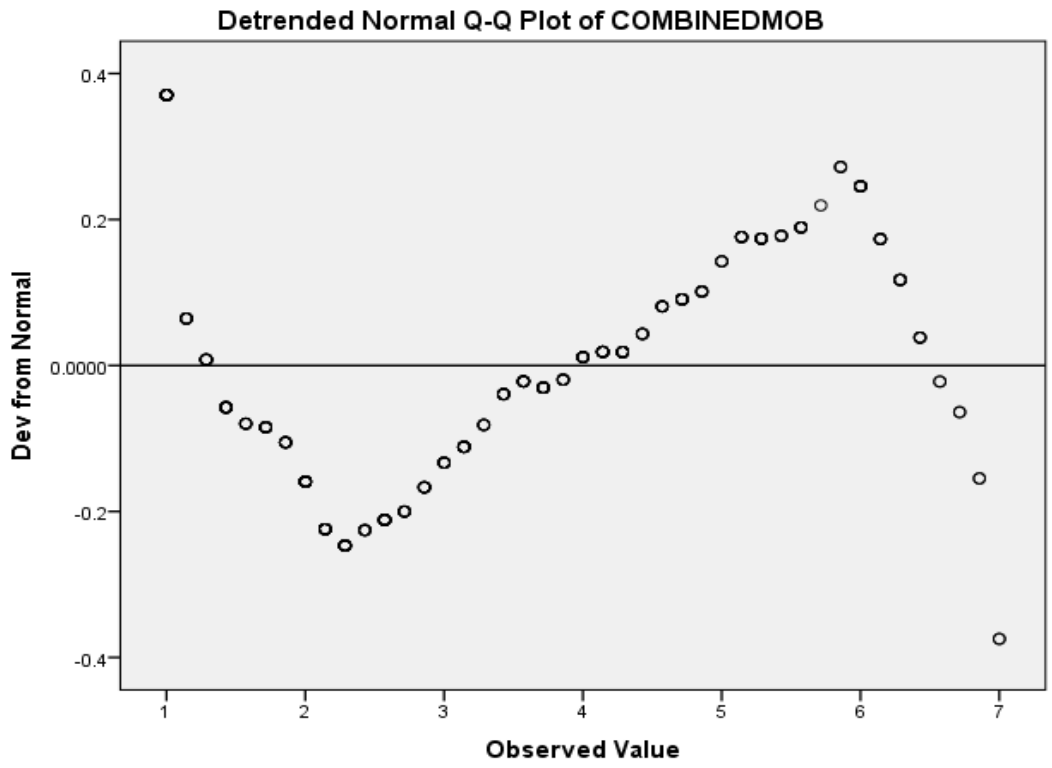
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
COMBINEDMOB	306	100.0%	0	0.0%	306	100.0%

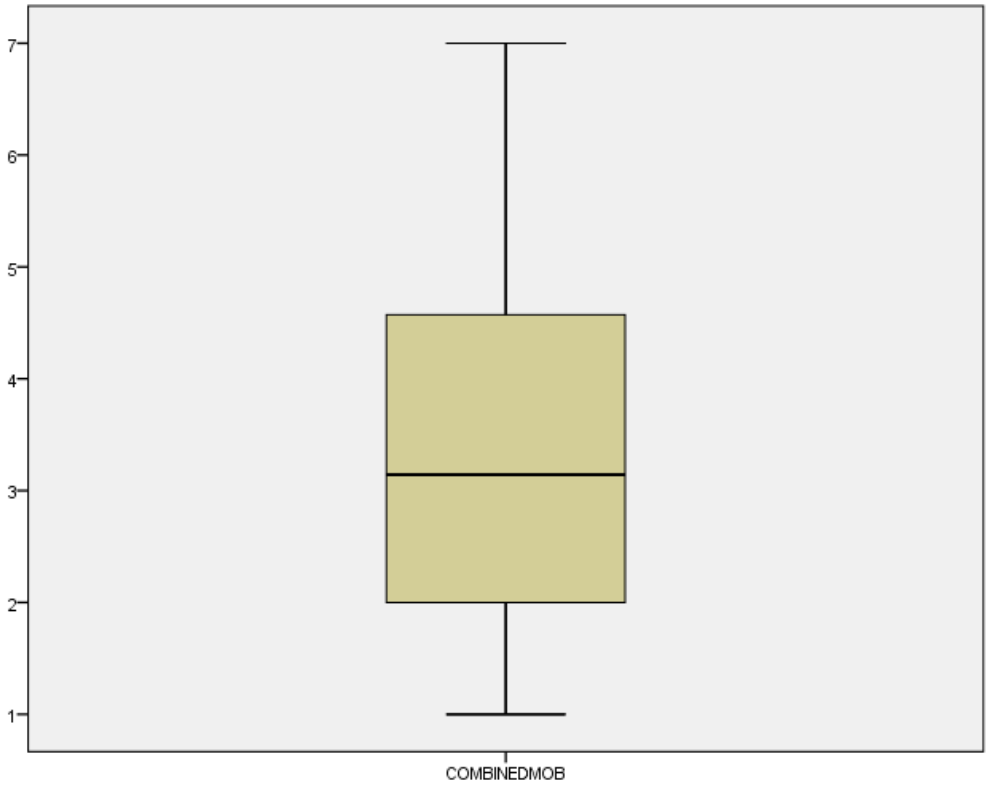
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
COMBINEDMOB	.101	306	.000	.953	306	.000

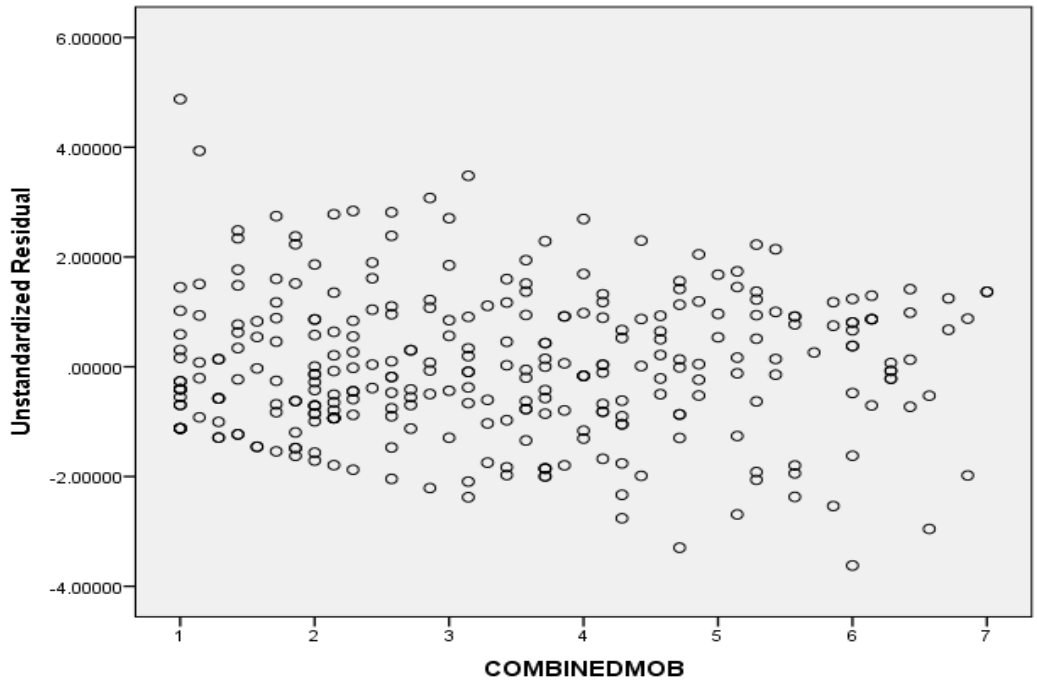
a. Lilliefors Significance Correction


Normal Q-Q Plot of COMBINEDMOB
Expected Normal
Observed Value
3
2
1
0
-1
-2
0
2
4
6
8


Detrended Normal Q-Q Plot of COMBINEDMOB
Dev from Normal
0.4
0.2
0.0000
-0.2
-0.4
1
2
3
4
5
6
7
Observed Value


7
6
5
4
3
2
1
COMBINEDMOB

Homoscedasticity Graph – Mobilization



COMBINED MOT (Motivation) Construct

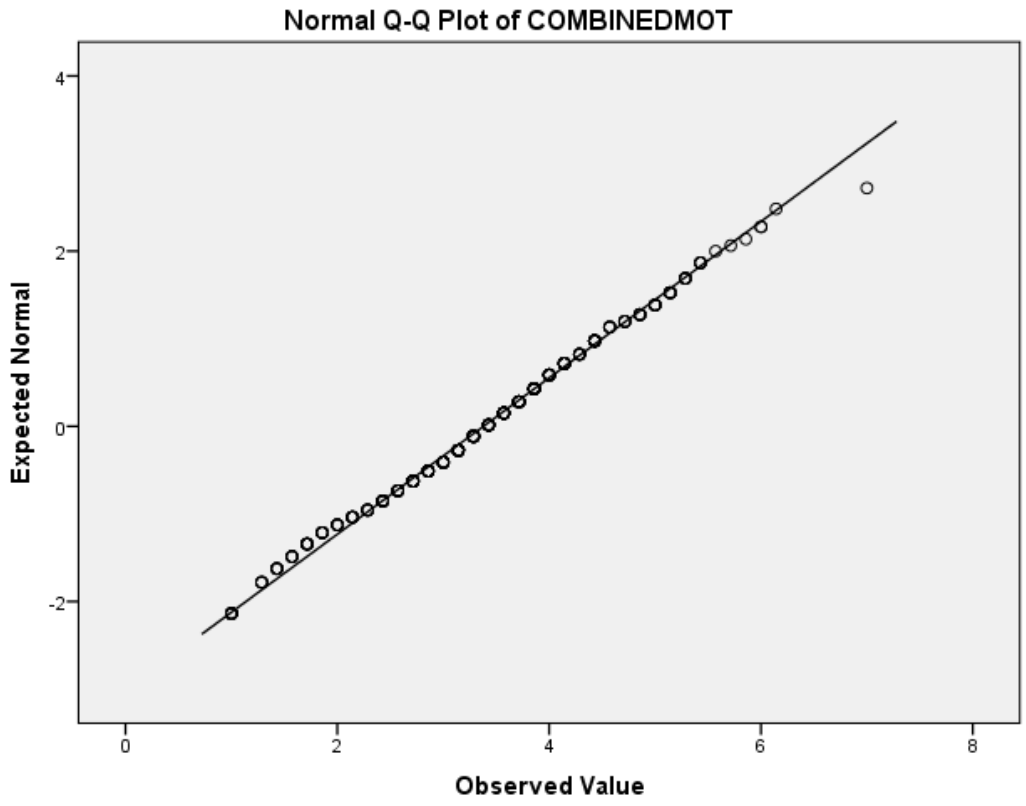
Case Processing Summary

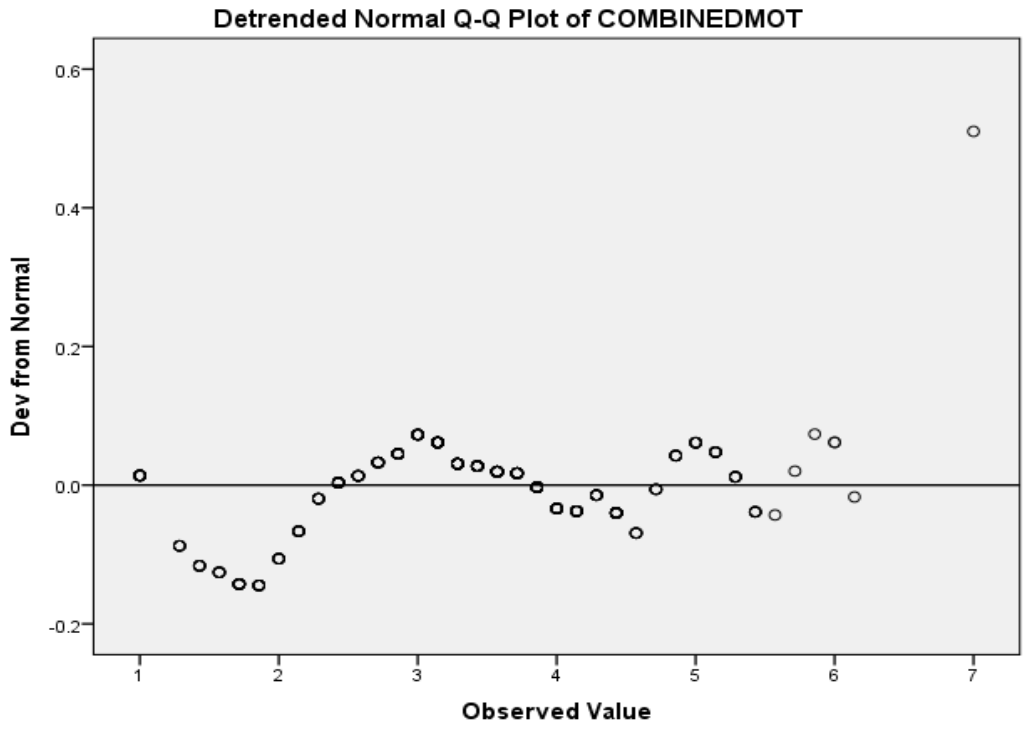
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
COMBINEDMOT	306	100.0%	0	0.0%	306	100.0%

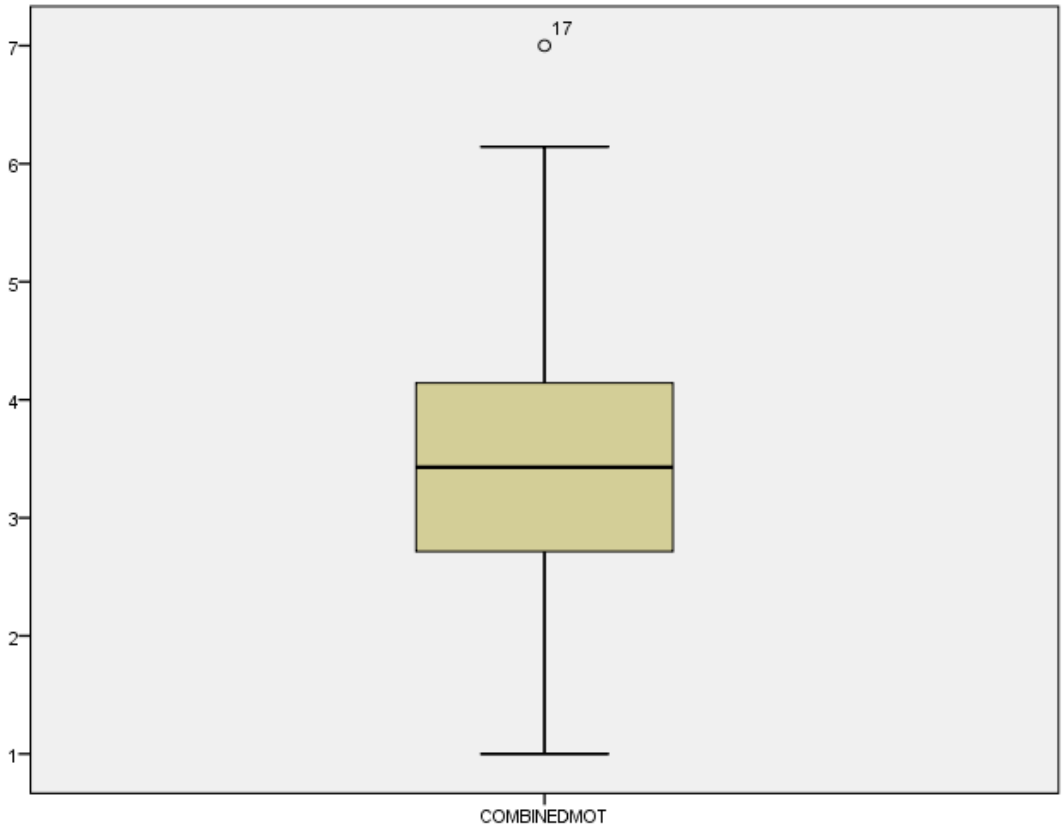
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
COMBINEDMOT	.060	306	.010	.991	306	.060

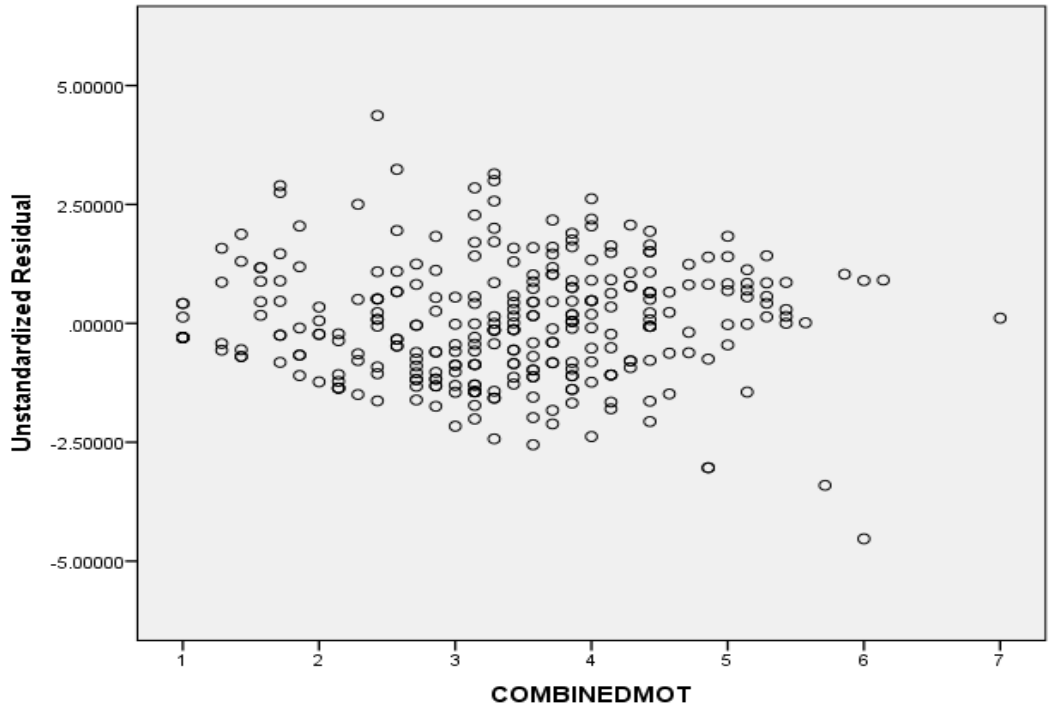
a. Lilliefors Significance Correction




Detrended Normal Q-Q Plot of COMBINEDMOT
Dev from Normal
0.6
0.4
0.2
0.0
-0.2
1
2
3
4
5
6
7
Observed Value


17
7
6
5
4
3
2
1
COMBINEDMOT

Homoscedasticity Graph – Motivation



COMBINED BAR (Removal of Barriers) Construct

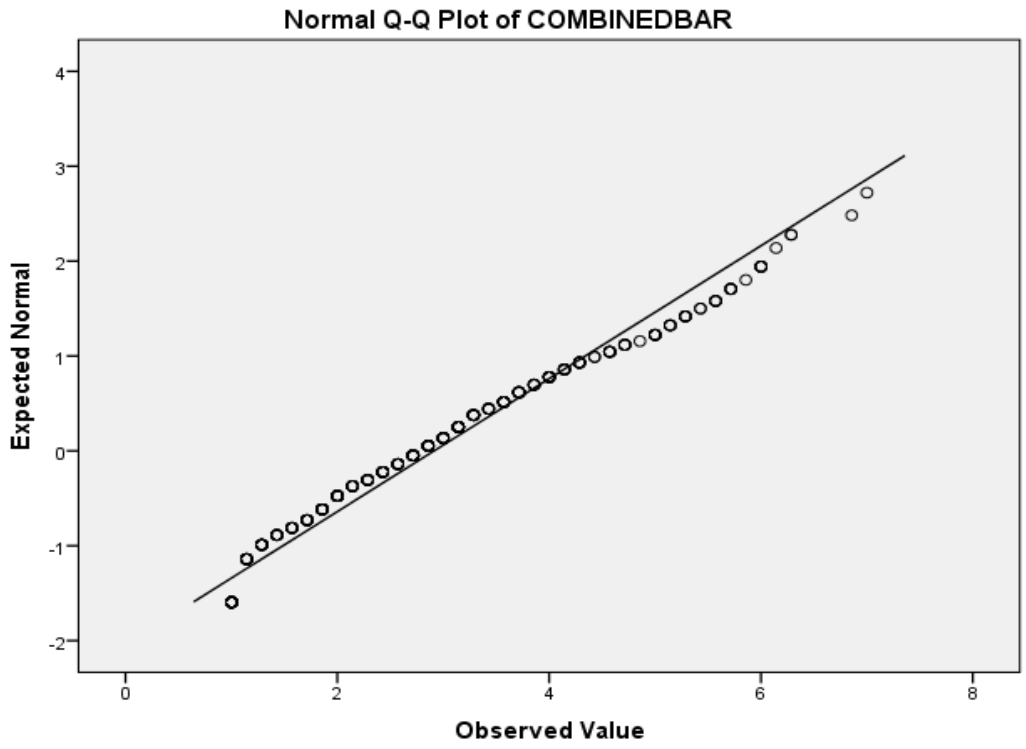
Case Processing Summary

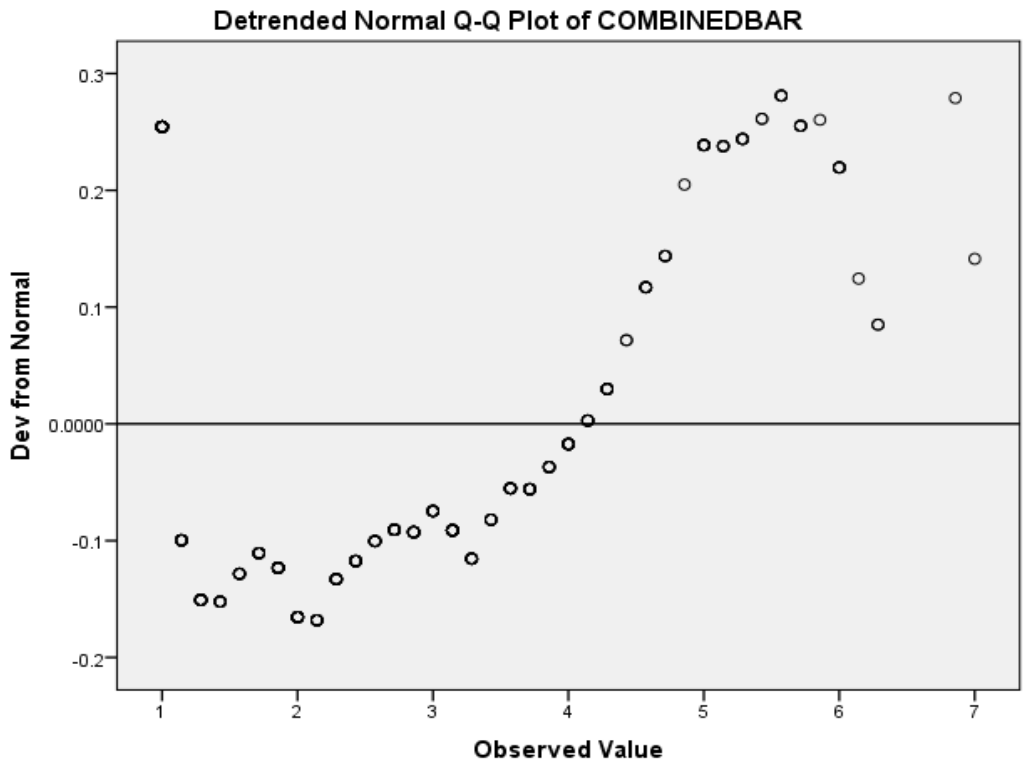
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
COMBINEDBAR	306	100.0%	0	0.0%	306	100.0%

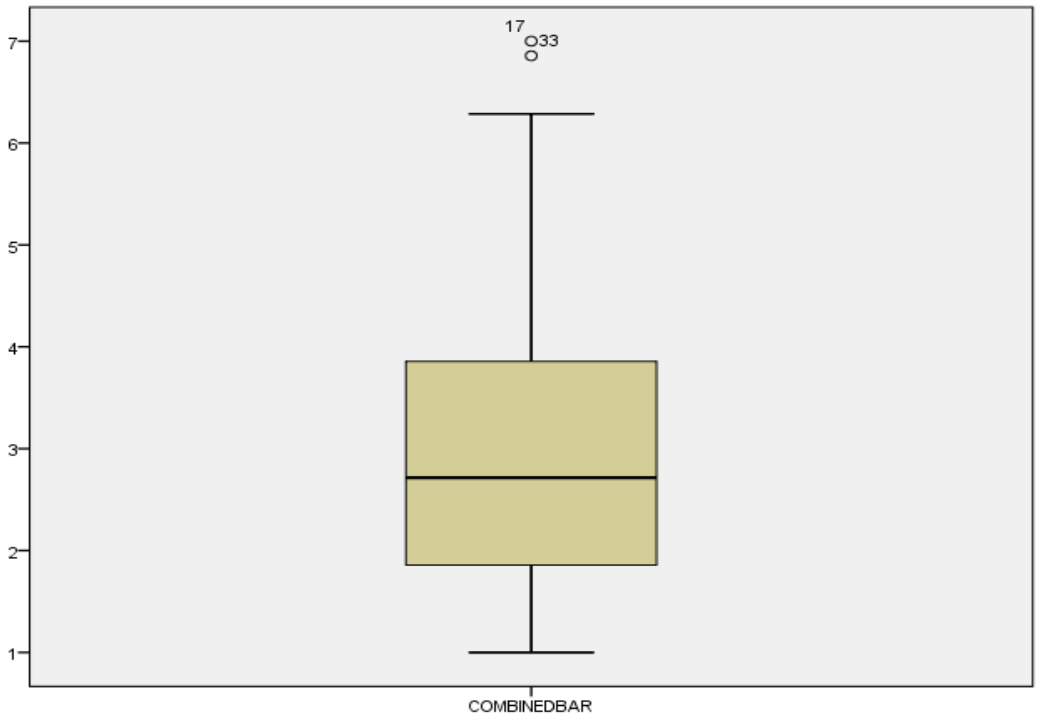
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
COMBINEDBAR	.090	306	.000	.950	306	.000

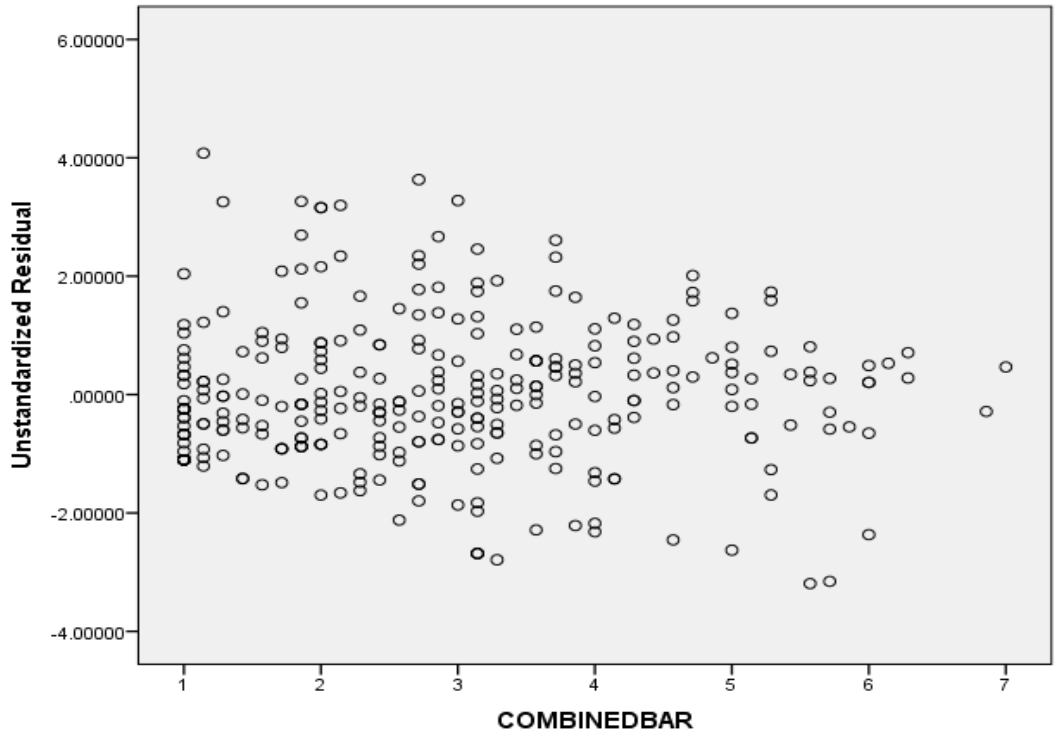
a. Lilliefors Significance Correction




Detrended Normal Q-Q Plot of COMBINEDBAR
Dev from Normal
0.3
0.2
0.1
0.0000
-0.1
-0.2
1
2
3
4
5
6
7
Observed Value


17
33
7
6
5
4
3
2
1
COMBINEDBAR

Homoscedasticity Graph – Removal of Barriers



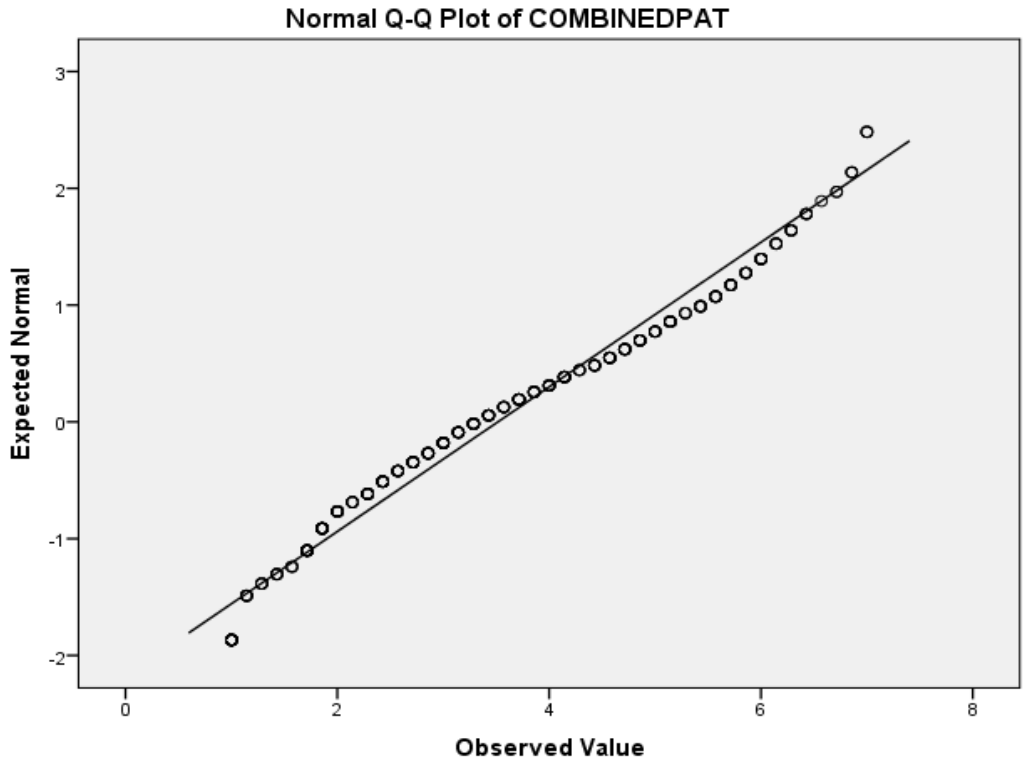
COMBINED PAT (Participation) Construct

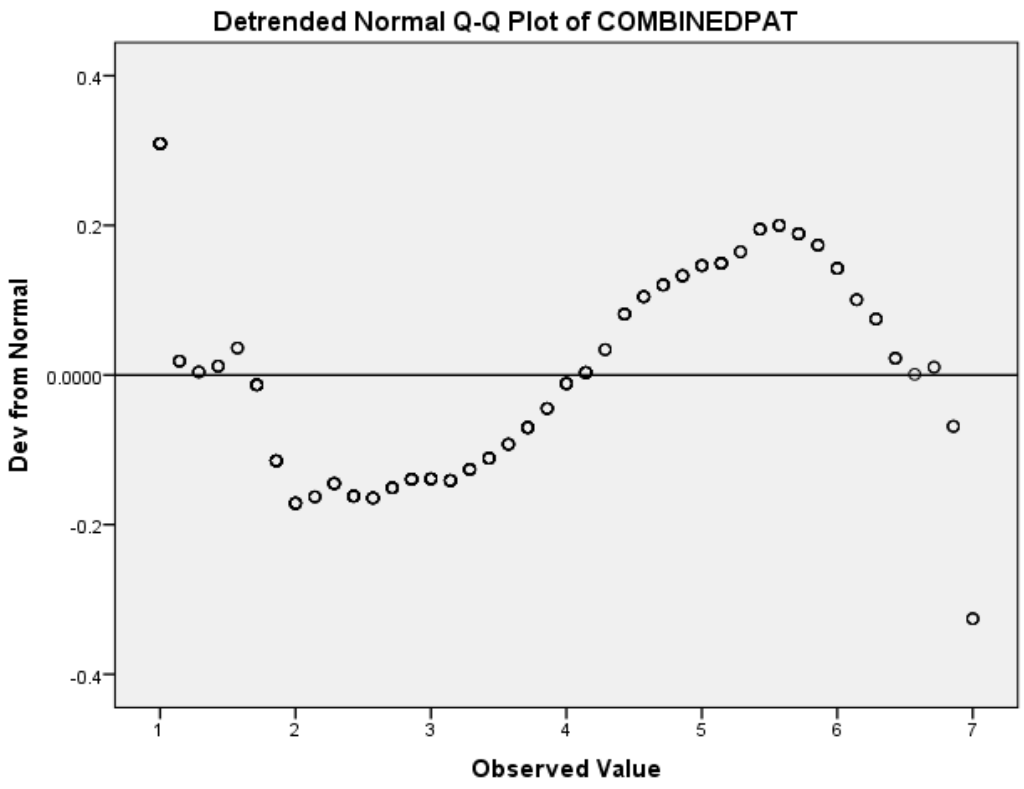
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
COMBINEDPAT	306	100.0%	0	0.0%	306	100.0%

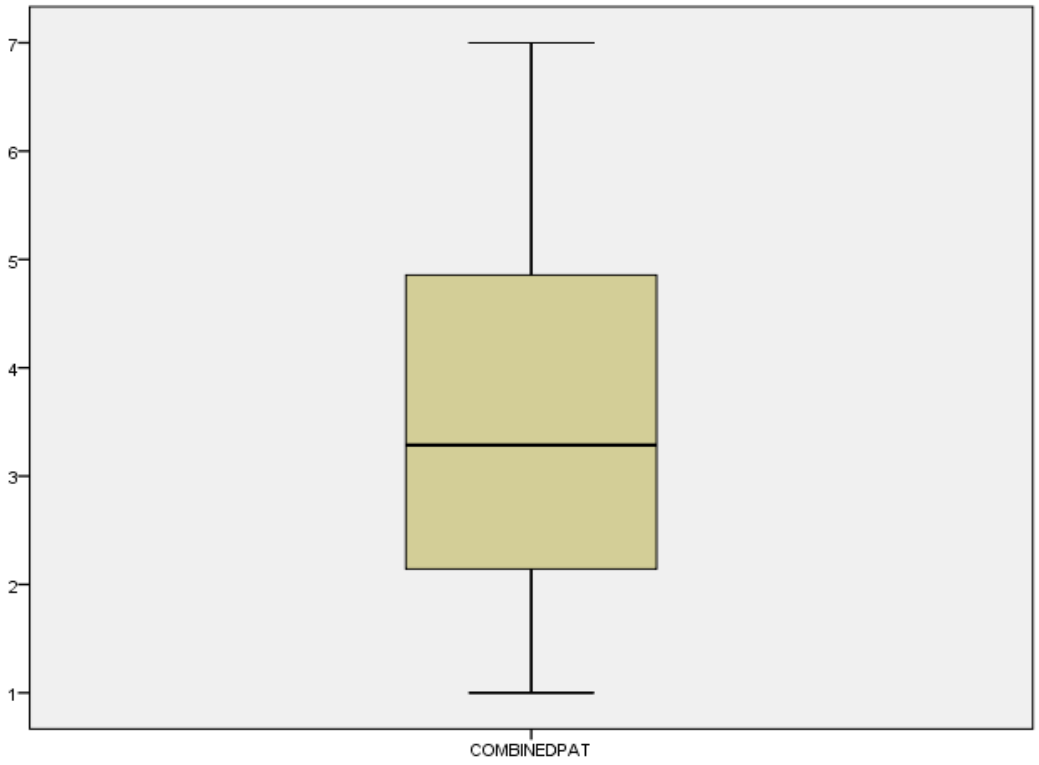
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
COMBINEDPAT	.073	306	.000	.962	306	.000

a. Lilliefors Significance Correction




Detrended Normal Q-Q Plot of COMBINEDPAT
Dev from Normal
0.4
0.2
0.0000
-0.2
-0.4
1
2
3
4
5
6
7
Observed Value


7
6
5
4
3
2
1
COMBINEDPAT

APPENDIX J – MEDIATION AND MODERATION ANALYSIS ON MODEL CONSTRUCTS: SPSS OUTPUT

Output for Mediator and Moderator Analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	COMBINEDMOT, COMBINEDID, COMBINEDMOB[b]	.	Enter
2	COMBINEDBAR[b]	.	Enter

a. Dependent Variable: COMBINEDPAT

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.711[a]	.506	.501	1.141	.506	103.016	3	302	.000
2	.755[b]	.570	.564	1.067	.064	44.628	1	301	.000

a. Predictors: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB

b. Predictors: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB, COMBINEDBAR

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	402.411	3	134.137	103.016	.000[b]
	Residual	393.236	302	1.302		
	Total	795.647	305			
2	Regression	453.187	4	113.297	99.580	.000[c]
	Residual	342.461	301	1.138		
	Total	795.647	305			

a. Dependent Variable: COMBINEDPAT

b. Predictors: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB

c. Predictors: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB, COMBINEDBAR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.125	.228		-.549	.583		
	COMBINEDID	.226	.047	.231	4.778	.000	.703	1.422
	COMBINEDMOB	.227	.055	.230	4.149	.000	.532	1.881
	COMBINEDMOT	.548	.080	.380	6.834	.000	.528	1.893
2	(Constant)	-.234	.214		-1.092	.276		
	COMBINEDID	.210	.044	.215	4.757	.000	.701	1.426
	COMBINEDMOB	.039	.058	.039	.664	.507	.408	2.452
	COMBINEDMOT	.438	.077	.304	5.698	.000	.504	1.986
	COMBINEDBAR	.408	.061	.360	6.680	.000	.492	2.034

a. Dependent Variable: COMBINEDPAT

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	COMBINEDBAR	.360[b]	6.680	.000	.359	.492	2.034	.408

a. Dependent Variable: COMBINEDPAT

b. Predictors in the Model: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	COMBINEDID	COMBINEDMOB	COMBINEDMOT	COMBINEDBAR
1	1	3.799	1.000	.01	.01	.01	.00	
	2	.103	6.063	.27	.04	.59	.00	
	3	.060	7.960	.29	.95	.01	.07	
	4	.037	10.105	.43	.00	.39	.92	
2	1	4.711	1.000	.00	.00	.00	.00	.00
	2	.131	5.996	.20	.09	.13	.00	.23
	3	.065	8.487	.28	.38	.26	.00	.37
	4	.055	9.224	.09	.53	.31	.11	.40
	5	.037	11.252	.43	.00	.30	.88	.00

a. Dependent Variable: COMBINEDPAT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.711[a]	.506	.501	1.141	.506	103.016	3	302	.000
2	.755[b]	.570	.564	1.067	.064	44.628	1	301	.000

a. Predictors: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB

b. Predictors: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB, COMBINEDBAR

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	402.411	3	134.137	103.016	.000[b]
	Residual	393.236	302	1.302		
	Total	795.647	305			
2	Regression	453.187	4	113.297	99.580	.000[c]
	Residual	342.461	301	1.138		
	Total	795.647	305			

a. Dependent Variable: COMBINEDPAT

b. Predictors: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB

c. Predictors: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB, COMBINEDBAR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.125	.228		-.549	.583		
	COMBINEDID	.226	.047	.231	4.778	.000	.703	1.422
	COMBINEDMOB	.227	.055	.230	4.149	.000	.532	1.881
	COMBINEDMOT	.548	.080	.380	6.834	.000	.528	1.893
2	(Constant)	-.234	.214		-1.092	.276		
	COMBINEDID	.210	.044	.215	4.757	.000	.701	1.426
	COMBINEDMOB	.039	.058	.039	.664	.507	.408	2.452
	COMBINEDMOT	.438	.077	.304	5.698	.000	.504	1.986
	COMBINEDBAR	.408	.061	.360	6.680	.000	.492	2.034

a. Dependent Variable: COMBINEDPAT

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	COMBINEDBAR	.360[b]	6.680	.000	.359	.492	2.034	.408

a. Dependent Variable: COMBINEDPAT

b. Predictors in the Model: (Constant), COMBINEDMOT, COMBINEDID, COMBINEDMOB

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	COMBINEDID	COMBINEDMOB	COMBINEDMOT	COMBINEDBAR
1	1	3.799	1.000	.01	.01	.01	.00	
	2	.103	6.063	.27	.04	.59	.00	
	3	.060	7.960	.29	.95	.01	.07	
	4	.037	10.105	.43	.00	.39	.92	
2	1	4.711	1.000	.00	.00	.00	.00	.00
	2	.131	5.996	.20	.09	.13	.00	.23
	3	.065	8.487	.28	.38	.26	.00	.37
	4	.055	9.224	.09	.53	.31	.11	.40
	5	.037	11.252	.43	.00	.30	.88	.00

a. Dependent Variable: COMBINEDPAT

Interaction Items

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	IDxBAR	.175[b]	.919	.359	.053	.045	22.351	.045

a. Dependent Variable: COMBINEDPAT

b. Predictors in the Model: (Constant), COMBINEDBAR, COMBINEDID

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	MOTxBAR	-.065[b]	-.366	.715	-.021	.049	20.555	.049

a. Dependent Variable: COMBINEDPAT

b. Predictors in the Model: (Constant), COMBINEDBAR, COMBINEDMOT

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	MOBxBAR	-.150[b]	-.874	.383	-.050	.060	16.669	.060

a. Dependent Variable: COMBINEDPAT

b. Predictors in the Model: (Constant), COMBINEDBAR, COMBINEDMOB

MOB → BAR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.879	.136		6.483	.000					
	COMBINEDMOB	.602	.036	.691	16.680	.000	.691	.691	.691	1.000	1.000

a. Dependent Variable: COMBINEDBAR

MOT → BAR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.403	.211		1.909	.057					
	COMBINEDMOT	.743	.059	.583	12.510	.000	.583	.583	.583	1.000	1.000

a. Dependent Variable: COMBINEDBAR

ID → BAR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.302	.218		5.975	.000					
	COMBINEDID	.356	.045	.411	7.868	.000	.411	.411	.411	1.000	1.000

a. Dependent Variable: COMBINEDBAR