



**RECONCEPTUALISING ACADEMICS' EXPERIENCES OF USING DIGITALISED
LEARNING ENVIRONMENTS TO TEACH AGRICULTURAL SCIENCES AT A
SOUTH AFRICAN UNIVERSITY**

by

Msimlelo Buyisile Nkohla

(216074125)

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School of Education, College of Humanities, University of KwaZulu-Natal, Durban, South

Africa

Promoter/ Supervisor: Professor Simon Bhekumuzi Khoza

Co-Promoter/Co- Supervisor: Professor Cedric Bheki Mpungose

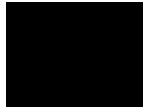
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SUPERVISORS' STATEMENT

This thesis has been submitted with my approval:



Promoter/ Supervisor: Professor Simon Bhekumuzi Khoza



Co-promoter/ Co-supervisor: Professor Cedric Bheki Mpungose

Declaration

I, Msimelelo Buyisile Nkohla, declare that this thesis, titled: **Reconceptualising Academics' Experiences of Using Digitalised Learning Environments to Teach Agricultural Sciences at a South African University**, presents my original work. I have appropriately acknowledged all sources used in my research. This study has not been previously approved for any academic qualification, nor is it concurrently under consideration for any other degree at any other institution.



----- Date: 26 February 2024

Msimelelo Buyisile Nkohla
216074125

As the candidate's supervisor, I approve the submission of this thesis



Supervisor: ----- Date: 27/02/2024
Professor Simon Bhekumuzi Khoza



Co-Supervisor: ... Date: 27/02/2024
Professor Cedric Bheki Mpungose

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Enkosi

Dedication

This thesis is earnestly dedicated to my dearest mother, who affectionately referred to me as ‘Doc’ long before I even completed my studies. Her unwavering belief in me held profound significance, becoming an invaluable beacon of motivation during moments when giving up seemed to be the only option. Through your nurturing sprit *nesakho isibeleko sizale ugqirha* (your womb has also given birth to a Doctor). Furthermore, I extend this dedication to my entire family because this work does not only uplift my name, but that of a family’s history from which forthcoming generations can draw inspiration and insight. Indeed, this document is a foundation upon which my family’s future and legacy shall be built.

ABSTRACT

In the ever-changing landscape of higher education, the acceptance, use, and integration of digitalised learning environments have become a crucial transformation, giving another shape to knowledge dissemination. South Africa, as with any other country in the global community, has a complex higher education system coupled with diverse digital practices and experiences that are informed by the divided institutional contexts. This thesis presents a pragmatic study conducted to explore academics' experiences of using digital learning environments to teach agricultural sciences modules at a South African historically disadvantaged university. As a result, data were generated qualitatively from fourteen academics through reflective activity, document analysis, one-on-one-semi-structured interviews, and focus-group discussions; and quantitatively from lesson observations for triangulation purposes. Non-probability sampling methods including purposive and convenience samplings were employed in selecting academics from three agricultural departments of the Faculty of Science and Agriculture. Thematic analysis and SPSS descriptive statistics were used to produce themes and frequencies, respectively. The three key research questions that were formulated for this study include: What are academics' experiences on the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university? (descriptive question); How can academics' experiences enhance the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university? (operational question); and Why do academics experience the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university in particular ways? (philosophical question).

Through the UTAUT-2 model, the findings of the study revealed that while academics recognised the potential of using prescriptive digital platforms, they encountered challenges in aligning technology with the contextual needs of academics. Thus, academics customised their teaching experiences by also using casual and informal platforms to address the practical nature of agricultural science modules. The study introduced four key propositions aligned with themes that emerged: reconceptualising effectiveness and quality assurance, enhanced support, adaptive active learning, and cultural sensitivity. Based on these propositions, the study proposes a modified framework, Contextually Adaptive Tech-Enhanced Pedagogy (CATEP) framework which emphasises the integration of culturally inclusive and discipline-specific digital pedagogy. This theory provides a comprehensive framework to empower academics in using digital learning environments effectively while acknowledging the unique challenges and opportunities presented in agriculture teaching as a practical discipline. The study contributes to the ongoing dialogue on contextually responsive digital teaching in historically disadvantaged HEIs, and facilitating transformative and inclusive teaching experiences for academics in agricultural sciences.

Keywords: *Agricultural Sciences, Comprehensive university, Contextually adaptive tech-enhanced pedagogy, Digital learning environment, Experiences, Historically disadvantaged university.*

List of key acronyms

4IR- Fourth Industrial Revolution

AI- Artificial Intelligence

CATEP- Cultural Adaptive Tech Enhanced Pedagogy

DLE- Digitalised Learning Environment

EDR- Educational Design Research

ERT- Emergency Remote Learning

HEI- Higher Education Institution

HW- Hardware

IoT- Internet of Things

IW- Ideological ware

LMS- Learning Management System

MOOC- Massive Open Online Course

MOODLE- Modular Object-Orientated Dynamic Learning Environment

SMS- Social Media Site

SPSS- Statistical Package for the Social Sciences

SW- Software

TAM- Technology Acceptance Model

TLC- Teaching and Learning Centre

UTAUT- Unified Theory of Acceptance and Use of Technology

VLE- Virtual Learning Environment

WEB CT- Web Course Tools

WHO- World Health Organisation

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Candidate Statement

A personal reflection on my doctoral journey

As I reflect on the journey, I have undertaken in conducting this study, I am struck by the profound impact that digitalisation is having on higher education, not just in my home country of South Africa, but globally. My Master of Education, which I passed *summa cum laude*, marked a significant milestone, setting a stage for my continued exploration into educational innovations, particularly within curriculum studies, digital education, and agricultural education. My Bachelor of Science and Master of Science in agriculture (Animal Science) also aided the groundwork for my expertise. Throughout the course of my doctoral study, I had the privilege of engaging academics who are at the forefront of teaching agricultural sciences at a historically disadvantaged university. Their experiences shed light on both the potential and the challenges that come with integrating prescribed and casual digital learning environments into education. It was fascinating to see how these academics recognised the possibilities presented by prescribed learning management systems, yet grappled with the task of customising these technologies to their specific teaching contexts and identities.

Furthermore, it became clear that, in the practical outlook of agricultural sciences, a one-size-fits-all approach simply would not do justice to the nature and practicality of the subject. Instead, these academics ingeniously used informal or social platforms to cater for the practical nature of the subject matter. This adaptive spirit not only showcased their dedication but also underlined the significance of considering discipline-specific requirements when embracing digital pedagogy;

and the emergence of the CATEP framework was a pivotal moment in my research journey, seeming a natural progression.

Currently, as I serve as a Deputy Head of School: School of Further and Continuing Education. Previously served as a programme coordinator for Bachelor of Education Honours (Science Education) and Postgraduate Certificate in Education. I have immersed myself in shaping educational pathways for aspiring educators, fostering a commitment to excellence and inclusivity. It is gratifying also to be part of the TVET programme development committee, where I contribute to the advancement of technical and vocational teaching. Looking ahead, I am excited about the potential impact that this research could have on the wider discourse surrounding digital education and agricultural education, particularly within historically disadvantaged institutions. I hope that my CATEP framework will serve as a practical guide, empowering academics to harness the benefits of digital learning environments while fostering inclusivity and transformation in their teaching experiences. I am filled with gratitude for the insights gained and the opportunity to contribute to the ongoing evolution of higher education in the digital age.

CHAPTER ONE

CONTEXTUAL OVERVIEW AND OBJECTIVES OF THE STUDY

1.1 Introduction

Chapter One introduces the entire study that aims to explore and reconceptualise academics' experiences of using digitalised learning environments to teach agricultural science modules at a South African university. This chapter highlights the processes followed in this study as it outlines the study's contextual background and rationale, a literature review which gives a synopsis of the nature of universities and the agriculture fraternity. The location, aims and objectives, together with research questions, and how the study is designed, are also outlined in this chapter. This also includes the theoretical and methodological framing of the study. The chapter further provides dependability, transferability, trustworthiness, validity, reliability and rigour issues that are followed by ethical considerations and limitations of the study. Lastly, an outline of the study's nine chapters is presented to give the readers an idea of how this study unfolds.

1.2 Contextualising the Background and Literature of the Study

In the ever-changing landscape of higher education, the acceptance, use, and integration of a digitalised learning environment have become a crucial transformation, presenting another shape to knowledge dissemination (Du Preez & Le Grange, 2020). Mashau and Nyawo (2021) argue that, as the world has become increasingly interconnected and technology-driven, higher education institutions (HEIs) have had to adapt their teaching pedagogies to align with the demands of the digital age. Ndebele and Mbodila (2022) posit that this paradigm shift is affecting all HEIs.

However, it is more pronounced in historically disadvantaged universities where unique challenges and opportunities amalgamate in the domain of digital learning environment (DLE). On that note, Mawere et al. (2021) and Mokwena et al. (2021) aver that historically disadvantaged HEIs, particularly those in rural areas which often grapple with limited resources, are encountering distinct hurdles in their intention to integrate technology. This raises an inequality issue that Lumadi (2020), in a discourse on equal education, argues as being unjust. This is because there is no balance between equality and equity. However, within all the hindrances, literature reports that there also lies the potential for innovating solutions that can empower academics' experiences and enhance the quality of learning for students. This study then seeks to uncover the multifaceted dimensions of academics' experiences with digital learning environments in teaching agricultural science modules within a historically disadvantaged comprehensive university.

According to Khoza and Manik (2015), digital learning environment is the integrated use of digital technology and online tools with the aim of facilitating teaching and learning. It encompasses different platforms, software, hardware, and any other resource designed to enhance educational experiences for both academics and students. It is further explained that DLE offers innovative opportunities for employing different teaching methods and allows flexibility in content delivery (Maphalala & Adigun, 2021). Universities as part of HEIs have adopted the use of learning management systems (LMS) as official DLE (Naidoo, 2022) while students preferred social media sites (SMS) such as WhatsApp (Mpungose (2019a). According to Azionya and Nhedzi (2021) who explored the digital divide and higher education, this divide is not solely confined to digital infrastructure, it extends to the realm of digital competencies. Khoza (2018) refers to digital competencies as an ideological-ware resource. This is because it includes the thoughtprocess, and

argues that digital competencies are the main ingredients to ensure a successful curriculum implementation. These also encompass the perceptions, attitudes and ways of understanding the platforms.

Makinde, Jiyane and Mugwisi (2019) argue that the evaluation of the level of adoption of digital technology remains of paramount importance for teaching, learning, and research. This study recognises that not all higher education institutions (HEIs) are equally equipped to embrace and adopt digitalisation. Historically disadvantaged universities, particularly those in rural areas, often face unique challenges due to limited resources. Mugwisi, Jiyane and Fombad (2018) further aver that, even public libraries in resource-limited communities, particularly in rural areas where digital access is a challenge, have limited funding to upgrade their facilities; and have shortages of skills, technology, and knowledge. This even informs the students enrolling in HEIs in the same context as the university in which this study was conducted.

In addition to the above, amidst the innumerable challenges encountered by HEIs, one prominent barrier arose from the utilisation of a digital learning environment and learning management systems, particularly during the COVID-19 lockdown (Mbambo, Jiyane and Zungu, 2022; Mpungose, 2020a). These experiences had a profound impact on HEIs, academics, students, and administrators as of 23 March 2020, after the announcement of a national lockdown in South Africa by President Mr Matamela Cyril Ramaphosa. The lockdown was effectively enforced from 26 March 2020, in response to the emergence of an unidentified virus in Wuhan, China. Such led the World Health Organization (WHO) to declare it a matter of international concern, thus disturbing the whole education fraternity (Singh, Watson and Nair, 2022). The lockdown

necessitated an immediate moratorium on face-to-face teaching, learning, and research across all educational institutions, including HEIs. The pandemic reached catastrophic levels in Africa and worldwide (Sengai, Mokhele and Makumane, 2022).

Owing to the virus, the random and instant move to fully digital teaching and learning caused frustration, anxiety, and resistance through cyberphobia with discomforting or conflicting experiences (Khoza, 2020a; Mpungose, 2020b). Noting the various experiences, it is evident that there are dysfunctionalities and inequalities in South African HEIs as far as online learning is concerned. Ultimately, the unbalanced contexts and experiences between HEIs during the COVID-19 pandemic have resulted in various institutions completing the 2020 academic year at different times; even though HEIs have LMSs such as Blackboard, Modular Object-Orientated Dynamic Learning Environment (MOODLE), and Web Course Tools (WebCT), to name a few.

On the other hand, agricultural science studies have been found one of the main sciences contributing significantly to the development and sustainability of any economy (Amao & Gbadamosi, 2015; Feldpausch et al., 2019; Foster et al., 2014; Saidu et al., 2017) from subsistence to the commercial farming system (Sibhatu & Qaim, 2017). Therefore, pedagogies and experiences of teaching the subject at any level must respond to contextual realities through impactful practices. My personal experience of teaching agricultural sciences at both basic institutions and HEIs enabled me to understand that the subject is practical in nature and requires specialised digital resources that will respond to its content; more especially because the transformation was informed by a heavy reliance on technology, machines, and/or software resources. This heavy reliance is a result of emerging technology breakthroughs that cover a wide range of fields such as the Internet

of Things (IoT), robotics and artificial intelligence (AI), 3D printing, biotechnology, autonomous machines, quantum computing, to name a few. This digital breakthrough is known as the Fourth Industrial Revolution (4IR) (Khoza, 2020a).

The 4IR is further explained by Mhlanga and Moloji (2020) as the infusion of digital resources that are blurring the lines between technological, physical, and biological worlds. The 4IR alters our experiences and the ways we live, work, and relate to one another through technological revolutions. Khoza (2020a) gives a background description of the former three revolutions. This researcher asserts that the First Industrial Revolution (1IR) used the steam engine to facilitate mechanical production. The Second Industrial Revolution (2IR) used assembly lines and electricity to facilitate mass production; and in the Third Industrial Revolution (3IR) there were electronics, the development of mainframe computing and the internet that enabled digital production. Hence 4IR is characterised by the rapid advancement of numerous technological resources that also include artificial intelligence (AI), whereby machines behave similarly to humans. However, Mbambo et al. (2022), who conducted a study on the use of electronic centres in public libraries in Johannesburg, asserted that the increased digital citizenry due to 4IR that has led to further digital divide must be addressed. It goes without saying that contextual differences in HEIs must be explored. Lumadi (2008) generally maintains that diversity in HEIs must always be considered, even when comparing academic outputs of institutions.

Van Schaik (2009) further states that, acceptance of digital spaces before use thereof is crucial. Sackstein, Coleman and Ndobe (2019) assert that there should be a standard that will meaningfully respond to a particular context. Mpungose (2020a) recommends a blended approach that is

pragmatic and semi-structured through the integration of SMSs. Liebenberg, Benade and Ellis (2018) also support the integration of both structured and unstructured virtual environments to support teaching. These researchers' rationale in supporting the integration is based on their aforementioned assertion that universities have young academics and students who were born and grew up with social media, the internet, and digital technologies. They know no other life than with virtual technology. When it comes to teaching and learning preferences, these digital natives favour platforms that will make them active rather than passive; whilst academics are only trained on the university based LMSs. Prensky (2001) shares the same sentiments that such users have radically changed: they are no longer the people that the educational system was designed for. Therefore, there should also be a radical change and emancipatory pedagogies in order for teaching to be responsive to the digitalised world.

The above therefore means that in higher education, South Africa in particular, the rapid evolution of multiple digital technologies may result in some universities being victims instead of beneficiaries of the 4IR. Part of the transformation is the use of digitalised pedagogical spaces through formal or structured LMSs, with some academics also integrating SMSs (Mpungose, 2020b). The problematic issue in the targeted university is what academics experienced when they were forced by the management and circumstances to use Blackboard to address COVID-19 and lockdown challenges. Some academics were resistant because the new normal took them out of their comfort zones, and forced them to learn new ways of teaching which may not have been in their best interests (Jackman, 2018; Sackstein et al., 2019). Academics, at any level of education, cannot build an environment conducive to learning if not supported to become critical and responsive when teaching. Even students, should the environment not be stimulating, will

experience less progression in learning (Lumadi, 2019). Thus, there was frustration and distress, particularly for academics regarded as digital refugees (Khoza & Manik, 2015) or technology immigrants (Landa et al., 2021; Prensky, 2001).

1.3 Rationale and Significance of the Study

The contextual background presented above acknowledges the evolving landscape of higher education and the significant role that digitalised learning environments play in transforming knowledge dissemination. The acceptance and integration of these environments have become essential in response to the interconnected and technology-driven world (Khoza & Mpungose, 2020). This study's focus on exploring academics' experiences of teaching agricultural science modules with digital learning environments is justified by the notion that a deeper understanding of these experiences provided insights into the interplay between various dimensions of experiences. Thus, this rationale problematises the phenomenon; and emphasises the importance of comprehensively understanding how academics interact with various digital tools in teaching agricultural sciences. By examining both positive and negative experiences, the study aimed at uncovering valuable insights that can contribute to improving the integration and utilisation of the digital tools in agricultural sciences modules; and can also improve teaching in other practical or vocational subjects/modules. By engaging with academics' experiences and interactions with different digital learning environments, a comprehensive understanding was attained. This study shed light on the complex interplay between prescriptive professional experiences, social casual experiences, and personal customised experiences, as well as institutional support, and contextual realities within the nature of the university.

Experiences of integrating the digital learning environment or LMSs with SMSs are not yet well explored, understood, and documented for the emancipation of academics, and attainment of their needs in historically disadvantaged comprehensive universities. The daunting experiences of using digitalised learning environment became even more evident during the COVID-19 lockdown. The ideological paradigm shift required transformation in experiences and/or practices, on which currently there are limited reports. More so, experiences pre- and during COVID-19 should inform pedagogies for post COVID-19. Studies on VLEs have been focusing mainly on Blackboard (Alokuk, 2018; Boshielo, 2014; Uziak et al., 2018); others exploring MOODLE (Mpungose, 2019b, 2019a; Sarfo & Yidana, 2016), while yet others compare Blackboard with MOODLE (Carvalho et al., 2011; Machado & Tao, 2009; Mpungose, 2019a; Sarfo & Yidana, 2016). These studies have not yet offered responsive pedagogies and strategies to integrate LMSs with SMSs. Recent studies on SMS integration (Khoza, 2020b; Khoza & Mpungose, 2020; Mpungose, 2020a; Mpungose & Khoza, 2020b) focused on a research-intensive university that offers different experiences from comprehensive universities. These studies primarily advocate for the use of WhatsApp; with technicalities on the ‘how’ part still lacking. Therefore, what seems to be under-explored is the use of technologies for the needs of academics and students, which should be the first point of departure before addressing institutional and societal needs. Institutional culture becomes another barrier that this study aims to address as a contextual factor in the use of digital learning environment.

Additionally, the practical nature of agriculture amplifies the complexities of utilising digital learning environments effectively. The extent to which current digital learning environments cater to the distinct practical requirement of agricultural sciences and skills development, remains an

unexplored facet. It is also evident that our historically disadvantaged HEIs are compelled to adapt their traditional teaching methodologies to align with the demands of the digital age. Therefore, this study aims to benefit academics, students, university management, and the government, in that these people can be influential in university processes.

1.4 Location of the Study

This study was conducted in one of the historically disadvantaged comprehensive universities in the Eastern Cape province of South Africa. The campus of the university is located in a small rural town where agricultural studies are offered; and the majority of academics are Black Africans. The study involved twelve participants from three different departments: Agricultural Economics and Extension, Agronomy and Livestock, and Pasture Science. All twelve academics are teaching various agriculture modules at different levels.

1.5 Aim and Objectives of the Study

Aim of the study

The aim of the study is to explore academics' experiences of using digital learning environments that they use to teach agricultural sciences modules at a historically disadvantaged university.

Objectives of the study

- Chronicle academics' experiences of digital learning environments that they use to teach agricultural sciences modules at a historically disadvantaged university;

- Rationalise the lessons that can be learned from academics' experiences on the use of digital learning environments to teach agricultural sciences at a historically disadvantaged comprehensive university;
- Understand the rationale that informs academics' experiences on the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university.

1.6 Research Questions

- What are academics' experiences on the use of digital learning environments in teaching agricultural sciences modules at a historically disadvantaged comprehensive university?
- How can academics' experiences enhance the use of digital learning environment in teaching agricultural sciences modules at a historically disadvantaged comprehensive university?
- Why do academics experience the use of digital learning environments in teaching agricultural sciences modules at a historically disadvantaged comprehensive university in particular ways?

1.7 Research Design and Methods

1.7.1 Research approach

1.7.1.1 Research approaches and the positioning of this study

According to Johnson, Onwuegbuzi and Turner (2007), in educational research, there are two distinct common research approaches – qualitative and quantitative. Researchers who utilise these approaches have generally deemed themselves either quantitative or qualitative researchers. Some researchers adopt both approaches, considering themselves mixed-method researchers. The

difference between the two distinct approaches lies primarily in their epistemological, ontological, and axiological assumptions which are noteworthy (Onwuegbuzie & Leech, 2005). The first assumption (epistemology) concerns knowledge and how we are able to know what we know. The second (ontology) is concerned with the nature of reality and what exists. Then axiology is about values, morals, and ways of living (Aliyu, 2015). According to Creswell and Creswell (2018), the qualitative research approach is for subjective exploration of experiences, reflections, understanding and meanings of individuals' or groups' contextual realities and ways of living. Quantitative research is for testing objective theories, and examination of relationships among variables. This study therefore adopted the qualitative approach.

1.7.1.2 Strengths of the qualitative research approach

In qualitative research, people listen to stories, ask questions, and engage in dialogue in order to understand a social phenomenon (Tracy, 2013). This suggests that through observing and talking to others (which in this study refers to academics) we study their experiences, interests, quirks, and sense of humour. Cohen et al. (2018) further assert that qualitative research signifies the use of words to make patterns of meaning more than numbers. Hence, I intended to gain stronger understanding and in-depth information on structured, unstructured, and semi-structured experiences of academics. Such would be achieved through lesson observation, interviews, focus-group discussions, document analysis and reflective activity. Through these qualitative data-generation instruments, I was able to gain more knowledge. This improved and enhanced my understanding of how people use virtual learning environments that respond to their needs as academics at a historically disadvantaged university.

1.7.1.3 Weaknesses/limitations of the qualitative research approach

Collins et al. (2007) assert that in the qualitative research approach participants may not be well informed or aware of the phenomenon and real situation. Cohen et al. (2018) add that there may be difficulties in conceptualising multiple realities. In addressing these weaknesses, I purposively and conveniently selected academics who teach agricultural sciences because they understand contextual realities of teaching the practical subject in the historically disadvantaged university. Furthermore, in the planning stages of data generation, participants were first informed and briefed on the study so that all uncertainties were eliminated.

1.7.2 Philosophical paradigm

1.7.2.1 Research paradigms and the positioning of this study

The word paradigm is a noun derived from a Greek word meaning pattern (Kivunja & Kuyini, 2017). In education, this translates to a belief system that attaches the researcher to a particular worldview (Denzin & Lincoln, 2018). Kamal (2019) further affirms that this is a way in which the researcher views the world that frames a research focus and topic. This suggests that a paradigm influences the way in which the researcher thinks about the topic. Thus, Nguyen (2019) refers to a philosophical underpinning of a researcher's thinking. Through thinking, methodological aspects of a study are revealed together with how data will be analysed. Kivunja and Kuyini (2017) assert that there are several paradigms in educational research which can be grouped into three dominant archetypes. These are positivism, interpretivism, and pragmatism. Several researchers have identified four components which comprise a paradigm, namely, epistemology, axiology, ontology, and methodology (Guba & Lincoln, 1994; Johnson, 2011; Kivunja & Kuyini, 2017;

Nguyen, 2019; Taylor & Medina, 2011). A summary of the three dominant paradigms is presented in Table 1.1 below:

Table 1.1 Summary of Dominant Research Paradigms (adapted from Nguyen, 2019, pp. 5)

Paradigm	<i>Epistemology</i>	<i>Axiology</i>	<i>Ontology</i>	<i>Methodology</i>
Positivist	Objective	Beneficent	Naïve realist	Experimental
Interpretivist	Subjective	Balanced	Relativist	Naturalistic
Pragmatic	Rational	Value-laden	Non-singular	Realistic: either one or both methods

This study was positioned on the pragmatic paradigm in order to understand and transform academics' experiences in using a digital learning environment to teach agricultural sciences.

1.7.2.2 Epistemology of pragmatic paradigm

Pragmatism is a philosophical position that can liberally draw from both qualitative and quantitative assumptions (Creswell & Creswell, 2018). Pragmatism is therefore not committed to a single system of knowledge acquisition, but to what is working in a particular context. Epistemologically, this implies that pragmatists are rational: they consider the possibility of both objective and subjective ideologies in practice. Collins et al. (2007) also utter the same sentiments that the logic in knowledge acquisition includes the use of discovery patterns (induction), testing of hypotheses and theories (deduction), and considering of paramount sets of explanations to understand one's practice and results (abduction). This means that I had to immerse myself within the context, culture, and experience of academics while also structuring their experiences to establish statistical differences in experiences. Themes from interviews, document analysis, focus

groups, and reflective activity were triangulated and compared with quantitative rating of lessons through lesson observation. This allowed extensive knowledge discovery about the use of digital learning environments that include both LMSs and SMSs, and new ideas in moving forward with digital teaching in previously disadvantaged comprehensive universities.

1.7.2.3 Axiology of pragmatic paradigm

Axiology refers to the values and ethics of planning a research proposal or study. Axiology considers the philosophical lens through which the researcher makes valuable and ethical decisions on knowledge formation (Kivunja & Kuyini, 2017). Therefore, a combination of the humanistic/interpretivist and positivistic nature of pragmatic paradigm values social cohesion; and tests old and new ideas, norms, and beliefs about praxis. Since knowledge values are viewed [in pragmatism] as praxis (Thota et al., 2012), political interference can be minimised by the use of appropriate sampling designs that are realistic (Collins et al., 2006). Thus, an educational design research informed the nature of data that emanated from this study. Conclusions and recommendations were not exclusive to participants in this study but can be generalised for various other contexts outside the scope of this study. This suggests that findings from this study can be used even in other comprehensive universities; and even in HEIs such as historically disadvantaged universities of technology and TVET colleges.

1.7.2.4 Ontology of pragmatic paradigm

Ontology is a philosophical assumption about social existence (Kamal, 2019) and/or reality (Guba & Lincoln, 1994). This will be the way I define the truth and reality, together with how the agricultural science lecturers and students define them. According to Guba and Lincoln (2013, p.

39), ontology probes questions such as “What is the nature of reality?” or “What is there that can be known?” Several authors (Bogdan & Bilken, 1998; Daniel & Onwuegbuzie, 2002; Guba & Lincoln, 2005; Guba & Lincoln, 1994; Nguyen, 2019; Singh, 2019; Taylor & Medina, 2011) affirm that, ontologically, a single and ultimate truth does not exist in the pragmatic paradigm. Reality considers both subjectivity and objectivity of what is experienced. Hence, I needed to understand that academics’ experiences are informed by the context and universe that they live in. Their experiences and attitudes towards digital learning differ, and were influenced by their personal, social, and professional encounters with digital technologies.

1.7.2.5 Methodology of pragmatic paradigm

Kamal (2019) asserts that methodology, as an archetype or paradigm, is the method and process by which investigation is conducted. Thus, Guba and Lincoln (2013, p. 39) probe a fundamental methodological question, ‘*How does one go about acquiring knowledge?*’. Creswell and Creswell (2018) deliberate that, more often pragmatic research methodology must be pluralistic in nature, by allowing different methods to derive knowledge on the phenomenon or problem being studied. For the aforementioned reasons, academics’ experiences were explored through the use of both open- and close-ended instruments. Data generated was analysed accordingly, with quantitative data from lesson observation analysed using the Statistical Package for Social Sciences (SPSS) descriptive statistics, and thematic analysis for qualitative data.

1.7.3 Sampling methods/selection of participants

1.7.3.1 Recruitments of participants/sampling techniques

Cohen et al. (2018) identify two sampling techniques: probability and non-probability sampling. Probability sampling, which is also known as randomised or random sampling, occurs when all units have an equal chance or at least have probabilities of inclusion (Etikan & Bala, 2017). Methods include random, systematic, stage, stratified, multiphase, cluster, and area sampling (Cohen et al., 2018; Etikan & Bala, 2017). This suggests that, if they used this technique, all academics would have had a known, non-zero chance of participating in the study. Because this study specified that agricultural science academics would be the only selected group to participate, probability sampling was not used. Non-probability sampling represents the absence of probability when sampling units (Vehovar et al., 2016) and units are selected based on subjective judgements rather than on random selection (Tracy, 2013). Methods include quota, accidental, purposive, snowball, heterogeneity, dimensional sampling methods (Cohen et al., 2018; Etikan & Bala, 2017). This study adopted purposive and convenient sampling techniques for both qualitative and quantitative data. Both techniques belong to the non-probability sampling technique. The study selected fourteen academics who were available to participate in all data-generation methods of this study.

According to Vanderstoep and Johnston (2009), purposive sampling is the selection of participants based on a particular attribute. The selected participants should share equal attributes or there should be equal representation of groups that may not necessarily be equally represented in society. Cohen et al. (2018, p. 218) attest to the above assertions that in purposive sampling a researcher handpicks participants based on their "...judgement of their typicality or possession of the

particular characteristics being sought. They assemble the sample to meet their specific needs”. Thus, I selected only academics involved in teaching agricultural science modules.

In most research, if not all, results would be more accurate and credible were the whole population selected; however, it is impossible to include every subject. The main reason for this is that the population is not always accessible, and the scope is always limited to certain accessible individuals (Etikan et al., 2016). Thus, I chose convenience sampling together with purposive sampling. According to Khoza (2015b), purposive and convenience sampling complement each other if one wants to select a specific, easily accessible population with a particular attribute. This assertion by Khoza (2015b) is aligned with Marshall (1996), who states that convenience sampling involves selecting the most accessible subjects. Marshall further explains that accessibility could be in terms of costs (least costly), time, and effort. Etikan et al. (2016) further deliberate on convenience in terms of practical criteria such as geographical proximity; and also identified willingness to participate in the study as a component of convenience.

1.7.4 Data generation

Data generation is the process by which the researcher collects information from a selected population (Cibangu, 2010). For addressing the key research questions, data were generated qualitatively by reviewing academics’ portfolios or learning guides (document analysis), reflective activity, semi-structured (open-ended) interviews, and focus-group discussions. Quantitative data were collected by evaluating virtual lectures (participant observation) and by using closed-ended evaluation tool surveys to evaluate the sessions. These methods assisted comprehensively in

addressing this study's research question and enquiring about in-depth experiences of the academics.

1.7.4.1 Qualitative data-generation methods

- **Document analysis**

Qualitative document analysis occurs when the researcher systematically reviews printed or digital texts in order to understand, interpret, and make meaning of a phenomenon (Onwuegbuzie et al., 2012). Empirical knowledge and understanding of experiences or practices can be explored through reviewing or evaluating documents (Sommerhoff et al., 2018). Academics' digital or printed (participants' preference) teaching portfolios or learning guides were reviewed and analysed in order to understand the nature of the academics' teaching experiences. A document analysis review form with themes was used in addressing the descriptive research question: "What are academics' experiences of the use of digital learning environments in teaching agricultural sciences modules at a historically disadvantaged comprehensive university?" After which reflections took place to unpack my observations from the portfolios.

- **Reflective activity**

Reflection is a process, often used in education, in which people apply introspection and check their reflections in the figurative mirror of their own experiences and practices. By so doing, people become aware of their own knowledge and teaching strategies and are able to evaluate their own performance (Dumlao & Pinatacan, 2019; Khoza, 2018). According to Zulfikar and Mujiburrahman (2018), a reflective activity is a deliberate and persistent strategy in which

educators can think, conceptualise actions, and represent approaches that respond to the need to seek ways of improving their practices. This suggests that all fourteen academics needed to reflect on their experiences of using digital learning platforms to teach agricultural science modules. A reflective activity in this study was structured to address the ‘what’ question: “What are academics’ experiences on the use of digital learning environments in teaching agricultural sciences modules at a historically disadvantaged comprehensive university?” – a descriptive question.

- **One-on-one semi-structured interviews**

According to Sileyew (2019), semi-structured interviews are a data-generation tool in which the researcher has a set of guiding questions to ask people who agree to participate in a study. Participating people are considered knowledgeable on the topic of interest (Creswell, 2003; Sileyew, 2019). Semi-structured interviews have been used for many years in qualitative and mixed-methods research (Denzin & Lincoln, 2018). Such interviews are increasingly viewed as a moral enquiry (Creswell & Creswell, 2018). Therefore, semi-structured interviews were used for answering the philosophical question (‘why’ question) which is: “Why do academics experience the use of digital learning environments in teaching agricultural sciences modules at a historically disadvantaged comprehensive university in particular ways?.

- **Focus-group discussion**

A focus group is defined by Onwuegbuzie et al. (2010) as a qualitative method of generating data on a particular topic from more than one individual at a time. Cohen et al. (2018) describe the

focus group as the interviewing of a group of individuals in which reliance is entrenched in the engagement and interaction within the group. Cohen et al. (2018) also state that the topic to be discussed is supplied by the researcher; and it yields a collective rather than an individual view. This means that in a focus group, participants will interact more with one another than with the researcher. Hence, academics involved in this study were dominant in the discussion, mainly facilitating the discussion. Academics further aimed to gain a collective and in-depth addressing of the same philosophical question as by the semi-structured interviews. This was conducted through face-to-face engagement due to load shedding schedules; and because most academics were available in their offices during times when there were power cuts.

1.7.4.2 Quantitative data collection

- **Lesson observation (participant observation)**

Participant observation is a data-collection method in which a researcher watches events and particular behaviours, seeing practical characteristics in their naturalistic nature. The researcher takes advantage of the physical and visual space; and involves methods such as archival records, documentation, participant observation and direct observation (Sileyew, 2019). For the purpose of this study, participant direct observation was appropriate in addressing the operational question: “How can academics’ experiences enhance the use of digital learning environments in teaching agricultural sciences modules at a historically disadvantaged comprehensive university?” Answers revealed how the teaching was executed. Timetable and links to access virtual classes including session recordings for the full semester were requested, and an observation form with Likert

scaling (ranging from unsatisfactory to outstanding) was used. Quantitative data in this qualitative research were used as another method for triangulation purposes.

1.7.5 Data analysis

Data analysis is defined by LeCompte (2000) as a process of reducing a large amount of generated data to make a story and its interpretation. This means making sense of the data generated. In research, once data collection or generation is complete, researchers have to decide how they will analyse it (Aronson, 1994). In this research, qualitative data was analysed using thematic analysis following the principles proposed by Braun and Clarke (2006). Quantitative data used the Statistical Package for Social Sciences software (SPSS).

1.7.5.1 Qualitative data analysis: Thematic analysis

According to Braun and Clarke (2006, 2012), thematic analysis is a process in which the researcher identifies, analyses, and reports patterns (themes) within data. Thematic analysis should be a foundational data analysis method for qualitative studies and mixed methods. Several researchers (Castleberry & Nolen, 2018; Lawless & Chen, 2019; Vaismoradi, Jones, Turunen, & Snelgrove, 2016) have noted that thematic analysis has been criticised by other researchers claiming that it lacks a proper definition and clear or concise guidelines. However, Braun and Clarke (2006) assert that capturing important aspects of the data in relation to research questions is a guideline. In addition, categorising patterned responses or meanings within a data set is what constitutes a thematic analysis. Thus, I was able to identify meaningful patterns (themes) as they emanated from the data, and managed to thematise, interpret, and make sense of academics' experiences.

1.7.5.2 Quantitative data analysis: Statistical analysis

According to Collins et al. (2007), statistical analysis refers to collecting, interpreting and presenting a large amount of data in order to uncover patterns, similarities and trends from a sample. In this study, Version 28.0 of SPSS was used to uncover frequency distributions of academics' teaching experiences. Therefore, quantifiable numerical coding as seen in the Likert scale was used for analysis.

1.8 Dependability, Transferability and Trustworthiness, Validity and Reliability

According to Cohen et al. (2018), dependability addresses reliability in qualitative research, and addresses the consistency of the process used in research and its findings over time. Through UTAUT-2 and relevant literature on the archetypes enhance dependability and transferability as this study can be applicable to other similar contexts. Validity and reliability represent key strengths of a research study, in that they ensure the accuracy of findings for the researcher, participants, and readers (Creswell & Creswell, 2018). Cohen et al. (2018) define validity as the extent to which an instrument effectively measures and describes the intended subject, encompassing all pertinent elements; while reliability encompasses dependability, replicability, and consistency across instruments and participants.

In this study, data collection was aligned with the UTAUT-2 and related literature, ensuring the findings' legitimacy. Both qualitative and quantitative methods were employed for precise, dependable, and consistent results applicable to other historically disadvantaged universities or HEIs. All the data-collection methods effectively addressed the research questions.

1.9 Ethical Issues

Almost all qualitative research involving human participants is bound by firm ethical principles (Cohen et al., 2018; Creswell, 2003); and this study was no exception. Guba and Lincoln (1994) characterised ethics as a system of principles governing acceptable conduct, encompassing a notion of right and wrong accepted by individuals and social groups. Consequently, meticulous consideration was given to moral values and rights of the participating academics in this study, as well as to those connected with or impacted by the study. This entailed securing ethical clearance, acquiring informed consent, and ensuring participants' anonymity during the reporting of their contributions. All these measures were diligently obtained prior to the commencement of data generation. The study obtained ethical clearance from the University of KwaZulu-Natal's Humanities and Social Sciences Research Ethics Committee. This clearance was submitted to relevant universities for permission to involve academics. Informed consent was diligently obtained from participants, clarifying potential consequences, risks, and benefits, while ensuring the option to withdraw should any discomfort arise. Confidentiality and anonymity measures were implemented to protect participants' identities, employing pseudonyms for academics and the university. Student data was not utilised, maintaining their anonymity.

1.10 Overview of the Study

The study's title is *Reconceptualising Academics' Experiences of Using Digitalised Learning Environments to Teach Agricultural Sciences at a South African University*. The study consists of nine chapters; each chapter conceptualises a different contribution to the findings of the study.

1.10.1 Chapter One: Contextual overview and objectives of the study

Chapter One serves as an introduction to the research, furnishing the reader with an essential context from which to grasp the study's purpose. Chapter One presents the rationale, scope, and significance of the study, explaining the necessity behind its execution. Furthermore, the chapter also preliminarily outlines the methodology of the study. A concise preview of the subsequent chapters is also provided, offering an overview of the entire doctoral thesis.

1.10.2 Chapter Two: [re]-Conceptualising experiences of using digital learning environment to facilitate teaching and learning.

Chapter Two offers a comprehensive literature review focused on utilising digital learning environments in both academic and professional settings. The research objectives and questions from the preceding chapter guide the exploration of this literature. The chapter seeks to establish a theoretical and conceptual foundation of the study while pinpointing gaps and inconsistencies in current knowledge. The literature conceptualised and comprehended global and local experiences with digital teaching and learning environments. The chapter concludes by categorising experiences into three levels: prescribed, casual, and customised. The experiences laid the groundwork for various identities shaped by diverse contextual realities adopting a digitalised learning environment in agricultural sciences and other fields in general. This conceptualisation deepens the understanding of opportunities and challenges faced by academics teaching agricultural sciences modules at a historically disadvantaged university. Ultimately, Chapter Two forms a crucial basis for probing university stories, illuminating how HEIs navigate the shift from face-to-face to digital learning spaces.

1.10.3 Chapter Three: University stories: gunpoint experience

Chapter Three explores the diverse experiences within higher education during the mandatory shift to digital learning due to the COVID-19 pandemic. This transition led to various national responses, including institution closures and the challenge of moving to digital education. This chapter also discusses the differences between research-intensive institutions and comprehensive HEIs, driven by international rankings, and their experiences thereof. Chapter Three explores these experiences through university narratives and policies, setting the stage for Chapter Four's exploration of the theoretical underpinning of these experiences.

1.10.4 Chapter Four: Theoretical underpinning of academics' experiences: Unified Theory of Acceptance and Use of Technology-Two

Chapter Four introduced the UTAUT-2 framework to understand academics' experiences with digital learning environments in a historically disadvantaged university. Chapter Four explores UTAUT-2's principles. The chapter proposes a new theory, CATEP, which customises UTAUT-2 to align with diverse experience levels. CATEP emphasises context-specific adaptation, cultural sensitivity, and inclusive education in teaching agricultural sciences.

1.10.5 Chapter Five: Conceptualising academics' experiences

Chapter Five outlines the study's design, including research objectives, the pragmatic paradigm, the qualitative approach, and participant selection.

1.10.6 Chapter Six: Actualising academics' experience

Chapter Six builds on the methodological foundation set in Chapter Five, and probes into data-generation methods, including reflective activities, document analysis, lesson observations, interviews, and focus-group discussion, along with the corresponding data-analysis methods. The chapter addresses the limitations, ethical considerations, and the establishment of trustworthiness, validity, reliability, and rigour. Overall, Chapter Six provides a comprehensive research plan for understanding academics' experiences with digital learning environments in teaching agricultural sciences.

1.10.7 Chapter Seven: Thematic presentation and conceptualising findings from qualitative data

Chapter Seven focuses on presenting the findings of thematic analysis conducted on the qualitative data obtained from the experiences of academics teaching the agriculture module. The thematic analysis process is detailed, involving the identification and formulation of initial patterns and codes into themes, both inductively and deductively. The five themes that emerged related to the adoption and use of digital learning environments. These themes are highlighted and supplemented by significant verbatim utterances from participants. The presentation adheres to the established guidelines for comprehensible communication of findings. This chapter sets the stage for the subsequent chapter, which will further extend data presentation by presenting results from the statistical analysis of quantitative data.

1.10.8 Chapter Eight: Statistical presentation and conceptualisation of quantitative data

Chapter Eight conceptualises quantitative data collected from lesson observations. The chapter outlines the data-collection process, analysis with SPSS, and presentation through descriptive statistics, tables and charts, and graphs. Findings presented by this chapter contribute to understanding academics' experiences and practice, paving the way for further discussion and consolidation of the study.

1.10.9 Chapter Nine: Reconceptualising the findings; consolidating and positioning experiences

Chapter Nine synthesises the findings from both qualitative and quantitative analyses of academics' experiences in the context of agricultural sciences at a historically disadvantaged comprehensive university. The chapter discusses propositions generated from the analysis; and introduces the Contextual Adaptive Tech-Enhanced Pedagogy (CATEP) framework. By aligning with the identified themes and addressing tensions that exist between prescribed, casual, and customised experiences, the CATEP framework enhances teaching experiences and student learning processes. The study's implications for teaching and learning enhancements are highlighted, emphasising the potential of CATEP to create engaging and effective digital learning environments. The study contributes to a comprehensive understanding of academics' experiences and practices, providing valuable insights for the improvement of teaching and learning in this academic context.

CHAPTER TWO

[Re]-CONCEPTUALISING EXPERIENCES OF USING A DIGITAL LEARNING ENVIRONMENT TO FACILITATE TEACHING AND LEARNING

2.1 Introduction

This chapter aims to provide a comprehensive review of the literature on the use of digital learning environments in both academic and professional contexts. The research objectives and questions presented in the previous chapter serve as a basis for exploring the literature. Cohen et al. (2018) stipulate that a literature review is essential for gaining an understanding of the theoretical and conceptual background of a study, as well as for identifying inconsistencies and gaps in the existing knowledge. Therefore, this review aims to conceptualise and comprehend the experiences of utilising digital learning environments globally and locally.

A recent study by Khan et al. (2022) conducted a systematic review of literature on the use of digital learning environments in higher education. The study found that, while digital learning environments have numerous benefits, such as increasing accessibility and flexibility, there are also challenges that must be addressed, such as ensuring digital literacy and addressing technological issues. Another recent study by van der Spoel et al. (2020) investigated the experiences of teachers in using digital learning environments during the COVID-19 pandemic. The study found that teachers faced various challenges, such as lack of training and support. However, the study also recognised the potential of digital learning environments for enhancing student engagement and collaboration. This suggests that, although academics experienced challenges in using DLE, such as lack of training and support, they also recognise the potential to

improve their experiences including student involvement and cooperation. Thus, to fully utilise the advantage of DLE, several issues must be addressed. This review aims to provide insights into these experiences and challenges.

The critical construct of experiences serves as the basis for the line of reasoning that is presented in this chapter. These experiences are categorised as follows: prescribed experience (structured), casual experience (unstructured), customised experience (semi-structured), and gunpoint experience (see Figure 2 below). According to Khoza (2021), one's life experiences produce identity. Therefore, the literature presented in this chapter serves as the foundation for identifying diverse identities that depend on various contextual realities of adopting digitalised learning environments in institutions of higher learning. Journal articles, books, theses, stories from the media, and papers pertaining to policy are the sources that contribute to this chapter.

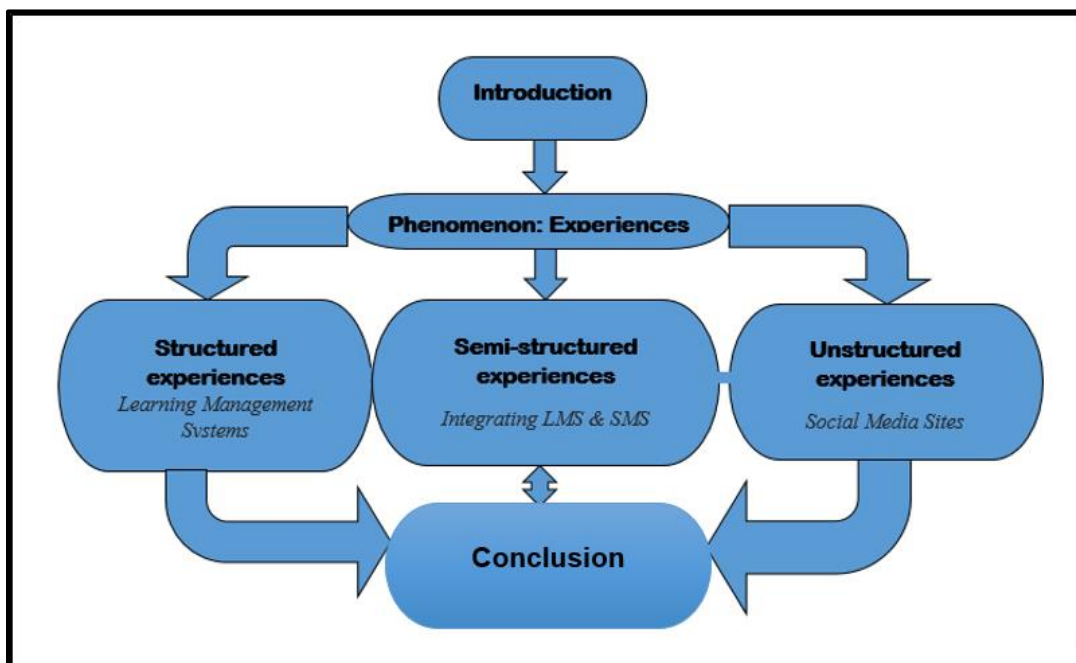


Figure 2.1 Chapter Two flow diagram

2.2 Conceptualising the Phenomenon: Academics' Experiences

Dewey (1938) who is amongst the most distinguished philosophers and educationists conceptualised experience as a consequence of organism-environment interaction. Dewey (1938) explains that continuous and/or consistent participation in actions, histories, cultures, and circumstances constitutes experience. This simply means that experience is the interactivity between humans and the environment in which they live. Bernstein (1961), who is another distinguished philosopher in education, shares a similar view. This researcher adds that the context in which humans live, and what the environment provides, informs the nature of experiences that those humans will have in that particular environment. In academia, Khoza (2021a) describes environment as one's personal, professional, and social settings that collectively produce an identity that informs practice and experience. This suggests that academics' experiences are informed by what Mpungose (2018) describes as either formal (structured), informal (unstructured), or non-formal (semi-structured) interaction within their teaching world.

Mpungose (2018) proposes that formal experiences entail a regulated approach to performing a specific task, in which established rules and methods must be followed. In the academic context, this means adhering to prescribed patterns in effectively using virtual spaces such as Blackboard, Moodle, and WebC, which are professional learning management systems (LMSs) recommended by higher education institutions (HEIs). Ndlovu (2022) agrees with Mpungose's (2018; 2019b) view that informal experiences involve unstructured ways of performing a task. Additionally, Mpungose (2019b) asserts that informal experiences include the use of social media sites (SMSs) such as Facebook, WhatsApp, and Telegram, which are not mandated by HEIs. Non-formal experiences are partially structured and involve a combination of structured and unstructured

experiences. This means that the semi-structured experience of using digital tools entails the simultaneous use of both LMSs and SMSs.

The concepts that have been discussed illustrate that experience is the best instructor that can explain both how and why people do things the way that they do. Farrell (2020) investigated a hermeneutic phenomenological study on misunderstandings of lived experience in education; and the missed opportunities that result from such misunderstandings. Farrell (2020) acknowledges that education as a field is predicated on paying attention to, and expanding on, the information and experiences of other people. According to Vyas and van der Veer (2005), one of the most valuable possibilities available to humans is the capacity and capability to gain knowledge from the experiences of others. The conclusion of the above study affirms that this is one of the most valuable possibilities accessible to humans. In addition, Vyas and van der Veer (2005)'s study emphasises that we learn by observing what other people are doing. Furthermore, the study revealed that engaging in exploratory activities and reading about what has been documented provides us with a unique experience that may be distinct from the activities that we see other people engaging in.

The general understanding of the concept 'experience' in education, has been one of the concepts most commonly used and recognised by various authors (Airey, 2011; Hlatshwayo & Fomunyam, 2019; Maureen, 2016; Mpungose & Khoza, 2020; Pekkarinen & Hirsto, 2017; Sarfo & Yidana, 2016). Khoza (2021b) asserts that in the twenty-first century there has been a rise in cross-disciplinary experiences and interests in the body of education. Pekkarinen and Hirsto (2017) conducted a study that explores lecturers' experiences of their pedagogical competency

development at university level. In the above-mentioned study lecturers reflected on their long- and short-term university pedagogical training experience, and how such experience informs the manner in which they teach. Reflections from lecturers revealed that in a period of nine months' training during a university pedagogical course, there was a significant development in pedagogical competency. Adding to the above, a similar study by Guasch et al. (2010) explored university teacher-training experience competencies in a digital teaching and learning environment. The study outlined that the manifestation of digital resources at universities requires ongoing training. Maphalala and Adigun (2021) assert that training must be mandatory, regardless of age, gender, context, or experience. This is because through experience over time, we develop skills and knowledge (Baatjes et al., 2014).

Furthermore, regarding experience, COVID-19's global expansion caused the suspension of face-to-face teaching and learning across nations, globally. This resulted in the interruption of original teaching plans of HEIs (Chen et al., 2020). Such also brought various kinds of experience; and the sudden shift created a sense of urgency for academics to rethink their teaching experiences. For far too long South Africa has been grappling with that urgency. Even when HEIs were shut down amid protests to decolonise education, discussions to rethink experiences in HEIs intensified. However, nothing was mandatory, and as a result when institutions re-opened after protests, academics returned to their normal face-to-face teaching (Hlatshwayo & Zondi, 2020; Jackman, 2018; Sackstein et al., 2019). For these reasons, academics' ways and reasons for using particular digital learning environments may be informed by how other academics use them (unstructured experience). Their rationale may also be influenced by what they read or simply by following the prescribed steps (structured experience). Also, those who may be savvy and well exposed to social

media may, to some extent, use SMSs concurrently with LMSs (semi-structured experience) to facilitate teaching and learning (Mpungose, 2019b).

Dewey's conceptualisation of the experience has been adopted by many other scholars. Sackstein et al. (2019b) conducted a study on how lecturers reflect on their experiences of using formal learning management systems (LMSs) at a historically disadvantaged university in South Africa. Yusof et al. (2019) explored a similar theme but focused on the techno-pedagogical approach used by academics in universities in Malaysia. In addition, Chen et al. (2020) studied lecturers' experiences of Blackboard collaboration in open universities in Australia. Despite that the three studies above focused on distinct contexts and varying aspects of digitalised education; the phenomenon was academics' experiences. Thus, academics are required to think, rethink, and account for their past and current practices in relation to their lived experiences. According to Sokhulu (2021), it is crucial that academics recognise their professional, social, and personalised experiences when considering the use of virtual learning environment in any line of work.

Conversely, Sokhulu (2021) and other researchers overlook the enforced 'gun-point' experience. However, Khoza (2021a & b) writes about natural experience, which is a sudden experience in which no one anticipated engaging. All the levels of experiences are unpacked in this chapter. The section below deliberates on experiences (structured, informal/unstructured, semi-structured and gunpoint) that inform the use of digital learning environment to facilitate teaching and learning.

2.3 Structured Experience: Prescribed Experience

Structured experience, also known as formal experience, and in this study referred to as *prescribed experience*, is a digital experience gained solely for professionalised attainment of pedagogical content knowledge (Sokhulu, 2021). Structured experience is the use of formal digitalised learning environment when teaching. Mpungose (2020) stipulates that such experience is driven by precise chronological steps and instructions (prescription) to be followed. Thus, structured experience can appropriately be referred to as prescribed experience, having strong adherence to its hierarchy in terms of steps and/or procedures (prescription). Thus, this experience, as its name suggests, is hierarchically and/or systematically controlled. Furthermore, when academics are using a prescribed digital platform, they are shown how content should be disseminated, and how it will be received by students. In other words, teaching and learning have clear and non-negotiable rules.

Furthermore, prescribed experience is also revealed in a study by Chen et al. (2020). Since the year 2013 when the Massive Open Online Course (MOOC) was widely used in China, universities were discouraged from using the traditional face-to-face teaching and learning. However, due to accessibility concerns, digitalised teaching, even today, is not embraced by everyone, even though there are other prescribed tools that are used for formal teaching and learning. Adding to the above, Khoza and Fomunyam (2021) assert that, for prescribed (professional experience) needs, which they also refer to as esteem needs of any curriculum, most academics either solely or heavily rely on formal digital resources that each institution subscribes to, or prescribes. This is similar to what Hoadley and Jansen (2013) state in their book *Curriculum: Organising knowledge for the classroom* that, in curriculum as a profession (prescribed or professionalisation experience), teachers are the only guides that give students instructions on rules to follow on content, activities,

assessment, and procedures. Any deviation from what is prescribed is not deemed a significant part of what students should know and understand to attain curriculum goals. According to Khoza and Fomunyam (2021), success in this type of experience is assessed by adhering to or mastering a predefined linear hierarchy of organised steps, rules and processes. Thus, communication between academics and students is exclusively for academic matters, using only a formal digital learning environment (DLE) or learning management systems (LMSs) such as Blackboard, Molecular Object-Orientated Dynamic Learning Environment (MOODLE), and also emails (Maphalala & Adigun, 2021).

Prescribed experience as described above, is driven by a competence-based curriculum (Hoadley & Jansen, 2013), and demands the knowledge, skills and ability to perform at a level that is consistent with the criteria set for a certain profession (Likisa, 2018). Makumane and Khoza (2020) also argue that the application of professional and theoretical knowledge contributes to practice. This suggests that practice is professionally inclined; and that the emphasis is on what academics need to accomplish to attain certain standards of competency in the use of digital tools that a particular HEI prescribes. Competencies are declarations of the abilities, a level of knowledge, and an understanding necessary for work (Alvunger, 2018). Competencies also define the minimum level of professional ability that must be maintained in the workplace (Likisa, 2018). Thus, prescribed (structured) experience serves to advance the academics' professional identities. According to the ideas that were stated earlier, academics should be encouraged to pursue the progression of prescribed experiences to define their professional demands. In the end, their social identities, which are based on their informal and unstructured experiences, as well as their personal

identities, based on their personalised and semi-structured experiences, are not acknowledged. Academics thus continue to be misidentified in their field of work.

Furthermore, Bernstein (1999) in conjunction with Hoadley and Jansen (2013), also outline that prescribed experience is in line with formal curriculum which is centralised performance and fits the vertical curriculum. According to Shulman (2019), in a vertical curriculum, knowledge of material and a manual is mandated and prioritised over other archetypes of experiences. Therefore, when experiences are prescribed for academics, the primary focus is addressing the curriculum and/or HEIs' needs, and in the way that the university requires. Thus, when it comes to using the digitalised environment, academics should follow what the university prescribes. Such experience is viewed by several authors as not necessarily addressing personal needs (Czerniewicz & Brown, 2014; Mpungose, 2020a; Ngubane-Mokiwa & Khoza, 2016; Ramrathan et al., 2021; Sokhulu, 2021).

Because it affects HEIs' professional standing when it comes to utilising digital learning environments, the phenomenon of prescribed experience is an issue that deserves to be critically rethought, as was suggested by the preceding discussion. The casual (unstructured) and customised (semi-structured) experiences, as well as the prescribed (structured) experiences, must be discussed in conjunction with the prescribed (structured) experiences. This is because it is possible that the prescribed experience will not inform the experiences in universities. Having said that, the following section expands on the principles of prescribed experiences in the use of a digitised learning environment.

2.3.1 Prescription of virtual content

Prescribed experience demands the structured content knowledge, abilities, and capacity to accept and use digital tools according to the standards required to deliver the content (Alvunger, 2018). The prescription of content is driven by a performance-based curriculum (Hoadley & Jansen, 2013). Khoza (2019) asserts that the hierarchy of steps and/or procedures in prescription experience has to be systematically followed in order for one to master any given task. Therefore, when academics deliver agricultural sciences content, they have to follow a particular guide with clear instructions and objectives in order to master the contents of the virtual learning environment.

Furthermore, Khoza (2019) stipulates that the content in prescribed experience is strictly for formal learning. Thus, learning, in prescribed experience, takes place only when the stipulated instructions on how to deliver content that is also structured, are followed. Therefore, academic content is published on and through formal learning management systems such as Blackboard and Moodle (Moonsamy & Govender, 2018). Alvunger (2018) also avers that content is focused; and knowledge requirements are specific and uniform. Academics must therefore learn the same content of digital tools, and instructions that are supplied. Furthermore, the content that they will learn and teach has to be assessed.

Alvunger (2018) further maintains that in prescribed (structured) content, teaching is more orientated to the replication of information and/or knowledge in accordance with what Strandler (2017) deems the intrinsic dimensions of the content; and less on the critical examination of extended skills and capabilities of students. There is therefore a clear delineation of what must be taught. This is similar to the South African Curriculum and Assessment Policy Statement (CAPS)

in which each subject is assigned its own specifically determined content (Khoza, 2018) According to Hoadley and Jansen (2013), when making judgments, only documented facts, school knowledge, and global standards are taken into account. Thus, content that is prescribed should be informed by researched facts and schooled knowledge; and furthermore, be dependent on professional opinion. Academics teaching content, whether animal production, plant studies, soil science or agricultural economics and extension have content that is hierarchically organised and built from existing knowledge and research. The hierarchy of knowledge ranges from simple to complex. Prasad (2021) asserts that academics teach the same content, and students acquire the same knowledge from the lowest level to the highest. Sokhulu (2020) echoes Alvunger's (2018) proclamation that prescribed content caters to standardised and vertical curriculum where there is reinforcement of knowledge.

When content is prescribed, social experiences are less important because the prescription is clear in terms of the content to be covered, how and when it should be covered, and the criteria for evaluating such (Alvunger, 2018). Shulman (1986) further asserts that a teacher's pedagogical content knowledge is central to a successful enactment of any curriculum. These assertions give an indication that academics must be specialists in the field in order to be able to deliver the content; and for students to meet the subject objectives. Furthermore, academics must have conducted in-depth research; and they must have published in the field that they are teaching. Pedagogical content knowledge also informs how content is assessed. Thus, the next section discusses how content is assessed by academics in prescribed experience.

2.3.2 Assessment

Assessment is an important component of teaching and learning because it provides evidence of learning, and how to improve knowledge (Newton & Martin, 2013). With the background of prescribed (structured) experience, there is no doubt that prescribed and/or formal assessment, as explained by Prasad (2021), has hierarchy; and in education this is predominantly characterised according to levels found in a taxonomy developed by Benjamin Bloom in the 1950s. The taxonomy, according to Masapanta-Carrión and Velázquez-Iturbide (2018), states the learning goals and classifies the knowledge the student is expected to attain. Therefore, in prescribed experience, assessment is pitched at particular levels at which students' performance is measured. There are six levels according to Bloom's Taxonomy: knowledge, comprehension, application, analysis, synthesis and evaluation (Sobral, 2021).

Having said all the above, it is clear that assessment can be *for* learning (customised experience) because it aims to adjust activities in order for learning and improvement to take place. Assessment can also be unstructured *as* learning informally unfolds (casual experience). For prescribed experience, where goals are put in place, and have to be attained, assessment *of* learning that took place is given at the end of a learning cycle or unit. This form of assessment is structured and is measured against the prescribed objectives, as Montenegro-Rueda et al. (2021) outline. All three archetypes of assessment are represented by Figure 2.2 below, and this section focuses on the latter.

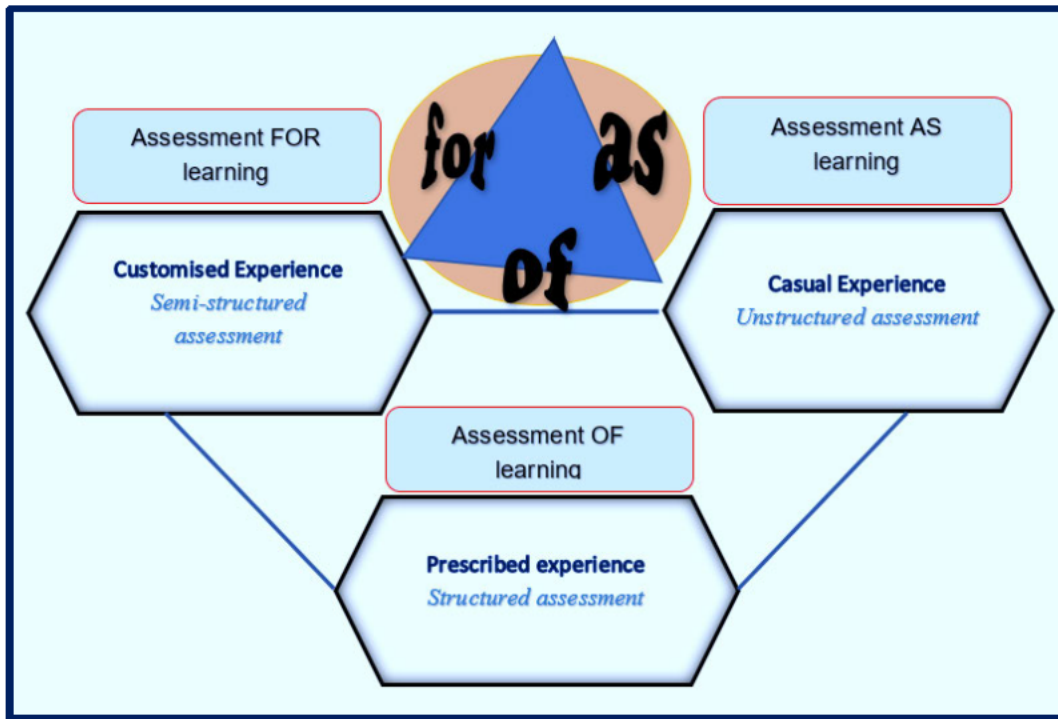


Figure 2.2: Archetypes of assessment [adopted from Mpungose (2017)]

According to studies (Luckett & Sutherland, 2000; Sobral, 2021; van den Akker et al., 2009), assessment of learning places the content and objectives at the centre of teaching and learning. Mpungose's (2019a) study which explored academics' reflections on the influence of Moodle's curriculum on the success of students provides evidence in support of this assertion. The researcher states that assessment of learning is structured; and the content that informs the assessment is prescribed, and chronologically guided by a planned curriculum which is clearly outlined in a module guide. This type of assessment is informed by prescribed experiences and is formal in nature. In other words, structured assessment is concerned with agricultural sciences' needs.

The influence and effectiveness of the curriculum on the students' cognitive capabilities may be determined via assessment of learning (structured assessment) in accordance with Newton and

Martin (2013). This is supported by Mpungose (2020a) who deliberates that structured assessment is concerned with the effect that the enactment process has had on the curriculum that has been obtained. Furthermore, according to Huda and Siddiq (2020), structured assessment can be administered by means of digital technology, and is summative in nature. It can take the form either of examinations, presentations, or assignments. One of the many good effects that digital assessment has is that it makes it possible for students to receive immediate and individualised feedback on their work because it makes use of online submission and marking. This implies that academics can use summative assessment to grade students' performance through a digitalised environment such as Blackboard. However, the gap in knowledge and experience is addressing how digitalised assessment can respond to the practical nature of agricultural sciences. Academics in this study present responsive pedagogies of teaching agricultural sciences using digitalised environments.

Furthermore, Kelly (2006) posits that, during the teaching and learning process, evidence is gathered as part of the assessment process in order to quantitatively determine the extent to which a person possesses a particular quality, level, or attribute. In addition to this, Akimov and Malin (2020) make mention that assessment generates quantitative information for grading purposes such as scores and numerical values and percentages. According to Mpungose (2017) and Montenegro-Rueda et al. (2021), assessment involves establishing whether the goals that were originally prescribed have been accomplished. Taking this one step further, we may assert that assessment is the curriculum in that it reflects the real curriculum in terms of what students should have accomplished by the end of the learning experience. In the same vein, Hoadley and Jansen (2013) state that assessment guides academics on what and how the content should be taught. It also

determines the level of complexity that assessment tasks should be pitched at in order for objectives to be attained. Therefore, assessment activities need to be aligned with the goals, content, and resources that respond to the context and practical nature of agricultural sciences. This also relates to the use of online assessment, which should not detract from the practical nature of agriculture.

2.3.3 Resources

In the preceding section on assessment, the importance of aligning assessment with curriculum goals and content is emphasised. According to Omotayo and Haliru (2020), in today's world, alignment of assessments with curriculum goals and content will never be possible unless both academics and students have access to digital resources. Mutongoza et al. (2021) believes that inequalities in education have emerged as a primary problem as a direct consequence of the hurried implementation of online education. HEIs, including schools in rural areas, have criticised the lack of suitable resources in comparison with their counterparts in metropolitan areas. Thus, Mkhize et al. (2020) assert that academics may become perplexed by new curriculum expectation and digital resource requirements if they are not aware of or prepared for them. Khoza (2018) identifies three resources that academics can successfully use in order to implement and enact any given curriculum. These are hardware (HW), software (SW), and ideological ware (IW). Academics must be aware of the digital resources that underpin their teaching of agricultural sciences at a previously disadvantaged university.

In addition to the aforementioned, van den Akker et al. (2009) found that the intended curriculum and prescribed usage of any resources are framed by IW resources as well as by the creator of a

specific HW or SW resource. Therefore, academics have the prescription for digital resources to use; and academics are deemed the only officials to effectively deliver content. The ideology, attitudes, and intention to use are informed by the institution's mandate and policy makers. Dewey (1938) contends that attitudes and beliefs are the central pillars of IW resource. Zulfikar and Mujiburrahman (2018) agree with the deliberation above in that the ideology that one has about one's work informs strategies that address the need to identify ways of enhancing teaching experiences.

IW resources may also be related to digital literacy, which Ktoridou and Eteokleous-Grigoriou (2011) refer to as the capability of an individual to be conversant with computerised operating systems and application software. According to Spires et al. (2017), digital literacy encompasses a wide variety of approaches to reading and writing in digital format across a variety of media formats such as words, text scripts, visual displays, multimedia presentation, motion graphics and audio forms. Academics are expected to develop a positive attitude and show literacy to teach effectively using a digitalised learning environment for professional purposes. Furthermore, there is no doubt that LMSs such as Blackboard, Web CT, and Moodle to name a few, have to be understood and used the way they are prescribed in order for one to show relevant literacy. This also suggests that the acceptance, attitudes, and skills an academic possesses in prescribed experience have less influence on the use of a particular resource, prescriptions being non-negotiable. Khoza (2021b) and Sokhulu (2021) affirm that academics' attitudes (IW) towards using digital technology for prescribed experience is dominated by LMSs prescribed by HEIs, because they focus on a performance-based curriculum.

HW resources are tangible tools that support SW applications (van der Meij & Maseland, 2021); and, according to Sokhulu (2020), HW tools include computers, Smart Boards, projectors, smartphones, amongst others. For prescribed experience, HW resources are compatible with the installation of LMSs (SW) for the purpose of teaching and learning. The key to effective usage of both HW and SW resources, according Mncube and Mthethwa (2022), is advancement in a variety of technologies. Such includes those pertaining to internet bandwidth quality, computer systems which are easily accessed and interoperable, portable computer systems, and smartphones.

An earlier study by Adzharuddin and Ling (2013) found that LMSs in HEIs have been reported as the primary SW resource that connects academics and students. In addition, LMSs have been found to be the only official portals that provided an avenue emulating a classroom where even classrooms materials and activities can easily be shared. As a result, it is important to keep in mind that LMSs are HEIs' prescriptions of software that have been given official status in order to promote interaction between academics and students. In addition, the study reveals that the quality of internet bandwidth and accessibility, two factors that are essential for running software resources, are also addressed in current research, These two factors that run SW resources, are also mentioned in recent studies (Cunha et al., 2020; Dube, 2020; Faturoti, 2022; Lesame, 2021; Maphalala & Adigun, 2021; Songca et al., 2021), and have always been more easily accessible in urban areas than in remote areas. Even outside the university campus, students in urban areas usually have easy access to internet cafes that are within walking distance from their residences. Some have smooth running internet access within their home to run LMSs for teaching and learning. The divide in terms of access to SW resources has always been there. In South Africa and in many other African countries, prescribed experience may also be challenged by access to

digital skills (IW), as well as affordable quality internet coverage that is still unevenly distributed across HEIs (Du Preez & Le Grange, 2020). Resources used inform the role that an academic can play in a teaching and learning environment (Mhlanga & Moloji, 2020). Thus, the following section expands on the roles of academics.

2.3.4 Roles

The above sections provide literature on various principles of prescribed experiences, reflecting on how the role of academics has grown in the evolving world. The role of academics, throughout history, has evolved with major industrial revolutions (Khoza, 2021a; Mhlanga & Moloji, 2020; Oke & Fernandes, 2020) and curriculum developments (Badat, 2010; Khoza, 2017; McGill & Hobbs, 2008; Watermeyer et al., 2021). There could be added and conflicting roles and responsibilities amid the looming Fifth Industrial Revolution which Sarfraz et al. (2021) foresee COVID-19 may be pushing the world to. Mokwena et al. (2021) attest that academics are still entrusted with the crucial role of teaching a nation notwithstanding the changes and revolutions that have taken place, and which are still to take place. This indicates that academics take on a range of tasks (roles) in order to ensure that education is relevant to the professional demands of society, more particularly, to the students who are enrolled in the institution.

The term ‘educator role’ has been used by a number of authors to refer to the responsibilities that are carried out by educators in order to ensure that learning takes place, either for the educators themselves or for the learners or students they are instructing, while also taking into account the goals of the educational system (Berkvens, 2009; Hoadley & Jansen, 2013; Jansen, 2017; Khoza, 2017; Manap et al., 2017; van den Akker et al., 2009). According to Bantwini (2010), the

enactment of planned curriculum (prescribed experience) can also be tricky for academics who are always required to make significant adjustments whenever there are curriculum reforms. Academics' pedagogies of teaching agricultural sciences must change with the changing digital world. Academics may always be proactive in adjusting their pedagogies to respond to contextual realities of digitalised teaching and learning. In addition, van der Spoel et al. (2020) attest that, even though conventional pedagogical tools such as Smart Board and PowerPoint are generally recognised and utilised, the real integration of digitally supported instruction for professional reasons is at a different level.

The above deliberations suggest that there is no educational reform that can succeed without the support and collaboration of academics. Therefore, if academics are not involved as the core actors or implementers, centrally driven curriculum modification will not be effective in improving student results. According to Azionya and Nhedzi (2021) and Khoza and Biyela (2020), there is no doubt that, in order to guarantee effective enactment of a curriculum, it is essential that academics be aware of the role they play in the process. Therefore, such roles are an essential component of the planned or prescribed curriculum.

However, in addition to what has been stated above, Bantwini (2010) asserts that educators' roles to effectively deliver the curriculum are hampered by a lack of access to specialised and contextualised training in rural areas, as well as daily support for educators. Makgahlela et al. (2021) further deliberate that, when academics pursue their professional roles to enact the curriculum, they are often confronted with hurdles to overcome so as to comprehend new ways of education, pedagogical approaches, policies, and continuously changing contextual realities.

2.3.5 Objectives of using a digital learning environment

Objectives are defined by (Sana et al., 2020) as information and skills on a certain topic that students should be familiar with by the time they finish a study session. Sokhulu (2020) further explains that in a structured (prescribed) practice, a set of objectives informs the content in which students learn from the lowest to the highest level of complexity. Also, objectives guide delivery and focus attention on information deemed important to be learned; and skills that must be attained (Togaeva, 2022). In this study, objectives are academics' goals and motives to use a digitalised learning environment. Furthermore, academics must have specific goals that will be directly linked to activities involved in the use of digital technology resources. Sokhulu (2021) claims that, to address the demands of the university and curriculum needs, and to direct the implementation of activities, objectives are formulated for academics to follow.

The significance of objectives is witnessed in a study by Togaeva (2022) that explored goals and objectives of employing multimodal learning. The study first outlines that the unique idea of blended or multimodal learning combines benefits of traditional teaching in the classroom with the benefits of learning facilitated by ICT, which may include both offline and online learning. Objectives open scope for learning, and delineate how diverse modes of learning can be employed at different levels of the learning process. Togaeva (2022) further asserts that the use of digitalised platforms has been a remarkable transformation in the education landscape as new technologies have become rapidly globalised. In the use of the digitalised environment to facilitate teaching and learning, objectives are critical for courses that focus on skills development because they align

content with assessment. Hence Likisa (2018) insists that performance and skills development are informed by theoretical and learned knowledge that also informs practice and experience thereof.

The deliberations above on objectives provide credence to the notion that objectives have to be relevant to the subject matter or topic at hand as well as to the overall vision of the curriculum. There is thus a particular hierarchy in which academics need to achieve a certain level of performance.

2.4 Unstructured Experience: Casual Experience

According to a study by Mpungose (2020a), it is well known and understood that social media sites (casual experience) are the most common platform on which people interact and communicate. The researcher further states that social media sites (SMSs) can be the best auxiliary tool during this digital age. According to the findings of the study, students prefer SMSs over LMSs. Similarly, Murire and Cilliers (2017, p. 1) share the same sentiment: their study revealed that the '*massification*' of education at historically disadvantaged universities decreased interactions between academics and students. SMSs have become an alternative tool to increase student-lecturer interaction. As a result of that casual and unstructured way of using digital technologies, Czerniewicz et al. (2004) stipulate that SMSs are able to allow people effortlessly and conveniently to use digital technologies.

The assertions above suggest that the use of digitalised technologies promotes casual experiences generated by one's social identity and needs. As such, SMSs are currently prevalent and inescapable in lives of students all around the world, including South Africa (Mpungose, 2020a).

Thus, digital technology and society are inseparable (Brey, 2004). These assertions suggest that for far too long, and until today, informal encounters (casual experience) have been at the heart of digital technology. Furthermore, academics may be more familiar with informal digital environments than those formally prescribed.

The casual use of digital technologies has gained popularity over the years. Because of the experience (casual) it provides, together with having an element of contemporary culture, information-sharing takes place informally via digital means (Chawinga, 2017). This is also evident when Bates (2016) claims that informal experience improves how a lecturer and his students connect with the digital tool used to facilitate teaching and learning. Bates (2016) further deliberates that students have some degree of control and/or influence over the manner in which they are taught, and the timing thereof. This means that, with casual experience, ideas from other people form part of decision-making during teaching and learning. In the same breath, Dewey (1938) associates this experience as central to the horizontal curriculum. Khoza (2019) views the horizontal curriculum as a platform that allows students to socially co-construct their personal identities, making meaning of their surroundings. Thus, digitalised social learning abilities are enhanced through the casual use of digital learning environments.

Drawing from the works of Prensky (2001) that users of digital technologies are either immigrants or natives in the digital world, digital natives are more likely to be experts in the casual use of digital technologies. However, Mpungose (2020a) stresses that they (natives) may still struggle to address prescribed digital identities. Sokhulu (2021) shares similar sentiments that being native in the digital worlds does not ensure that you will utilise digital technology sufficiently effectively to

inform your prescribed digital experiences. To support these assertions, a study by Du Preez and Le Grange (2020) also argues that not all students, even the digital natives, are enjoying the equitable benefits that come with digitalised technology. The study further explains that students' backgrounds and exposure might be disadvantageous, although they are digital natives, having been born during the digital age. This could be because they may not have had sufficient access to digital platforms, not because they are digitally illiterate.

The above suggests that the use of digitalised environments for prescribed and casual experiences varies, and that some have better access to socialising using a digitalised environment. Thus, Czerniewicz and Brown (2014) deliberate that, generally, urban digital users are better digital socialites than their rural counterparts. Similarly, urban universities may have academics and students with better casual experiences than those in rural areas.

2.4.1 Assessment and learning outcomes

The significance of assessment and learning outcomes is shown in a qualitative case study conducted by Khoza (2013) who explored learning outcomes as understood by a publishing research facilitator at a university. The primary goal of the study was to provide the selected research facilitators with a platform on which to express their opinions. In addition, the study sought to determine the learning outcome that had been planned for, carried out, and successfully attained in connection with the publishing research module. Document analysis and semi-structured interviews were used to generate data; and the study was framed by the prior analysis theory. The six facilitators asserted that they were using identical learning outcomes in order to assist students in accomplishing the goals outlined in the module; however, the outcomes of the

module tell a vastly different tale regarding the facilitators' levels of warmth and achievement of learning outcomes. Therefore, some academics and researchers may not be well informed on how learning outcomes inform content, assessment, and curriculum goals.

Knowing and understanding learning outcomes may not be the only challenge that academics are faced with. Prasad (2021), who used the Bloom's taxonomy to evaluate student performance, contends that assessment can never be separated from learning outcomes because one can never know the level at which a student is performing unless proper assessment is conducted. Moreover, because learning outcomes are the final product of what students achieved and can do after the learning has taken place, assessment plays a crucial part in knowing whether those learning outcomes that were initially stipulated to be attained have really been achieved. Kennedy et al. (2006) concur that the relationship between instruction, assessment, and learning outcomes contributes to a more transparent learning experience. This indicates that assessment is a means of measuring learning outcomes; and in this study, learning outcomes include academics' casual experience of using a digitalised learning environment in teaching agricultural science in order to meet their needs. As mentioned by Jaiswal and Al-Hattami (2020), assessment and learning outcomes can only be conducted after learning activities have been completed.

Furthermore, Guangul et al. (2020) conducted a case study that revealed that, inasmuch as online assessment is adopted by many HEIs, there are questions around academic integrity. The study aimed at exploring issues of digital assessment and learning activities used in HEIs during the COVID-19 pandemic at Middle East College. Data were collected using a questionnaire that was disseminated through Google Forms to all faculties; and 50 replies were obtained. The challenges

associated with digitalised assessment in general and academic dishonesty in particular were the primary foci of the study. Academic dishonesty, resources, attainment of learning outcomes, and students' commitment to submit assessment tasks were identified as the primary issues that arise from digitalised assessment. On that note, Mashau and Nyawo (2021) argue that there is a need to enhance both academics' and student experiences of utilising digitalised learning environment and conducting online assessments in order to effectively roll out teaching and learning. Online assessment therefore also has challenges that academics have to overcome in order for their identities to be met, together with those of students.

2.4.2 Learning activities

It has been discussed that, given the unrelenting attention that is being paid to the academic performance of students all over the world, one of the most important aspects that requires be done is to make students participate in learning activities that will give them the greatest possible amount of exposure to the curriculum or subject matter at hand. That exposure and experience will enable them to achieve the desired learning outcomes (Mabuza & Khoza, 2019). Learning activities, according to Bervell et al. (2022) and Du Preez and Le Grange (2020), are tasks carried out throughout the process of teaching and learning that result in a certain behaviour or competency in any given curriculum. Mpungose (2019b) further asserts that unstructured curriculum's learning outcomes and competencies are attained through administering informal activities which are problem-centred, as opposed to the content-centred formal activities.

2.4.3 Facilitation role and resources

The facilitating role of academics in this study is linked to the unstructured pedagogies in which academics use informal resources to facilitate and enable teaching and learning. The role was more readily embraced when academics who are accustomed to on-campus teaching were abruptly forced to move to remote teaching. Chidi et al. (2021) aver that rapid pragmatic interventions to the move were needed to cater to the diverse student body. Du Toit and Verhoef (2018) further state that pragmatic intervention in online teaching and learning is the use of socially embedded mechanisms that students are familiar with. In addition to the above assertions, Du Preez and Le Grange (2020) argue that, in order for interventions to be effective, the user's embodied knowledge of the technology as well as what they typically use it for should be taken into consideration. Therefore the role of academics is to identify digital resources that students are most familiar with, and help guide them on these in learning agricultural sciences. Mpungose (2020a) identified social media sites as the most used digitalised environment; and students spend more of their time on social media than in any other digital space.

Moreover, amongst many other responsibilities of an academic, flexibility to use various digital resources to facilitate teaching and learning is central to a successful attainment of learning outcomes (Collins et al., 2006). The integration of various digital resources into a variety of educational settings is becoming more common and fashionable, and it has been swiftly accepted for a number of these settings. To this day, the use of computers and smartphones has been essential to the development of virtual classrooms as a platform for the distribution of information both within and outside the traditional educational setting (Bervell et al., 2022). Academics should customise their classroom settings by not confining teaching only to the use of prescribed digital

resources such as LMSs (Blackboards, Moodle, etc). Flexibility should also allow SMSs such as WhatsApp, Telegram, 2go, Zoom, Interactive Videos, Infographics, and other informal digital environments.

2.5 Semi-structured Experiences: Customised Experience

Studies explored above give evidence that the digital environment has been identified as of great use in promoting digital prescribed and casual experiences, and shows less evidence of how customised experiences have been promoted (Czerniewicz & Brown, 2014; Khoza, 2020, 2021; Maphalala & Adigun, 2021; Mhlanga & Moloi, 2020; Mpungose, 2020a; Sokhulu, 2021). To add to this, Mwapwele et al. (2019) identified the digital environment as primarily preferred for socialising and networking with people both known and unknown. Thus, Suyatna (2019) argues that most digital users, particularly students and young academics, are always plugged into social media, and are always quick to respond to shared information. To add to this claim, Mpungose (2020a) offers that millennials (people born from 1982 onwards) would prefer SMSs that promote casual experiences rather than any other rationale for using technology.

Despite informal encounters being enjoyable, as was mentioned above, instructors in educational institutions have been reluctant to make use of this technology. This is merely due to a lack of confidence in their own technological abilities as well as apprehension over what the future holds (Mwapwele et al., 2019). As a result, unease was felt while attempting to employ both unplanned and planned experiences while tailoring their own method of instruction. It is also possible to recognise individual identities (Khoza, 2021). According to the findings of this study, the only way for personal identities to be satisfied in a pragmatic sense is through the combination of

social/informal (such as Facebook, WhatsApp, and Twitter) and professional/formal software (such as Blackboard, MOODLE, and emails).

Sokhulu (2020) conducted a qualitative case study that explored the use of a digital environment during COVID-19 lockdown from the perspective of five master's students. This study was conducted to speak about the significance of individualised experiences, thus addressing personal needs or meeting personal identities. Participants were selected at random for this study; and data were collected using a combination of semi-structured interviews, focus-group discussions, and questionnaires. Both inductive and deductive approaches were utilised in the investigation. According to the findings of the study, not all individuals who use digital technology are aware that it is necessary to determine their own research requirements; whilst other individuals were aware of this fact. It is also stated that the only way for a person to determine personal demands and consequently, the most appropriate and responsive digital technology for the job that they perform, is via the use of individualised experiences that can be tailored to their specific circumstances. Further to that, users of digital technologies must find what their identities demand in order to perform to their best abilities through customising their experiences. Customising experiences, according to Makumane and Khoza (2020) is informed by reflection on practice. Reflection refers to looking back to where you have come from, absorbing the experiences gained. One can reflect on one's experiences, whether they are personal, social and/or professional, as well as behaviours that have been followed throughout the practice.

2.5.1 Experiences based on reflections

Customised activities, according to Sokhulu (2021), are personal in nature. Mpungose (2018) identified these as semi-structured. This researcher also expresses that customised activities are contextual and are informed by personal reflections. A study was conducted by Mpungose (2020a) exploring whether SMSs, according to students' experiences, are platforms for professional or personal learning. The reflections summarised in Figure 2.3 below show how SMSs can also be used for professional purposes:

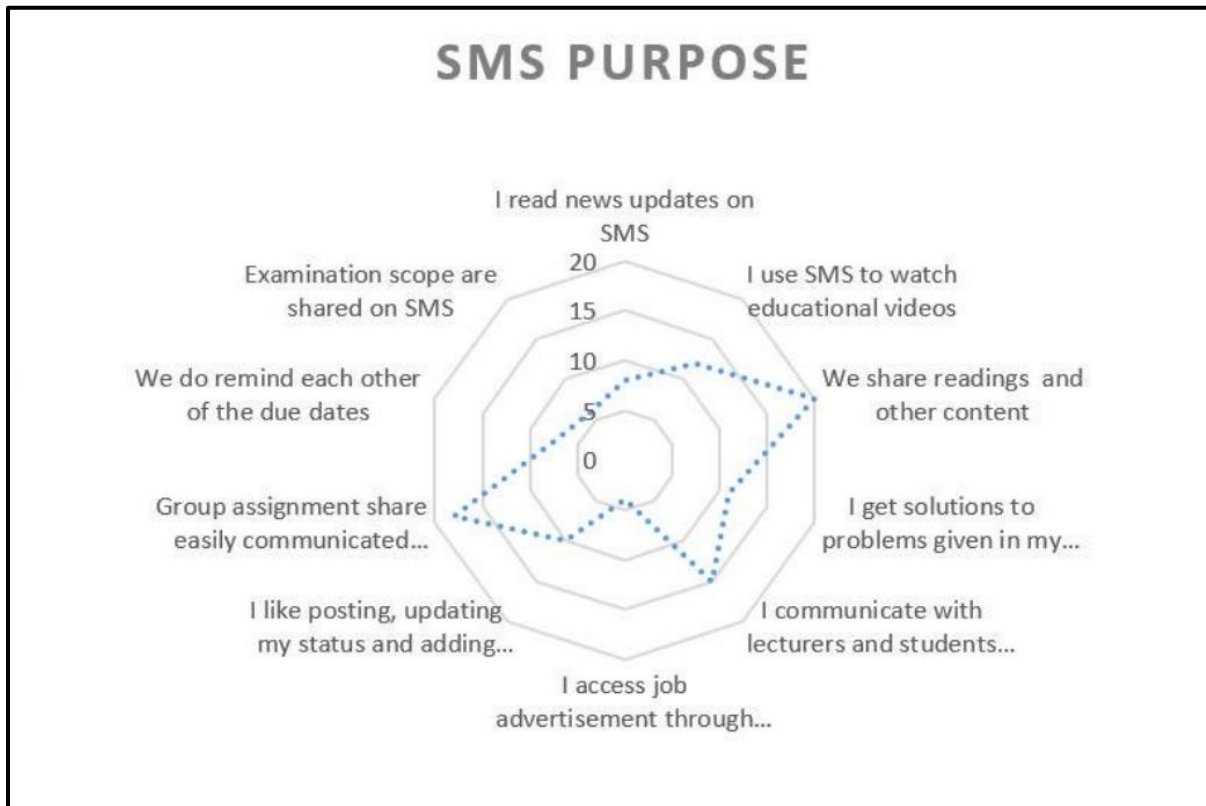


Figure 2.3: Reason for using SMSs for professional purposes (Mpungose, 2020a)

It is clear from the above Figure 2.3 that, in moving forward, the integration of prescribed and casual platforms may take HE to another level. Because examination guidelines, assessment

activities, presenting lessons and the sharing of learning material can also be conducted on SMSs, academics have to be versatile in the 4IR. Academics' artistry and flexibility may be more required in the 5th Industrial Revolution that Sarfraz et al. (2021) foresee coming. The same purpose has also been reported by several other authors (Bosch, 2009; Chaka & Govender, 2020; Chawinga, 2017; Gharrah & Aljaafreh, 2021; Murire & Cilliers, 2017; Williams et al., 2021). Therefore, social media may have huge powers to drastically transform HE when used complementarily with LMSs.

Furthermore, Zulu (2022) is in agreement with the assertions above that the use of SMSs, particularly for emergency remote teaching, complementarily with formal digital platforms or LMSs may encourage HEIs to explore new ways of instruction, while simultaneously keeping students engaged, interested, and tackling the obstacles that come with technology. However, Tanga et al. (2020) mention that, during the COVID-19 lockdown there was very little time for training academics and students: many academics, including students, were struggling with adjusting to the transition. There are several other authors that explored reflections of academics customising experiences of using digitalised platforms other than the prescribed ones (Chirinda et al., 2021; Maphosa et al., 2020; Singh et al., 2022; Zulu, 2022). According to Makumane (2018), customised experience is informed by one's reflection on a personal need to have control over the curriculum. Therefore, academics must always find ways of liberating themselves from experiences on which they are unable to find their identities. A clear representation of an ideal experience in which prescribed (professional/structured) and casual (social/unstructured) needs are balanced is shown in Figure 2.5, and is adopted from Makumane (2018):

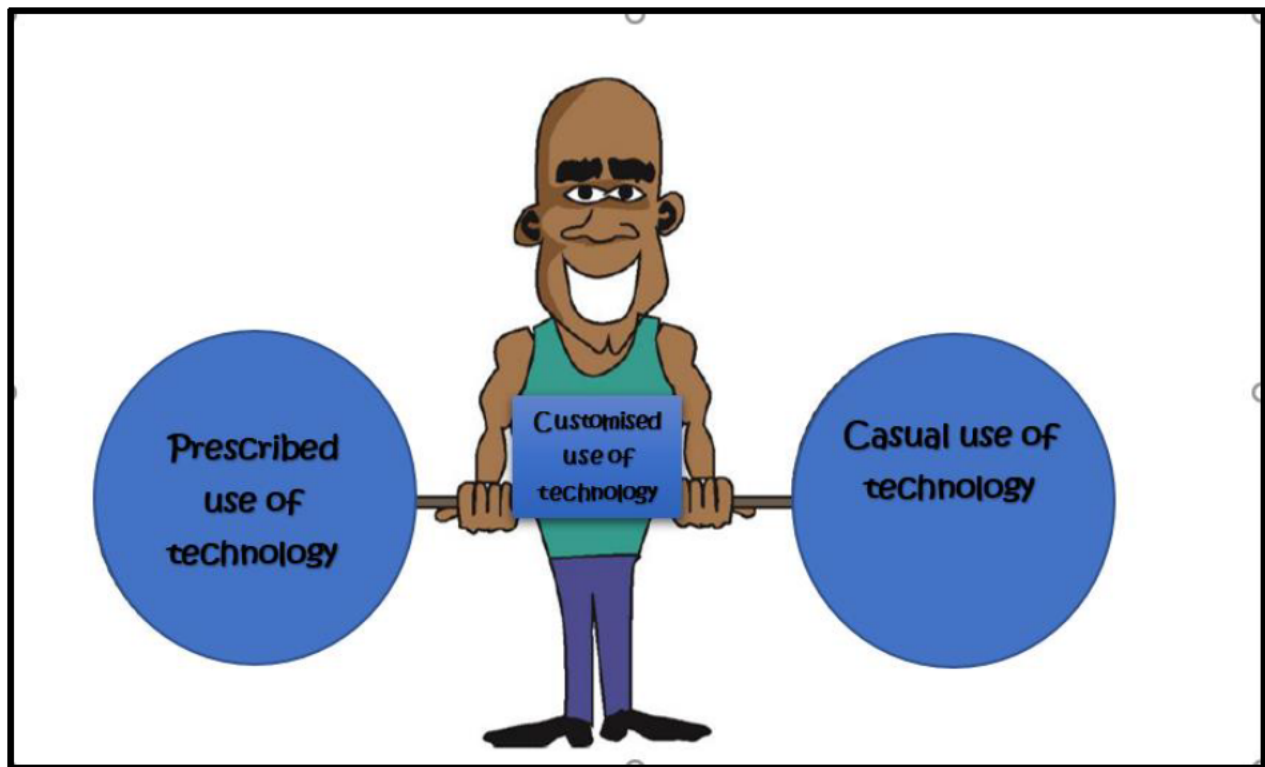


Figure 2.4: Ideal experience of using digital learning environment [adopted from (Makumane, 2018)]

The above illustration and explanation on customised experience suggests that Mashau and Nyawo (2021) conducted a qualitative and deductive study utilising an existing theory to explore the use of digital technology resources in a HEI. Data were collected through a questionnaire using a census approach; and analysed using SPSS software. The questionnaire was sent to 212 students registered for the second-year level, in the discipline of public governance. Only 107 students completed the questionnaire. The study captured how students perceived the use of digital platforms. Findings from the study reveal that the vast majority of participants – 80% – agreed that they were unable to finish online tests within the allocated time; participants believed that they should have been given more time. Nearly half of the participants (48%) agreed that the reason they did not finish assessment examinations was due to their sluggish typing speed. Similar findings are reported by Azionya and Nhedzi (2021), who explored reflections and experiences of

students from historically disadvantaged and underprivileged HEIs. The findings show that digitalised teaching, learning, and assessment, particularly during lockdown, was adversely impacted by network coverage, ICT varying competencies, and educational disparities. These results suggest that more inclusive and adaptable pedagogies, not only depending on universities' resources, are required. Also, personal identities must be established through customised experiences.

Likewise, Nguyen (2019) asserted that academics should constantly develop curriculum, pedagogy, and assessment by reflecting on their own experience in order to make the most of the opportunities presented by globalised and digitalised education. In the same context, Pekkarinen and Hirsto (2017) state that educators who are also researchers are commonly regarded as constantly making reflection a precondition and a vital step for evolving as an expert. Thus, it is a common practice for academics to be required to engage in a certain form of reflection that is personal in nature and is dependent on the practices they engage in on a daily basis.

To elaborate further on what has been stated above, the significance of academics' reflections is based on an assertion made by Pekkarinen and Hirsto (2017), that most academics in universities are not typically fully trained educators; they seem to be primarily researchers. The quality of the researcher is prioritised above the pedagogical qualities of the candidate when it comes to selection of university academics. Reflection on experience has also been reported in a qualitative study conducted by Ndlovu (2022). The study explored educators' reflections on their experiences of teaching financial literacy/accounting using a digital learning environment. The interpretivist paradigm and the TPACK theory framed the study. Data were generated through one-on-one semi-

structured interviews, focus-group discussion and reflective activity; and analysed using thematic analysis through both inductive and deductive methods. According to the findings, the inconsistent utilisation of experiences may reflect not only lack of subject knowledge, but technological expertise that influences pedagogical knowledge, and certain curriculum archetypes. Academics therefore should integrate prescribed (structured) and casual (unstructured) experience in order for a customised (semi-structured) experience to assist in implementing or enacting a technology-driven curriculum that will also respond to the practical nature of agricultural sciences. Thus, student performance may also be improved. On another note, the experience of compulsion has resulted in the adoption of pseudo-online teaching and learning and/or pseudo-embracing of technology improvement (Chidi et al., 2021).

2.6 Conclusion

In conclusion, this chapter provided a comprehensive review of the literature on the use of digital learning environments, primarily for teaching and learning, with a particular focus on the archetypes of experiences. The experiences discussed were on three levels: the prescribed experiences, casual experiences, and customised experiences. These experiences are outlined as the foundation of diverse identities informed by various contextual realities of adopting a digitalised learning environment. Conceptualising experiences in this chapter provided a deeper understanding of the opportunities and challenges encountered by academics when teaching agricultural science modules at a historically disadvantaged university. Thus, this chapter serves as a foundation for exploring, through university stories, how some universities managed their lesson delivery using digitalised learning environments.

CHAPTER THREE

UNIVERSITY STORIES: GUNPOINT EXPERIENCE

3.1 Introduction

The experiences outlined above are an indication that HEIs took unprecedented steps; and these exceptional challenges have elicited a wide range of national and sectoral responses (Sahu, 2020). Amongst the responses was the closure of universities that impacted negatively on education and mental health of academic staff and students (van Schalkwyk, 2020). This did not only affect academics but also other operational and support activities such as workshops, intra- and inter-university sports events, and conferences, to name a few. When restrictions were eased, the paradigm shift from face-to-face to online learning caused a great deal of anxiety and uncertainty about content coverage and resulted in much panic and uncertainty on contentment coverage and the pedagogy thereof. This was because the pandemic came when many institutions did not have adequate resources to facilitate digitalised teaching and learning with immediate effect (van Schalkwyk, 2020).

The articulation between various experiences of academics in HEI has become a topical issue particularly in the context of the existing educational transformations towards a more equitable and integrated education system. According to the centre of World University Rankings (CWUR) 2022/23 university rankings (<https://cwur.org/2022-23.php>), South Africa has five research-intensive universities ranked in the top 500 HEIs. These are the University of Cape Town (UCT) (ranked 270), the University of the Witwatersrand (Wits) (ranked 292), Stellenbosch University

(SU) (ranked 441), the University of KwaZulu-Natal (UKZN) (ranked 484) and the University of Pretoria (UP) (ranked 555). UP did not make it to the top 500 in most of the rankings in 2020, 2021, and the 2022/23 rankings. The Times Higher Education World University Rankings 2022 (<https://www.timeshighereducation.com>) also show similar results that UP did not make it to the top 500 international rankings. The Times rankings further show that two comprehensive HIEs: North West University (NWU) and the University of Johannesburg (UJ); and one university of technology (Durban University of Technology) are ahead of UP. Having said that, this does not mean that experiences of academics at UP are the same as those of the other fifteen comprehensive universities and six universities of technology that have never before gained any ranking in the top 500 World University Rankings. Marire (2017) asserts that fighting to be included in the 500 positions demands that academics and students be familiar with advanced technologies for teaching, learning, supervision, and research, which may be lacking in the majority of universities. Therefore, what is experienced by academics in research-intensive institutions is different from those of other types because their practice is driven by international activities of keeping their universities in the world rankings.

Research intensive universities are institutions that focus more on prioritising research output and all other research related activities. Unlike comprehensive universities that aim at providing a wide range of programmes services, and with more emphasis on teaching and learning, and community outreach/engagement programmes (Fauzi, Tan, Daud and Awalludin, 2020; Hou and Jacob, 2017). This suggests that, while research is being conducted in comprehensive universities, undergraduate programmes weigh more significance than research. Similarly, postgraduate programmes and advanced degrees are placed more in research intensive universities. This may also translate to

resourcefulness of universities in the different categories, where research intensive universities are supported primarily for scholarly publications and adhering to international standards (Hou and Jacon, 2017).

Despite the challenges, universities had to continue teaching online to complete the academic year. With or without the necessary resources, universities were still expected to attain all curriculum goals. Thus, such experiences, in this study, are regarded as ‘*Gunpoint Experiences*’. The next section explores how some universities experienced the immediate transition at gunpoint. The three research intensive universities whose experiences have been discussed below are identified as: the University of Cape Town, and the University of the Witwatersrand. These institutions top the list of prestigious South African universities, as per the global rankings. The University of KwaZulu-Natal is not only a prestigious and well-ranked HEI, but the only research-intensive university that had its 2020 academic year overlapping into 2021. Therefore COVID-19 caused more damage to UKZN than to other research-intensive universities.

3.2 Gunpoint Experiences in Three Research Intensive Universities of South Africa

3.2.1 University of Cape Town

On March 16, 2020, the Senior Manager for Media Liaison and Social Media of the University of Cape Town (UCT)’s Communication and Marketing Department, Elijah Moholola, issued a media statement on the university’s news bulletin (<https://www.news.uct.ac.za/article/-action/list/-archive/media/-category/all/-year/all/-month/all>). The statement insisted that within seventy-two hours students would be evacuated from their residences as a preventive and proactive effort to reduce the likelihood of the virus spreading. On this date, UCT had confirmed only one positive

COVID-19 case. Relating UCT's story, reports from Khoza, (2021b) and many other authors (Du Preez & Le Grange, 2020; Dube, 2020; Sahu, 2020; Sokhulu, 2021) have shown that the evacuation and closure of universities were not uncommon incidents. The South African Minister of Higher Education, Science and Technology, Dr Blade Nzimande, announced the closure of universities and colleges as of the 18th of March (<https://www.thesouthafrican.com/news/coronavirus-south-african-universities-colleges-closed-nzimande/>). Despite the announcements, on 19 March, UCT's Deputy Vice-Chancellor for Teaching and Learning, Professor Lange, had already shared plans for digital teaching and learning in order for students not to lose the academic year (<https://www.news.uct.ac.za/article/-2020-03-19-uct-shares-plans-for-online-teaching-and-learning>).

The above reports suggest that for an institution such as UCT, migrating to 100% online teaching and learning brought fewer challenges than to some of its counterparts that became dysfunctional. However, Mapukata and Toto (2021) who conducted a study that evaluated UCT's first-year students' experience of learning during a pandemic revealed some challenges and opportunities that came with emergency remote teaching (ERT). The study reports that immediately after the subsequent pronouncement of the state of disaster, academics and students had to be prepared for the immediate digital migration. It also emerged from the study that, despite the flexibility and convenience of ERT, this somehow denied students the learning validation and authenticity that comes with attending lectures in person. Some students find it difficult to learn when they cannot see the lecturer, and, similarly, lecturers prefer to be looking at the real-life face of the student.

The views from Mopukata and Toto's (2021) study are similar to what Conrad and Farao (2020) reported in a study that also focused on ERT but for design thinking in health innovation at UCT. The university was able to provide students and academics with necessary resources to teach via online platforms. One of the measures was that data or bandwidth was made less intensive, for accessibility purposes. The study also revealed that familiar tools seemed new because of the mandatory or gunpoint push to utilise ETR. Conrad and Farao (2020) admit that academics were conversant with platforms such as Zoom, Google Slides and Vula; however, they had not utilised them solely for the bulk of the instruction at the same time. Therefore, even UCT has never used VLEs as the major repository of all its content. This is because, when conditions were normal, some content was created and delivered face-to-face during lectures.

In addition, Ndebele and Mbodila (2022) confirm that the sudden exponential rise of DLE has placed an excessive amount of strain on professors and students in all types of educational institutions. The scope of this statement does not exclude universities with a strong emphasis on research. Despite this, Faturoti (2022) and Dube (2020) argue that the transition to VLEs has widened the divide between historically privileged institutions and historically disadvantaged institutions because of unequal access to data and connections. Ultimately, the precarious state of the social fabric in a larger sense was revealed. It appears from this that UCT was also affected by the hit. Although having the opportunity to complete their academic year without having to carry over into the next one, some students nevertheless did continue the course the following year.

Czerniewicz et al. (2019) performed a qualitative study that evaluated academics' opinions on online education in reaction to student demonstrations and campus closures. The study was based on UCT's experiences with campus shutdowns. Interviews were conducted with sixteen professors representing the faculties of humanities, commerce, and engineering. The cultural-historical activity theory (CHAT) was used by the academics at UCT in order to outline the components of the utilisation of the digital learning environment.

Elements of CHAT that are highlighted by Czerniewicz et al. (2019) and even by several other authors (Grimalt-Álvaro & Ametller, 2021; Tan et al., 2021) are similar to that of UTAUT that is used to delineate academics' experiences in this study. Czerniewicz et al. (2019) assert that CHAT is generally utilised to evaluate tensions and contradictions that exist within a particular activity system. Furthermore, CHAT examines how people use a system, and it reflects attitudes towards a given outcome that is mediated by available tools, rules, communities and labour divisions. The study reported that academics in UCT, more than anything else, see positive effects of a digitalised teaching and learning environment because curricula are always covered in a timely manner.

3.2.2 University of the Witwatersrand

On the 19 March 2020, the Senior Executive Team (SET) of the University of the Witwatersrand (Wits) announced changes in working conditions for staff amid the COVID-19 state of disaster (<https://www.wits.ac.za/news/latest-news/general-news/2020/2020-03/wits-covid-19-update-14-most-students-have-left-residences.html>). Academics were advised to work from home; and first-term recess ran from the 20th to the 30th of arch. On the 20th, it was announced that 85% of students had evacuated the university residents. Wits-e, commonly known as Sakai, is a learning

management system used at Wits. All students were informed on 24 March that they would be continuing 100% to learn using Wits-e. According to Tagoe and Cole (2020), Sakai is one of the most popular open-source LMSs used by institutions of higher learning in both developed and developing countries.

Furthermore, from the above, Dukhan (2021), who explored the quality of teaching, learning and assessment under emergency digitalised conditions, outlined experiences at Wits. Despite Wits being a well-resourced research-intensive university, Dukhan (2021) also reveals that the haste with which teaching and learning was conducted online left both students and academics unprepared for the ‘new normal’ method of assessment. Wits also had some similar challenges as comprehensive universities and universities of technology; particularly, previously disadvantaged higher-education institutions (HEI). Increasing instances of dishonest academic activities are one of the many concerns raised by academics. Nguyen et al. (2020) also share the same sentiment that, digitalised teaching and learning have also compromised academic integrity. This did not exempt Wits, regardless of how resourceful they are compared with many other institutions in South Africa.

To add to the above assertions, the increased dishonesty during digitalised teaching and learning may be attributed to minimal digital experience, primarily amongst undergraduate students. Some students, including academics, only possess rudimentary knowledge of digital learning management systems and need additional time to adjust (Du Preez & Le Grange, 2020). Therefore, time to complete tasks may be a contributing factor in the performance of users, because of the required competencies with digital resources.

Furthermore, students from poor backgrounds were also disadvantaged by the sudden jump to digitalised teaching and learning. Khumalo (2020) reported that on 19 April 2020, the Deputy Minister of Higher Education, Science and Technology, Buti Manamela castigated Wits over the rapid shift. The Deputy Minister also took to Twitter and Facebook to express his dissatisfaction with other HEIs' plans to resume the academic year without ensuring that all their students had full access to teaching and learning remotely. Thus, some students, particularly those from low-income families, were negatively affected by the unexpected change. No academic should have immediately continued as though nothing had happened; and students without the necessary devices and connectivity should not be punished as though they were the cause of COVID-19 (K. Khumalo, 2020).

Mwapwele et al. (2019) also emphasised accessibility as a key component in the use of the pervasive and powerful digital space. This had also been the case even prior to COVID-19. Earlier studies (Birch, 2009; Dintoe, 2018; Koehler & Mishra, 2009; Pynoo et al., 2011; Zdravev et al., 2011) concur with the above statement, as they reveal that the aspect of accessibility is noted to be central in facilitating digitalised teaching and learning. In this respect, Khoza (2019) associates accessibility with environment or physical space and time; and with resources which are categorised into hardware, software, and ideological-ware. Any lack in the components may lead to inappropriate use of a virtual learning environment. Nevertheless, even though the studies have presented how digitalised learning spaces have transformed teaching and learning, they are still silent about gunpoint experiences that academics endure in previously disadvantaged

comprehensive universities. Comprehensive exploration of those gunpoint experiences, together with prescribed, casual, and customised experience, makes this study unique.

3.2.3 University of KwaZulu-Natal

According to the National World University Ranking, the University of KwaZulu-Natal (UKZN) is ranked number 4 and is amongst the top five most prestigious South African universities. In 2022-23 World University Rankings ([World University Rankings 2022-23 | Global 2000 List | CWUR](#)), the UKZN ranked 484th of 2000 institutions (accessed on 29 June 2022). Even though COVID-19 was, and still is in effect, it is intriguing to learn and comprehend how UKZN was able to keep its status as one of the top 500 universities in the world despite the challenging conditions.

On 1 June 2020, responding to the COVID-19 pandemic, academics at UKZN were forced to transition to one hundred percent remote teaching and learning (Mhandu et al., 2021). This was on Sunday 22 March 2020, after the vice-chancellor, Professor Nana Poku, announced that UKZN would be on lockdown with immediate effect (Ross, 2021). After making that decision, a trial known as a dry run on emergency teaching and learning was implemented from the 18th to 22nd of May. Its primary aim was to validate academic readiness of the systems, resources, academics, and students (Mhandu et al., 2021). The dry run was accompanied by a capacity-building session in preparation for the ERT (Thabethe & Reddy, 2021).

In addition to the above, Hodges et al. (2020) write about the differences between ERT and online learning. ERT refers to a random shift in instructional delivery in response to a crisis, while online

learning involves planned and designed procedures from the beginning of the academic year. This suggests that ERT be divorced from online learning, as it informs gunpoint experiences.

There is evidence that UKZN, even before lockdown, has been using online learning primarily via MOODLE as its official learning management system (Du Preez & Le Grange, 2020; Khoza, 2021b; Khoza & Manik, 2015; Mhandu et al., 2021; Mpungose, 2019a, 2019b; Sokhulu, 2020). Even so, a study by Mashau and Nyawo (2021) reveals that ERT came at a time when the utilisation of MOODLE was still not up to its maximum capacity for crisis control. The study explores the adaptation to unanticipated events utilising a virtual platform, as well as a move to a new mode of delivery. Perspectives of students at UKZN were quantitatively collected using a census-data approach from 107 questionnaires. Findings from the study suggest that academics should swiftly rethink their pedagogies as the new dawn prevails. Furthermore, the study shows that even students were not fully ready for the immediate shift. The lack of readiness could also be attributed to “UKZN enrolls innumerable students who come from disadvantaged schooling and poor socio-economic backgrounds who enter the university without adequate computer literacy levels” (Mashau & Nyawo, 2021; pp 126).

The preceding claims indicate that exploring academics’ teaching experiences throughout the Fourth Industrial Revolution is critical. In so doing, academics’ identities in an institution such as UKZN and any other institution, could enhance the understanding of personal needs (Sokhulu, 2020). In a case-study research conducted by Khoza (2021a), purposively selected educators reflected on their identities while teaching mathematics in the 4IR era in order to improve their teaching. The eleven educators selected were registered for a Master of Education degree. Data

was generated through one-on-one semi-structured interviews, focus-group discussions, and reflective activities; and the Three Tree Rings Theory with Carrere was revealed as a useful framework for the study. Identities in the study were categorised as societal, professional, and personal. Findings from the study revealed that societal identity drove teaching and learning, even though MOODLE is the prescribed LMS at the university where the participants were registered. It was also revealed that students mostly used WhatsApp and Facebook as leading social media sites even during face-to-face classes. This implies a need for more studies to explore virtualised environments that respond to different contexts, and that will suit agricultural sciences.

Moreover, Ross (2021) explored learning experiences of students in the medical field at UKZN during the COVID-19 pandemic of the 2020 academic year. The study purposively selected 5th year medical students to answer questionnaires in assessing their experiences in the MBChB programme. Of the 112 students, only 35 (31%) were in urban areas, with 39 (34.8%) in rural areas, while 30 (26%) were situated in semi-urban areas. From the total number of participants, only 34 always had internet connectivity, while 28 had internet occasionally. Throughout lockdown, 9 (8%) had no access to the internet at all. However, despite the fact that UKZN provided data bundles for students, 47 had insufficient for their academic demands. The results revealed that only 35 students experienced an environment conducive to online learning, while the rest (71) were not in the right frame of mind to participate in online teaching and learning. The experience shared above is an indication that while there is an undoubted advantage of digitalised learning environment as far as access and reach is concerned, socio-economic and structural factors limit that potential. These issues also affect a prestigious South African university such as UKZN. Thus, Mashau and Nyawo (2021) emphasise the improvement and exploration of

experiences of using digitalised environment and conducting online assessment for a successful rollout of teaching and learning in the digital era.

Moreover, Mhandu et al. (2021) stress that, because academics and students enrolled in universities those coming from a variety of backgrounds, cultural diversity and various degree of computer literacy should not be overlooked. Similarly, Oluwatimilehin et al. (2021) who conceptualised the value of digital capital in HEI during COVID-19 and beyond assert that, also in UKZN, the transition led to mixed feelings in which some academics and students settled comfortably into the new mode. Therefore, the potential value of digital capital in the new dawn in respect of HEIs must be reconceptualised and explored, particularly in historically disadvantaged institutions.

Khoza (2021b) shares the same sentiments in a study that was framed by a community enquiry, using pragmatism, and critical discourse. The study aimed to explore and understand the migration to digitalised teaching and learning at UKZN. Findings of the study indicated that, while the UKZN had a professional identity of migrating through engaging Moodle, migration through the use of WhatsApp, Facebook, Skype, and Zoom conferencing technology (ZVCT) began the migration from Moodle to WhatsApp.

3.3 Gunpoint Experiences in Two Historically Disadvantaged Comprehensive Universities of South Africa

As has been indicated by Mhandu et al. (2021), even before the dawn of COVID-19, historically disadvantaged universities, particularly those in rural setups have had unpleasant experiences with virtualised teaching and learning. The experiences are, amongst many reasons, a result of massification of education and chronic underfunding (Escher et al., 2014). There have always been severe capacity constraints with regard to virtualised instruction and learning in digital immigrant universities. Worse still, some students, including academics in remote areas, have to walk distances to access internet connectivity (Mhandu et al., 2021).

3.3.1 University of Fort Hare

On 16 March 2020, the University of Fort Hare's news bulletin (<https://www.ufh.ac.za/news/News/PrecautionarymeasureslimitimpactCOVID19>) announced the suspension of lecturers with immediate effect, following the South African president's lockdown announcement. The university closed on 18 March 2020, and students were encouraged to evacuate residences and return home. An online teaching and learning task team at the University of Fort Hare (UFH) was formed to prepare for the migration to virtualised teaching and learning even before the onset of the COVID-19 lockdown (Linden, 2020). Dr Christian Johl, the then chief information officer of the UFH, on 01 April 2020 announced in a news bulletin that, at least for the duration of the national COVID-19 lockdown, four internet service providers in South Africa had extended an invitation to UFH to participate in their zero-rated data offerings. This would allow remote access to Blackboard Collaborate and Microsoft Teams on zero-rated billing.

An online newsletter

(<https://www.ufh.ac.za/news/News/UFHOnlineTeachingandLearningDuringLockdownMilestoneandPlans>) that was published on 19 May 2020 reported that by the time lockdown prevailed, modules and course materials had already been moved to the Blackboard learning management system that UFH now uses. However, some academics still preferred the traditional face-to-face teaching. Professor Vuyisile Nkonki, the director of teaching and learning, also reported that forced migration has significantly increased the usage of Blackboard by both students and academics. The deliberations above give an indication that, inasmuch as plans were in place, virtual learning was never mandated. As a consequence of the irregularities, the experiences seem to have been confined to one institution in Lesotho, and as a result, they were haphazard and rudimentary (Makafane & Chere-Masopha, 2021).

Additionally, as with other institutions discussed in the sections above, the integration of formal and informal digital learning environments has also been seen in the case of the UFH. The UFH primarily interacted with Blackboard Collaborate and MS Teams, and more on WhatsApp during lockdown (Linden, 2020). Similarly, even research-intensive universities had to strengthen their versatility of using digital tools from performance-based practices to competence-based practices (Khoza, 2021b). Khoza (2017) further explains that competence-based curricula are those grounded in social rationale and are characterised by grouping subjects together to create a learning area. The primary goal is the acquisition of certain competences or knowledge skills. Conversely, in a curriculum focused on performance, the cognitive domain is what is used to determine whether a learner is successful in a certain field. Thus, the cognitive domain determines whether a student has learned a specific topic. The decision that UFH's academics took also to migrate to social

media sites was advantageous for both students and academics: in historically disadvantaged comprehensive universities, the use of digital resources is informed by social needs (Sokhulu, 2020).

The UFH is a public university that is situated in a small rural town, Alice, in the Eastern Cape province. A qualitative research study conducted by Mutongoza (2019) in one of the rural institutions in South Africa, in the Eastern Cape, explored how initiatives to save education during COVID-19 epidemic were experienced by academics and students at a rural university. A purposive online survey was used to collect data. Findings from the study reflect that similar experiences were revealed by other studies (Chirinda et al., 2021; Khoza, 2021b; Mncube et al., 2021; Mutongoza & Olawale, 2022). The accessibility of online pedagogy did not happen spontaneously for a number of reasons. These reasons include a lack of technology-enabled devices, infrastructure, and policies, as well as a general lack of digital literacy. The study concludes that, should rural institutions be serious about addressing the issue of unequal access to education in the new normal, they should adapt their teaching methods to reflect specific characteristics of their rural context and/or local community.

The above claims lead one to the conclusion that a virtual learning environment is a double-edged sword. Although it did make it possible for academics to teach during COVID-19 epidemic, the virtual learning environment also prevented the amount of effective teaching and learning that could take place. Olawale et al. (2021), who focused on exploring psychological challenges that coming to terms with the new normal has had on academics and students at two historically disadvantaged universities, attested to Mutongoza's (2021) findings. Olawale (2021) further found

out from academics that gunpoint experiences resulted in an undefined work schedule, an unbearable workload, increased work-related stress, and too much academic pressure. One student participant deliberated that, due to heavy workloads, they had missed assignments. Coming from a rural area where internet connectivity is an issue resulted in failure to submit assignments and presented a hurdle to writing of tests. One participant said: “ *to stay afloat, I have resorted to copying*” (Olawale et al., 2021, pp. 186). It appears some students in rural universities believe that, had it not been for cheating, they would not have passed some of their modules. This also suggests that proper planning was not adequately conducted.

However, despite the aforementioned research demonstrating a limitation to online teaching and learning at rural universities such as the UFH, research (Khoza, 2021b; Mncube et al., 2021; Sokhulu, 2021) also shows that some academics and students also appreciated the adaptability and flexibility, and sheer convenience of recorded video lectures. Some also acknowledged the compassion and support provided by institutions throughout the process. In a UFH media release ([file:///C:/Users/mnkohla/Downloads/Media-Release-29-April-2020 0.pdf](file:///C:/Users/mnkohla/Downloads/Media-Release-29-April-2020%200.pdf)) Mpukata (2020) announced that students, particularly those who did not have access to their own computers, were able to participate in online learning in a massive initiative to provide 12 000 laptops and modems that had data. This suggests that support was provided also for students, so that the academic year was not lost, and no student was left behind.

On 16 February 2021, Professor Sakhela Buhlungu, the vice chancellor and principal of the UFH, announced in a newsletter

(<https://www.ufh.ac.za/news/News/End2020Academicyearandclosureresidences>) that on 18 February 2021 students had to vacate university premises as the 2020 academic year came to an end, even though it had overlapped into 2021. The 2021 academic year was officially opened on 30 March 2021, to commence lectures in April. However, most institutions in the developed world had previously adopted digital learning environments and had accessed advanced digital technology and expertise before the migration was enforced on them, unlike most South African HEIs (Mutongoza & Olawale, 2022). These findings suggest that historically disadvantaged comprehensive universities struggled to catch up with 2020, unlike research-intensive universities that managed to end their 2020 academic year in 2020. Even though research-intensive universities also had challenges, they managed to complete the 2020 academic year in December 2020, except for UKZN.

Similarly, during the time period when digital teaching and learning was mandated, Olawale et al. (2021) undertook a qualitative interpretivist approach to study a case of a historically disadvantaged university in the Eastern Cape. Evaluation procedures in the mathematics teacher training programme were investigated. Data were generated purposively through semi-structured interviews with mathematics teacher trainers, heads of departments and pre-service student teachers. Findings from the study show similar experiences as those reported by Ndzinisa and Dlamini (2022), that departmental heads encouraged the use of various techniques to teach and assess mathematics; and academics made efforts to use these assessment practices. Lacking oversight of mathematics education students, they were unable to determine a meaningful and accurate assessment pedagogy and/or method. In a similar vein, the findings reveal that the

provision of multiple assessment tasks for the purpose of increasing student engagement in the absence of coordinated assessment across the programme led to a number of academics and students reporting feelings of being over-assessed and overwhelmed. These findings suggest that, while the non-negotiated migration revealed limitations of assessment processes in the existing education system, academics should rethink and reconceptualise what to teach, the pedagogies to teach, and the most responsive assessment strategies thereof. Thus, during times of crisis, the use of multimodal technology for teaching and assessment should be emphasised. In addition, online assessment approaches, not only mathematics, should emphasise problem-solving, decision-making and cognitive demands.

The experiences above could be the reason that the UFH does not appear in the national and world university rankings ([World University Rankings 2022-23 | Global 2000 List | CWUR](#)) [accessed: 03 July 2022]. In addition, the significant role that a virtual teaching and learning environment has played shed light on the need for the university to immediately improve its online systems by putting into place urgent infrastructure. This requirement was revealed because the university has been shown to have played a crucial role. In the context of the university, ongoing discussions are taking place about migrating to Blackboard Ultra in order to capitalise on its potential benefits of distance online learning. These discussions are taking place in order to make the most of the potential advantages of online teaching and learning.

3.3.2 Universities in Limpopo province

The University of Limpopo (UL) was also declared by the minister of higher education, science and technology as one of the South African rural universities (<https://mg.co.za/article/2019-09-28-00-nzimande-wants-to-prioritise-rural-universities/#:~:text=There%20are%20eight%20universities%20that,the%20University%20of%20Western%20Cape>). Mbombi (2021) shares the same sentiment as Mutongoza and Olawale (2022) that an online platform is a potential option for flexible learning at a historically disadvantaged university. Such a platform offers a wide range of options and more opportunities for self-directed learning. The study by Mbombi (2021) was conducted in one of the historically disadvantaged comprehensive universities in South African universities in Limpopo. Also, Mashilo and Selelo (2021) explored a similar study on experiences of role players in academia at the University of Limpopo. In contrast with certain deliberations that demonstrated the negativities of a virtualised learning environment, the latter studies assert that virtual teaching and learning in Limpopo is much simpler to understand than the more conventional methods of learning through personal contact. More so, students are able to complete assessments in the convenience of their homes, giving them the opportunity of seeking any type of support that may be available; and even to participate in written group discussions over examinations.

The above findings may be enlightening as far as flexibility is concerned. However, they may also raise concerns regarding the honesty, calibre, and legitimacy of education in which institutions were closed for contact sessions. Furthermore, this may have resulted in sudden skyrocketing of students' pass rate, giving the false impression that there is better quality teaching, learning and

assessment online than in face-to-face teaching. On this note, even before COVID-19 surfaced, Peytcheva-Forsyth et al. (2018) explored the implications that technological advancements have for academic dishonesty and plagiarism, as seen from the viewpoints of both students and academics. Students may quickly and easily access a variety of information by using collaborative websites such as Wikipedia. The widespread use of mobile devices gives students countless options to quickly collect and preserve images or documents of course material that may be viewed during assessment or examination. According to Verhoef and Coetser (2021), this also indicates that online assessment created new opportunities for academic dishonesty; because there were, and still are, no invigilators to detect dishonesty, particularly in resource-limited institutions. Therefore, all universities and colleges must devise mechanisms for detecting cheating and any other misconduct or discrepancy that comes into online assessment.

In addition to what has been stated above, it appears that the differentiated approach heritage still exists, despite the decolonial protests such as #FeesMustFall, #RhodesMustFall, and others in South Africa. Maluleka (2021) reflected on his experiences of teaching in the time of crisis at a historically disadvantaged university in Limpopo. The study focused on pedagogical difficulties when they were forced to adopt emergency remote online teaching and learning. Maluleka also reports the difficulties of rural universities in Limpopo province to complete their 2020 academic year that overlapped to the second and fourth month of 2021. The above deliberation suggests that HDUs and HWUs continue to be unequal; and because of that there is digital divide and marginality. A digital divide is described by Charp (2001) as the disparity between the affluent and the poor; and between urban and rural regions, in terms of internet connectivity and the number of people who can afford to buy or have access to new technologies. The mere fact that the majority

of students at the UL come from rural and township communities implies that access to internet and even technological devices is a huge challenge. Thus, Maluleka (2021) also reports that, as with other historically disadvantaged universities, students were provided with data bundles, and some even with laptops, in order to be able to work in the comfort of their homes.

UL uses Blackboard as a learning management system. Maluleka (2021) asserts that this platform seemed new to academics and even to students because it was merely used for uploading material that no one interacted with; thus, the difficulty that academics and students named ‘gunpoint experiences’, despite training that universities offered. As also indicated by several authors (Chawinga, 2017; Makgahlela et al., 2021; Mpungose & Khoza, 2020; Mutongoza, 2021; Ndebele & Mbodila, 2022), WhatsApp has been one of the main alternative pedagogical tools found to be useful. This further suggests that tools consistent with university rules and policies on teaching and learning platforms should be supplemented with those that both students and academics are most comfortable and flexible with. Therefore, I contend that there is a need for every academic in higher education to rethink how we operate, in order to prevent leaving millions of students behind, particularly in historically disadvantaged universities that are already suffering from the effects of colonial apartheid.

3.4 Conclusion

This chapter has included a discussion on the experiences of utilising a digitalised learning environment at both research-intensive institutions and comprehensive universities. It examined the use of various digital learning environments for gunpoint experiences. The discussions on

experiences of being held at gunpoint were explored from accessing university stories, news bulletins, and policies that were published during the period of forced migration to digitalised teaching and learning environments, in particular during the COVID-19 outbreak and the period of national shutdown. The purpose of the next chapter is to outline the theoretical underpinning of the study and experiences discussed both in this chapter and the previous chapter.

CHAPTER FOUR

THEORETICAL UNDERPINNING OF THE STUDY:

Unified Theory of Acceptance and Use of Technology –Two

4.1 Introduction

This chapter intends to outline the theoretical underpinning (Unified Theory of Acceptance and Use of Technology -Two (UTAUT-2) and prospects of acceptance and use of digital technology. This resonates with the purpose of this study, which is to reconceptualise the experiences of academics in adopting a digitalised learning environment in which to teach agricultural sciences at a university that has been historically underprivileged. Thus, the previous chapter discussed the literature pertaining to academics' experiences (phenomenon) as well as navigating those experiences at research-intensive universities and in historically disadvantaged comprehensive universities. To establish an in-depth knowledge of the theory in relation to this study, specific UTAUT principles such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit, are explored. According to Cohen et al. (2018), a theory informs how one understands and interprets the world around one, the manner in which research is conducted, and the setting of research agendas. This frames the research; and it is used to understand and explain behaviours and attitudes through paradigms and variables. Based on the literature that has been reviewed, the UTAUT-2 has been identified as best in addressing the levels of experiences explored in this study.

The UTAUT-2 model is an upgrade of UTAUT that was pioneered by Venkatesh, Moris, Davis and Davis in 2003 (Venkatesh et al., 2003). It was developed in 2012 and put into practice as a

second model to UTAUT. The UTAUT-2 has been the most relevant and wisely utilised theoretical framework for examining the experience of utilising digital technology across a variety of study domains. Domains include information technology (IT), banking, economic management, and education (Tamilmani et al., 2021; Venkatesh et al., 2012).

The following sections present an overview of the development of UTAUT-2; the concept behind it, a review of the constructs that make it up, why it was developed, its limitations, how those limitations can be addressed. A summary of the chapter is then presented.

4.2 The Dawn of UTAUT-2

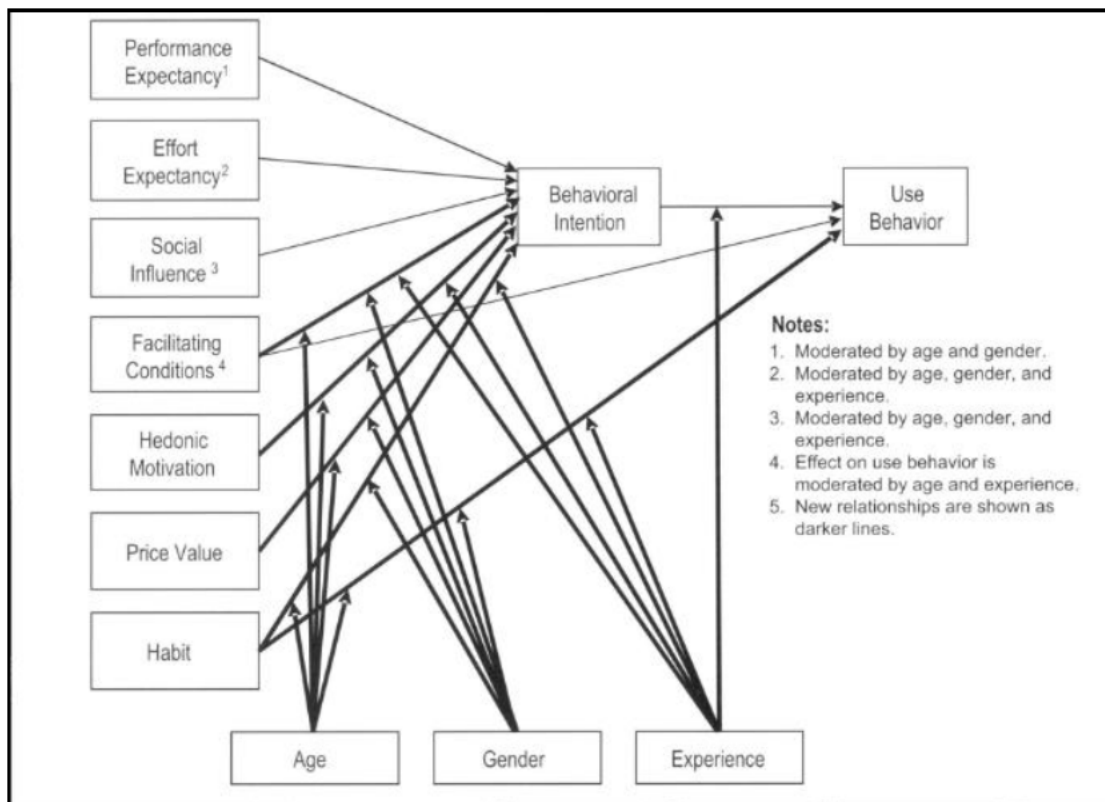


Figure 4.1: The UTAUT-2 framework and its archetypes (Sourced from Venkatesh et al., 2012)

The UTAUT-2 framework is a theory that has been used in a wide range of contexts related to the applications of technology and the conditions that facilitate their usage (Ain et al., 2015). The theory's inception was for understanding the acceptability and behavioural experiences of technology users. Although it has only been available for a little over ten years, UTAUT-2 has already amassed over 6000 citations, and has had widespread application in information systems and beyond (Tamilmani et al., 2021). As mentioned in the previous section, UTAUT was founded by Venkatesh et al. (2003), and later, in 2012, UTAUT was modified and/or extended to UTAUT-2 (Venkatesh et al., 2012). Deliberations from several authors (Abbad, 2021; Baptista & Oliveira, 2015; Jaya et al., 2017) express that UTAUT-2 identifies principles that inform the 'why', 'how', 'when', 'when' and 'with what' questions when it comes to the users of digital technology. Thus, Venkatesh et al. (2003) alludes to that UTAUT, in general, has a primary purpose to explore users' levels of knowledge, competence, and acceptability of current available and developing digital technologies. Participants in UTAUT are referred to as users, which is a phrase that represents those who utilise digital technology in executing their job responsibilities. For the purpose of this study, 'users' refers to university academics who use a digital learning environment to teach agricultural sciences modules.

Further to the principles above, there is hedonic motivation, price value, and habits that are extensions of UTAUT. These extensions brought UTAUT-2 into existence as they are archetypes that also inform behavioural intention and use of a digitalised environment. Thus, according to the context of this study, all these components or principles of acceptance and use of digital technology are referred to as archetypes. These archetypes demonstrate the path that should be followed by academics throughout the process of digital teaching and learning. In exploring academics'

experiences in teaching agricultural sciences at a historically disadvantaged university, their experiences on the archetypes are moderated by their age, gender, and length of exposure to such (Ain et al., 2015).

According to Radovan and Kristl (2017), theories of technology acceptance are often interdisciplinary in nature. Scholars have attempted to explain the factors that lead people to either embrace or reject the use of digital technology. In the same light, the founders of UTAUT which was later in 2012 modified to UTAUT-2 conducted a study that compared eight prominent digital technology theories and models, and their extensions (Attuquayefio & Addo, 2014). Theories and models with theoretical underpinnings from sociological sciences, information systems, and psychology, have been combined. Each has different philosophical predictors on the acceptance and use of digital technology. This affirms the assertion by Ain et al. (2015) and Tamilmani et al. (2021) that UTAUT-2 addresses the issue of context, emotional well-being, and culture of the technology users. This makes UTAUT-2 more suited for this study because the historical background of the institution informs current practices, resourcefulness, and the capacity thereof. Furthermore, the use of LMSs as reported by Sackstein et al. (2019) can largely be dependent on where academics, including students, come from. The majority of these people in historically disadvantaged universities may be coming from households and/or schools where technology is not used. They may therefore not have the necessary technical abilities to navigate LMSs on their own, without receiving training and instruction. Thus, UTAUT-2 is identified as suitable for re-imagining the experiences of academics at a historically disadvantaged university.

The combined theories and models that formed UTAUT-2 are presented in Table 4.2 below:

Table 4.2: Models and Theories that were Merged to Formulate UTAUT-2

Model / Theory	Archetypes	Description	Author(s)/Founder (s)
Theory of Reasoned Action (TRA)	Attitude Toward Behaviour Subjective Norm	This theory originates in social psychology, and is widely regarded as one of the most fundamental and important explanations of human behaviours. It has been utilised to provide accurate forecasts regarding diverse selection of behaviours.	(Fishbein & Ajzen, 1975)
Technology Acceptance Model (TAM)	Perceived Usefulness Perceived Ease of Use Subjective Norm	This model was developed specifically for use in the context of digital technology. It was conceived with the intention of predicting acceptance of and utilisation of information technology in the workplace. It also reveals the degree to which a person believes that utilising a particular system would increase their work performance.	(Davis, 1989)
Motivational Model (MM)	Extrinsic Motivation Intrinsic Motivation	This theory is based on the psychological tenet that behaviour is the product of motivation. This theory is used for the purpose of understanding the adoption and use of new technology.	(Davis et al., 1992)

Theory of Planned Behavior (TPB)	Attitude Towards Behaviour Subjective Norm Perceived Behavioural Control	TRB has been effectively applied to the study of human adoption and usage of a wide variety of technology. It has also been seen as the degree of perceived effort needed for an activity to be carried out. It also considers the individual's good or negative sentiments towards exhibiting the desired pattern of conduct (behaviour).	(Ajzen, 1991a)
Combined TAM and TPB (C-TAM-TPB)	Attitude Towards Behaviour Subjective Norm Perceived Behavioural Control Perceived Usefulness		(Taylor & Todd, 1995)
Model of PC Utilisation (MPCU)	Job-fit Complexity Long-term Consequences Affect Towards Use Facilitating Conditions	This model is used to anticipate the adoption of personal computers. Due to its nature, it is well-suited to the individual adoption and usage of a variety of information technologies. The model is rooted in a philosophy stating that people's actions are influenced by a number of factors, including their attitudes towards a certain action, their perception of what society expects of them, the routines they follow, and the consequences of the behaviours.	(Thompson et al., 1991)

Innovation Diffusion Theory (IDT)	Relative Advantages Ease of Use Visibility Image Compatibility Results' Demonstrability Voluntariness of Use	This theory is based on an idea that outlines the process by which new technology and other innovations spread throughout communities and cultures. Such begins with their initial adoption and progresses to their widespread adoption. The theory also aims to explain how and why new ideas and digital practices gain acceptance, with timelines that may be stretched out across very lengthy periods of time.	(Rogers, 1995)
Social Cognitive Theory (SCT)	Performance Personal Self-efficacy Affect and Anxiety	This theory explains the anxiety or emotional reaction when it comes to using a particular technology. It also addresses one's ability to use a digital space to complete a task.	(Bandura, 1986)

In comparing similarities between the eight digital theories and models presented in the table above, findings of the study (Venkatesh et al., 2003) revealed four archetypes which the founders refer to as constructs informing the behavioural intention to use and usage behaviour of digital technology. The archetypes include independent variables such as performance expectancy, effort expectancy, social influence, and facilitating conditions, as illustrated in Figure 3.2 above. The archetypes are moderated by other independent variables which are age, gender, and experience, discussed in the next section.

4.3 Archetypes of UTAUT-2

4.3.1 Performance expectancy

Performance expectancy (PE), according to Abu et al. (2014), is the degree to which one believes that making use of a particular system will assist in achieving advances in job performance. Studies (Ajzen, 1991a; Ibrahim & Jaafar, 2011; Khechine et al., 2020; Liebenberg et al., 2018; Nistor et al., 2014; Rogers, 1995; Tamilmani et al., 2021) on PE and the background of UTAUT-2 also report that PE is an influencing factor in acceptance, use, and adoption of digital technology. Having said that, according to Venkatesh and Davis (2000), and with reference to Table 3.2, PE emerged from combining archetypes of five theories and models: perceived ease of use from TAM; extrinsic motivation from MM; job fit from MPCU; relative advantage from IDT; and outcome expectancy from SCT. It is possible that PE may prove a decisive element in determining whether academics in the field of agricultural sciences make use of virtual learning environments in teaching the subject.

Similarly, Hamzat and Mabawonku (2018) investigated, in a descriptive survey study, the influence of performance expectancy and facilitating conditions on the use of a digital library by 759 engineering lecturers in 10 universities in South West, Nigeria. Data were analysed using frequency counts, percentages, and standard deviations. Findings from the study revealed that PE is a crucial determinant

that informed the use of a virtual library by lecturers teaching engineering. These findings are in line with findings from Saravani and Haddow (2011) who investigated the level of readiness of staff working at institutes of technology and technical and further education (TAFE) libraries all throughout Australia and New Zealand with regard to the provision of service using mobile technologies. Both studies (Hamzat & Mabawonku, 2018; Saravani & Haddow, 2011) show that technology users at the workplace showed a stronger interest in both the perceived usefulness and relative advantage both of which respond to performance expectancy in building capabilities that allow a mobile service delivery. Hamzat and Mabawonku (2018) further suggest that improvements should be made to facilitating conditions such as providing continuous power supply, fast broadband, and the facilitation of regular training workshops so that the use of digital resources can be sustainable and reliable.

In the context of this study, referring to the above findings and recommendations, most academics only saw the unmeasurable significance of virtual teaching and learning; academics took training workshops more seriously when they were forced into online teaching. Even the historical nature of the institution at which this study is conducted was reflected when the management discovered that facilitating conditions were not really in place for the immediate/emergent migration that was experienced. The reality is that an individual's opinions regarding the usefulness of a particular virtual site on which to carry out a variety of tasks is at the heart of what constitutes their performance expectancy (Ain et al., 2015). Agricultural sciences academics need to identify digital platforms that will respond to the practical nature of their subject. This could encourage them to the platforms even more, as long as their performance expectancies are met. On that note, Khoza (2021) also professes that academics perform well when their identity is clarified.

From the students' point of view, Lacka et al. (2021) explored whether digital technologies improve the efficiency of students, and the role played by VLEs and SMSs in HEIs. Building on the service-

productivity theory, the study investigated student efficiency by identifying the direct relationships between higher education inputs and outputs, taking into consideration the usage of technology. This was conducted with the goal of improving educational practices. According to the findings of the study, it appears that students would do better were they not to rely on a formal digital learning environment. Students who utilise and are most familiar with SMSs are still not efficient on the prescribed platforms, but would rather participate on informal/casual platforms. This is despite that virtual learning might help students attain their performance goals more quickly by providing them with additional inputs. Gupta et al. (2020), who explored the impact of the COVID-19 lockdown on agriculture education in Nepal, reported that land and crop cultivation practices are compromised by virtual classes. The study concluded that agricultural fieldwork can never be replaced by online classes. Thus, working from home could also be more of a nightmare for older and more experienced senior academics than for those in the early to middle stage of their careers.

Besides the practical components of the subject, Zarafshani et al. (2020) assert that computer anxiety is amongst the determinants of improved performance when using a digital learning environment. The relationship between computer anxiety and performance expectancy is also believed to be informed by the age variable, absent in acceptance models such as TAM, TRA, and MM. Performance expectancy is seen as moderated by the age factor. Assaker (2020), who explored age and gender differences in online travel reviews and user-generated-content adoption, reported that studies on accrued life experiences and self-efficacy alongside the aging process explain age disparities in user behaviour. Assaker (2020) expresses that these studies claim that older digital technology users often believe that they are too old to learn or embrace a new technology, in contrast to younger ones. This is in line with findings by Lesame (2021) who explored the digital divide and demand for internet services by middle-aged adults. The findings of the study revealed that the majority of adult digital technology users are aware of digital environments but face digital divide issues in terms of accessing and using the platforms.

In terms of experience, there are variations between older academics and their younger counterparts. Together with the majority of students who are perceived to be more digitally savvy (Liebenberg et al., 2018), the widespread use of digital technology may have a potential advantage for digital natives. This may suggest that, digitally, younger academics may perform better in lesson delivery; and curriculum goals are attained with less effort compared with senior academics. Hence, Khoza and Mpungose (2020) concur with the assertion above, and argue that understanding academics' experiences is a valuable instrument with which to transition digital immigrants towards digital natives. This may enhance experiences of using a digital learning environment in order to achieve high-performance teaching. Thus UTAUT-2 addresses prescriptive experiences that are professionally inclined. Academics should be supported in order to perform at a level that is professionally expected by the institution. Furthermore, academics must agree on the acceptance and use of the prescribed DLEs; and other technologies are informed by the professional reasons to use such technologies. Acceptance and use should be mutual across ages and experiences: the primary goal is improved performance that is expected from every academic teacher at a university.

When Venkatesh (2012) tested UTAUT in a variety of organisational contexts, it was discovered that the perception of adopting digital technologies in terms of advantages, completion time, money, and effort has a significant impact on PE. Research also shows that PE is moderated by age and gender (Mosunmola et al., 2018; Nikolopoulou et al., 2021; Tamilmani et al., 2021; Venkatesh, 2022). This is also illustrated in Figure 3.2. According to Nikolopoulou et al. (2021), PE is a fundamental archetype that influences acceptance, and is greatest amongst all factors that determine behavioural intention. As far as gender is concerned in digital use and performance expectancy, Dlodlo (2009) conducted a case study that explores accessibility of ICT competence in South African rural girls and women. The study aimed at empowering girls and woman in order to improve performance at school and work in the vast developing ICT world. Dlodlo (2009) shares the same sentiment as Ponge (2016) that there has always been a tendency of males

to dominate and perform better than their female counterparts. Neglecting the gender digital divide in education limits women's opportunities to develop skills and increase productivity. It also reduces the chances of reaching equality, and equitable societies (Dlodlo, 2009; Elena-Bucea et al., 2021). The gender divide is thus more of a social than professional issue. The gender divide may affect how female academics perceive the degree to which the virtual learning environment emancipates their experiences compared with male academics. In addition, the gender issue, which is a moderator in performance expectancy is something that is socially and economically constructed (Ancheta-Arrabal et al., 2021). This may be a result of male dominance and the power of masculinity over feminism. This refers to social norms in which men are generally seen as dominant and superior to women.

Using UTAUT-2 in reviewing academics' experience of the digital learning environment in teaching agricultural sciences has shown the extent to which academics believe that using a particular digital system would enhance their job performance. Furthermore, the theory's performance expectancy measures aspects such as progress made via the use of a digital learning environment, completion of duties in a more expedient manner, and the usefulness of the system for all users. This could also extend to non-academic staff, including students. Thus, in this study, performance expectancy is associated with prescribed level of experience which is mandatory in universities – research intensive universities, to be specific. Several studies on digital technology and use in education assert that there are always certain levels of varying effort expected from technology users in the facilitation of teaching and learning (Cabero-Almenara et al., 2022; Garone et al., 2019; Jaya et al., 2017; Onaolapo & Oyewole, 2018). The next section explores how effort expectancy as another fundamental archetype of UTAUT-2 informs the behavioural intention and use of digital technology to teach agricultural sciences.

4.3.2 Effort expectancy (EE) in using a digital learning environment

The use of digital tools has been reported to be informed, to a larger extent, by the efforts one must invest in (Kim & Lee, 2020; Nikolopoulou et al., 2020). Effort expectancy (EE) can be described as the level of expectation of academics that the use of a digital learning environment is not characterised by physical and mental efforts (Nikolopoulou et al., 2020). In this study, EE can be explained as the ease of use of a digital learning environment. Lakhal et al. (2013) assert that HEIs have always put effort into ensuring that digital teaching and learning is as effective as face-to-face teaching and learning. Additionally, the effectiveness is also reliant on the amount of work that academics and students put in: Venkatesh (2022) believes self-efficacy to be an operational layer of EE. Thus, EE is an essential component when embracing and making use of a certain technology. EE is the amount of effort that academics expend in order to utilise either the prescribed or casual digital technology. Raza et al. (2021) argue that efforts are less arduous when the technology is user-friendly.

User-friendliness can be linked to how quickly one can navigate various functions of a particular system (Ambarwati et al., 2020). A narrative identified above is that younger users of digital technology are more likely to use less effort when navigating digital systems. That narrative also stems from Prensky (2001), who refers to young users as digital natives, and who may be more technologically proficient, with an unwavering inclination for all things digital over analogue. All of this is a direct result of the enormous amount of time spent using various forms of ICT (Cabero-Almenara et al., 2022). The current generation of youth and growing children are at ease with technology and are able to navigate the internet and a range of ICT devices without any formal training. In this study, academics may have varying opinions and preconceptions about how simple and straightforward it should be to use different digital learning environments. Venkatesh et al. (2012) write about user-friendliness in relation to simplicity and flexibility of using a particular system. However, Mashau and Nyawo (2021) stipulate that it is not obvious that 'digital natives' will be more skilled and savvy in using digital learning platforms. Most countries,

especially those in Africa, are characterised by significant inequalities that may have contributed negatively to the capacity to access modern technologies and to develop ICT skills.

EE, according to Venkatesh et al. (2003), has three archetypes which are primarily rooted in the three main theories: the perceived ease of use from TAM/TAM2; the complexity of the system deduced from MPCU; and the ease of use from IDT. As with performance expectancy, effort expectancy is understood to represent a person's way of thinking about the performance enhancements and the amount of work and time that one must invest in using a certain technology (Bervell et al., 2022; Tamilmani et al., 2021). Venkatesh and Zhang (2010) go further by stating that the more one uses a particular digital technology or system the less the effort spent on navigating through it. This applies to both prescribed and casual digital platforms (Brown et al., 2010). In a similar vein, Venkatesh and Davis (2000) found that the level of significance increased when the effort was expected, regardless of whether it was voluntary or mandatory. Yet, the relevance is only present during the early stages of utilising a particular digital platform. The more exposure and experience in prescribed and casual digital platforms, the easier academics may find it to integrate LMSs and SMSs, and to customise their experiences in order to identify their personal identities.

4.3.3 Social influence in using digitalised learning environment

Since the internet was presented in the 1980s, the globe has seen a tremendous amount of digital transformation. People's ways of socialising, shopping, communicating with one another, obtaining entertainment material, managing business and schooling, and also gathering information and/or current affairs have been revolutionised over the course of the last few decades. This is as a result of advances in technology and the expansion of the internet (Wong et al., 2019). The advancements in technology have been reported by several authors to have socially influenced many users around the globe to positively change their behavioural intention and use of digital technology in both formal and informal spaces

(Alwahaishi & Snášel, 2013; Fabunmi et al., n.d.; Jacob & Pattusamy, 2020; Prensky, 2001; Thong et al., 2011).

Garone et al. (2019) also strongly believe that the effects of socialisation play a vital part in the behavioural intention and use of digital technology. Since universities have entered the technology implementation race, the social context has informed the use of digital technology. Similarly, Gharrah and Aljaafreh (2021) and Salloum and Shaalan (2019) affirmed that socialisation experiences are directly linked to social media sites that are informed by societal culture. Even Sokhulu (2020) avers that socialisation experience, which is acquired informally via engagements with the social environment, has a significant influence on all parts of a person's life, in particular the educational sector. In light of this, Aliaño et al. (2019) contend that social influence is the extent to which academics view the significance and relevance of the ideas of others when teaching using a particular digital learning environment: a valuable tool for informing their own teaching.

According to Venkatesh et al. (2003), social influence is a subjective determinant of behavioural intention that is rooted in the Theory of Reasoned Action, Technology Acceptance Model TAM, the Theory of Planned Behavior (TPB), and the Combined TAM and TBP. One of the primary archetypes of these theories is the subjective norm; all originate from social psychology as a principle that behaviour is the product of motivation (Davis et al., 1992; Davis, 1989; Fishbein & Ajzen, 1975). Thus, one's perspective of a certain digital learning environment, as well as how one uses it, might be influenced by the ways in which other people use that environment. This is in line with the aforementioned assertions. Mpungose (2020b) describes this kind of experience as informal learning that satisfies individual's societal needs.

Despite UTAUT-2 being recognised for identifying social influence as one of the primary factors of behavioural intention with regard to the use of a technology, Jameel et al. (2022), who explored

behavioural intention to use e-learning among academic staff during the COVID-19 pandemic found that social influence had no significance on behavioural intention to use a digital learning environment. The study was conducted at three private universities in Iraq. A stratified sampling technique was used to ensure equal presentation of participants; and 187 valid responses were obtained from questionnaires that were sent via Google forms. UTAUT was also used as the basis of the study which only considered performance expectancy, effort expectancy, social influence, and facilitating conditions as determinants of behavioural intention to use a digital learning environment. Structural equation mode was used to analyse the data. According to the findings of the study, decision-makers at universities should improve their technical infrastructure and provide sufficient professional training to academics in order to encourage them to participate in digital platforms. Moreover, the process through which universities upgrade their systems for professional reasons should not be subject to the effect of social influence. This means that universities should make it a priority to reinforce and prescribe professional identities for their academics, regardless of the society from which they come.

Farrell (2020) argues that gaining knowledge from the experiences and influence of other people is one of the beneficial opportunities available to humankind. Sometimes, researchers and academics in educational settings disregard the value of the human socialisation experience. Instead, they tend to go to more objective, hierarchical, and/or logical information sources. Many researchers concur with the positive impact of social influence on the use of digital technology. UTAUT-2 and a theoretical underpinning will inform academics on teaching of agricultural sciences. Al-Adwan et al. (2022) further assert that social influence is also informed by learning traditions and norms within a particular society that uses digital learning platforms. In education the main influencers would be other academics and university administrators. Students will be secondary influencers for academics. Together, the role players construct a particular institutional learning culture. Thus, this study also aims to determine how much academics

have been encouraged by the support of others to use a digitalised learning environment that is either prescribed or casual in nature.

4.3.4 Facilitating conditions

Computers, cellphones, and the internet are ubiquitous in today's information culture; their significance is certain to continue growing in the near future. This is also the case with the integration of new technology into teaching, despite that the question of how best to use computers in the classroom has been asked for some time (Pynoo et al., 2011). Taking this into consideration, Jameel et al. (2022) maintain that academics are still confronted with technological obstacles that, amongst other things, include the facilitation conditions. According to Venkatesh et al. (2003), facilitating conditions are the degree to which someone feels at ease with available organisational and technological infrastructure necessary to make use of technology. This archetype is rooted in three constructs. The first is the perceived behavioural control that is informed by self-efficacy and technological resource facilitating conditions (Ajzen, 1991; Taylor & Todd, 1995). This construct emerges from the Theory of Planned Behavior and the Combined Theory of Reasoned Action and Planned Behavior. The second construct is the facilitating condition which is informed by the Model of PC Utilisation that was founded by Thompson et al. (1991). Thirdly, the compatibility construct has its roots in the Innovation Diffusion Theory that describes how new technology and other innovations move across communities and cultures, from early acceptance to widespread adoption. This theory further explains how and why ideas and digital behaviours are adopted over long periods of time.

Facilitating conditions are linked to access. Mugwisi et al. (2018) state that these conditions are aligned with the level of adoption and use of alternative digital technologies (Makinde et al., 2019). The study by Makinde et al. (2019) evaluated the adoption and use of an alternative digital platform by researchers in a Federal Research Institute in Nigeria. The findings were obtained from questionnaires that were answered

by 114 researchers. It was revealed that, in adopting a particular digital resource, one must be sufficiently competent or digitally savvy to perform and access functions that aid in attaining outcomes. Even with the hardware infrastructure, the institute had no internet and programmes, and researchers opted to use their mobile devices, personal computers, and even cybercafés outside the institution. These findings are similar to those of Sokhulu (2020), who argues that whatever device or programme that is accessible should be available for finding their identity in order to attain a professional outcome. Institutions should be flexible in allowing students or researchers to use such. Similarly, HEIs must not stipulate only their learning management systems as the only credible platforms on which to facilitate teaching, learning, research, and assessment (Mpungose, 2020a).

A quantitative study carried out by Ambarwati et al. (2020) in Indonesia supports the above assertions. The study explored the role of facilitating conditions and habits in the use of a digitalised learning environment. Two hundred and fifty-four (254) surveys were collected. Findings revealed that one becomes more active with digital technology when facilitating conditions are conducive, accessible, and relevant to pursuing a task. Hence, organisations should provide their users with responsive resources. The availability of these resources should include supporting infrastructures such as abundant internet connection, simple access to mobile devices, and software resources that do not affect access speed. Hence one's access to facilitating conditions is more than just access: one must be familiarised with technology features (Mpungose, 2018). As a result, Garone et al. (2019) emphasises that facilitating conditions may be available; however, that does not necessarily translate to a more productive use of technology in educational institutions. Facilitating conditions are fruitless if academics do not have the ideological-ware resources to use the technology (Adov et al., 2020).

Furthermore, the deliberation by Jameel et al. (2022) outlined in Section 3.3.3 above suggests that enhancement of technological infrastructure by HEIs is key to encouraging academics in e-learning. In

this study, the improvement of facilitating conditions that are conducive to learning is seen as an essential objective. Such enhancement recognises that academics are vulnerable to skills shortages and lack of relevant tools for them to carry out their obligations in an efficient and uncomplicated manner. Wonga et al. (2019) emphasises that it is critical for people in both suburban and rural areas to have access to facilities, as well as suitable electronic devices that enable correct and uninterrupted usage of the internet and apps. It is essential for individuals to acquire new skills and areas of expertise, in addition to devising novel strategies for the production of alternate sources of revenue. Thus, Onaolapo and Oyewole (2018), Su and Chao (2022), and Venkatesh et al. (2003) set forth that the constructs of facilitating conditions are operationalised to incorporate components of the technical and/or institutional environment that are designed to eliminate usage barriers. Facilitation conditions also address self-efficacy in terms of skills. Mirzajani and Bayekolaei (2019) in utilising digital resources to facilitate teaching and learning, state that this archetype informs casual experience. Sokhulu (2021) refers to the experience as the socialisation experience, in which knowledge sharing through digital means can be informal. This also promotes the acquisition of social identity (Khoza, 2020b).

The above assertion suggests that UTAUT-2 does not only address digital skills for professional reasons, and for the prescribed LMS and emails, but also for interacting with academics through social spaces such as WhatsApp, Facebook, Instagram, 2go, Zoom and other platforms.

4.3.5 Hedonic motivation using digitalised learning environment

Hedonic motivation is the first archetype that Venkatesh et al. (2012) included in the UTAUT-2 model as an extension. Bervell et al. (2022) propose that hedonic motivation refers to the amount of enjoyment that one receives from making use of a system. Similarly, Baptista and Oliveira (2015) refer to hedonic motivation as the intensity of satisfaction and/or pleasure in the use of a digital technology. According to Venkatesh et al. (2012), the pleasure that comes from using a digital technology derives from an

individual's openness to new ideas and their ability to independently make innovative decisions. Venkatesh et al. (2012) further claim that extending UTAUT with hedonic motivation and the two other archetypes (price value and habits) that will be discussed in the next sections, furthers the generalisability of UTAUT-2 as applicable in many other contexts, including education.

A study conducted by Nikolopoulou et al. (2020) explored, amongst other constructs, hedonic motivation as factor in students' acceptance of mobile phone use for studying. Authors (Bernard et al., 2013; Chaka & Govender, 2020; Onaolapo & Oyewole, 2018) have reported an increase in the popularity of mobile phone use among university students. The study employed the UTAUT-2 model. Some 540 students participated by completing an online questionnaire. It was found that hedonic motivation had a substantial impact on the students' behavioural intent to use mobile phones. Notably, some participants wrote '*Using mobile phone in my studies is fun, enjoyable and very entertaining*' (Nikolopoulou et al., 2020, pp. 4157). As Venkatesh et al. (2012) suggest, excitement and joy (hedonic motivation) in using digital technology is influenced by innovativeness as users pay more attention to the novelty of a technology. Hence, since the content of agricultural sciences varies, academics should take pleasure in possessing the technological abilities to effectively and efficiently teach the subject utilising digital platforms (Granberry, 2022).

According to Ciftci et al. (2023), who also explored the adoption and use of the remote education systems of medical educators in Turkey, hedonic motivation is also defined as taking pleasure in using digital technology. The study suggests that when academics enjoy using technology, the likelihood that they will continue to use it and encourage others to do so increases significantly. Moreover, studies such as those of Bosch (2009); Chawinga, (2017); Gharrah and Aljaafreh (2021); Kutu and Kutu (2022); Murire and Cilliers (2017); Qamar et al. (2019); Williams et al. (2021) have reported that academics, and even students, find more pleasure on casual platforms or social media sites (socialisation/unstructured experiences) than on the prescribed learning management systems (professionalisation/structured

experiences). On that note, Ayasrah (2020) asserts that this may be the reason for academics using LMSs for academic purposes; they do not find prescribed digital resources enjoyable any more. Since they find pleasure in SMSs, the integration of the platforms could significantly spread the pleasure across compatible digital platforms for teaching and learning. Therefore, hedonic motivation is a significant archetype to consider when exploring the adoption and usage of a digital learning environment in this study. Likewise, Venkatesh et al. (2012); Venkatesh and Zhang (2010); Wang and Wang (2010) contend that hedonic motivation is one of the fundamental indicators of behavioural intention and use of technology.

In a study that was conducted by Oluwajana, Idowu, Nat, Vanduhe and Fadiya (2019), hedonic motivation of students to gamified learning as another approach to digital learning was explored. A structural equation modelling technique was used to construct and validate a hedonic motivation model. Findings of the study indicate that enjoyment, together with perceived usefulness and perceived usability have a substantial positive link with intention to use a gamified learning environment. The study also proposes that this technique, because of the thrill and satisfaction it provides to users, might serve as a new educational tool to accelerate the development of pedagogical and instructional technology. Similarly, Hartelina et al. (2021) aver that the use of technology in educational institutions should not only be for professional purposes; it should also become part of academics' everyday lives, such as via activities, for instance, playing video games, streaming music, and chatting in real time. It is possible that this will narrow the satisfaction gap between LMSs and SMSs.

Thus, the purpose of this study is to also provide some insights into the pleasurable usage of a digital learning environment in the hopes of assisting agricultural sciences academics and HEIs in increasing digital learning's level of acceptability. It is also hoped that one can achieve greater levels of satisfaction with various digital learning environments.

4.3.6 Price value in using a digitalised learning environment

There has been a significant rise in the number of people connecting their mobile devices and computers to the internet for various purposes. This has led to increased capabilities of devices, including smartphones and their price value, and ultimately an increase in the availability of applications and services that make heavy use of data (Wong et al., 2019). Uren and Edward (2023) aver that, cost-effective massive data availability and the capability to exploit it may often be overlooked when discussing the optimistic economic predictions of digital technology. Additionally, Maluleka (2021) postulates that the price attached to keeping up with all the ever-changing technological advancements, as well as the initial expenditure of establishing digital facilities, is substantial. This implies that price value and affordability or monetary constraints are also important drivers of acceptance and behavioural usage of digital technologies. As Venkatesh et al. (2012) also argue, not only is price an essential aspect of workplace technology, but users must also face costs involved with purchasing devices and using suitable services and applications. Hence the present study also looks at costs and affordability attached to the use of the digital learning environment in teaching agricultural sciences modules, and the price value of all devices involved.

Price value, the second archetype to be incorporated into UTAUT, is the sixth archetype negotiated by UTAUT-2 in terms of understanding user behaviours and adoption of digital technology. In this regard, Ain et al. (2016) and Venkatesh et al. (2012) discuss that price value refers to the person's cognitive tradeoff between the perceived significant advantages of the systems/applications and the expense of purchasing or using them. Therefore the price of a product is often conceived in conjunction with the level of service that is it able to provide to users (Baptista & Oliveira, 2015). In this study, for price value to be significant, the expense of purchasing digital gadgets and teaching applications by academics must correspond to the perceived usefulness and behavioural intention to teach using them.

A quantitative study was conducted by Shi et al. (2022) with the purpose of exploring factors that influence Bangladeshi farmers' intention to accept, use, and pay for the Internet of Things (IoT) in the agricultural sector. The study was also informed by UTAUT-2 to collect data from 345 farmers in which a convenience sampling and cross-sectional design was employed for rural fruit growers. SEM was used to analyse the data. The findings from the study were similar to El-Masri and Tarhini's (2017) findings, who explored contributing factors to the adoption of digitalised learning environments in Qatar and the United States of America. Both studies used the UTAUT-2 model; and also confirmed that should the perceived benefits of adopting and using a particular digital space outweigh the monetary costs, people are more likely to embrace the system. The farmers were willing to adopt the IoT even though they were rural fruit growers. Shi et al. (2022, pp. 16) reported "*The greatest antecedent of willingness to pay is to adopt the IoT*", and price value contributed to the adoption of IoT because of its potential benefit of boosting productivity and reshaping the entire agricultural industry. Farooq et al. (2019) outline the benefits and/or role of IoT in agriculture which also make farmers consider price value as more important. The IoT involves maintaining and monitoring of land, livestock, and the whole farm with minimal physical involvement. The IoT also offers smartphone- and sensor-based software resources designed to be applied to several aspects of farm management and security.

The above findings suggest that the agricultural sector is also evolving digitally, together with the education sector. Therefore, agricultural scientists who are academics at HEIs may find the need to be updated with the latest technologies in the industry; and be willing to accept the price value of the applications and devices to use when teaching the subject. This involves understanding and adopting the price value of using those technologies so that their teaching of the subject can respond to contextual realities and the industry that the students is hoped to be absorbed in after graduating. Strong et al. (2022) express that promoting the adoption of digital agricultural technologies and the price value thereof is a

primary role of institutions worldwide. Thus, the level of success achieved by academics in adopting and appreciating the price value of digital technology to teach agricultural sciences is crucial, due to the benefits that come with the digital learning environment.

On the benefit of digital technology in agriculture and agricultural education, and the price value it comes with, Maphosa et al. (2020) evaluated WhatsApp SMSs as a tool for academics to deliver lectures at a Zimbabwean university, using UTAUT. The study focused on WhatsApp because of its low data consumption compared with formal LMSs. Studies such as by Chirinda et al. (2021); Mpungose (2020a); Qamar et al., (2019) also explored WhatsApp as an alternative because of its price value and affordability. In common, the findings indicate that academics also find value in the price of using SMSs for casual experiences. Therefore SMSs should be acknowledged as alternatives to LMSs owing to their cost-effectiveness and also to their potential to fulfil the professional mandate of attaining the curricular goal (Marire, 2017). Having said that, Ndzinisa and Dlamini (2022) argue that the predicament of acknowledging price value in conjunction with adoption and using digital technology can resonate with and be informed by costs of accessibility. Price value can mean more to academics than the actual price of buying the technology and using a particular system or hardware; and yet they still do not afford this. This could be personal to specific individuals, in which each academic customises personal finances to weigh price value and the cost of using a digital learning platform.

4.3.7 Habit of using digitalised learning environment

The concept of habit has a lengthy and complex history that started to gain popularity from the time of Aristotle. It is perhaps one of the most extensively researched ideas in the history of Western philosophy and science of mind, holding a major place in the works of notable individuals such as Hartley, Bergson, Dewey, Pavlov, Skinner, Merleau-Ponty, and Piaget, to mention a few (Ramírez-Vizcaya & Froese, 2019). According to Bervell et al. (2022), a habit is a behaviour that is undertaken on a regular basis that fosters

the development of an automatic response. Similarly, Venkatesh (2022), who refers to habit in the context of the usage of a digital system characterises habit as a behaviour control that reinforces the utilisation of a system. This implies that habits have a direct influence on behavioural intentions as well as a moderating effect on the usage behaviour. This further suggests that, owing to the extent of interaction with a digital learning environment, experiences of academics and familiarity with a particular digital system both play a role in the formation of their habits.

The last archetype of the UTAUT-2 model is habit. Venkatesh et al. (2012) claim that habit's inclusion into the theory supports the theory's emphasis on intentionality as the underlying principle and main driver of behaviour. In the studies on digital usage conducted over the last decade, habit has become prominent (Jeyaraj, 2022), and the repeated use of digital technology by users is indicative of and underpinned by habits (Czerniewicz & Brown, 2014). Thus, habits are of great practical value for academics in developing their teaching and competency in using various digital learning environments.

Further to the above, Khoza (2020b) makes mention that the continuous interaction with digital tools makes the habit a subconscious act that drives the use of any digital tool. Moreover, Ramírez-Vizcaya and Froese (2019) assert that, to some extent, actions that are purposeful and intentional may be contrasted with habits, which are the king of psychological automatism. A habit informs particular behaviours and patterns of performing a task, there being a developed association between the digital platform and one's response. The response includes mental and cognitive mechanisms which are conditioned reflexes and behaviours. In this study, academics' habits can be a repertoire of action dispositions that may be modified to some degree in response to use of a digital learning environment.

Participants in Venkatesh et al.'s (2012, pp.178) study confirm the assertions above on how a habit is developed. One participant (HT1) mentioned that they developed habits through repeated encounters with

the internet. They said, “*The use of mobile internet has become a habit to me.*” Others deliberated that using digital technology and the internet became addictive and natural to them. These deliberations are in line with Ajzen’s (2001) ideology that a habit develops a particular implicit attitude and motivation towards a particular object. Similarly, in the education context, Chen, Zhang, Gong and Lee (2019) and Nikolopoulou et al. (2020) argue that habit is a consequence of prior experience of using digital technology. Khoza (2020b) adds that habitual experiences can either be disciplinary, social, or personal. Khoza’s (2020b) study on WhatsApp usage habits of Bachelor of Education students confirmed this. It was found that students also used WhatsApp in contact (face-to-face) sessions. Thus, students seem sufficiently satisfied with WhatsApp to employ a hybrid approach by using the app even during face-to-face lectures. The hybridisation allows identification of personal identities (personal habits) (Makumane, 2021; Sokhulu, 2020).

Inasmuch as the above assertions are student-centred, academics must understand the habits that inform their experiences and the categories of experiences which may not be similar to students. Khoza (2020b) summarises the integration of the three archetypes of habits (personal, discipline and social) as key elements that, together, form educational habits. Figure 4.2 below shows the model for educational habits:

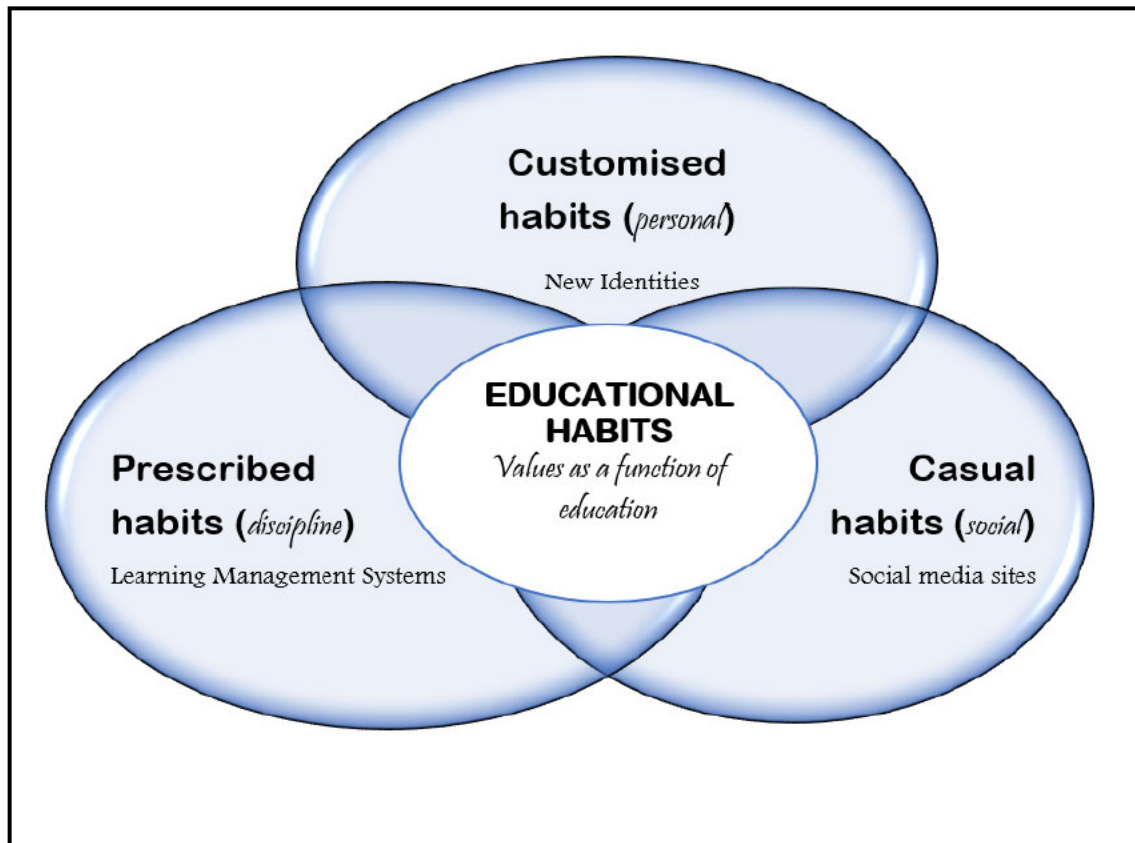


Figure 4.2: Model for educational habits [adopted from Khoza (2020b)]

Khoza’s modelling of educational habits focused primarily on WhatsApp as a social media site that students use for their casual (social) experiences. A quantitative study undertaken by Kutu and Kutu (2022) explored the instructional usage of media platforms at the University of KwaZulu-Natal in South Africa. The study was informed by the communication theory in which an online questionnaire was completed by fifty-one postgraduate students via Google Forms. Findings of the study revealed that the usage of social media platforms such as WhatsApp (83%), Zoom (79%), YouTube, Facebook, Pinterest, Instagram and Google+ was habitual, but with varying intensities or frequency. The least used platforms were Pinterest and Instagram, with 10% and 15 %, respectively. Therefore academics should develop a habit of utilising SMSs, and integrate them into their classes – social media seems to be more frequently used and enjoyed platforms than the prescribed LMSs (Lacka et al., 2021; Mkhize et al., 2020).

Furthermore, because a habit becomes autonomic even in teaching and learning (Gharrah & Aljaafreh, 2021) academics should find value in different digital learning environments as a function of education in order to develop educational habits, as represented in Figure 3.2 above. Even with LMSs that are said to be more complicated (Mhandu et al., 2021; Mpungose, 2020c) than social media platforms, Limayem and Hirt (2003) posit that having continuous access to a sophisticated digital platform stimulates both conscious (intentions) and subconscious (habits) usage. That conclusion above is rooted in the theory of planned behavior (TPB) (Ajzen, 1991a, 2001; de Leeuw et al., 2015) that compared behavioural determinants of inexperienced and experienced digital technology users (Huang, 2023; Taylor & Todd, 1995).

The above assertions suggest that this archetype is crucial to the exploration of academics' experiences of using digital learning environment in teaching agricultural sciences. When users continue to participate and engage with a particular digital tool from an ideology of enhancing their experiences, they may require some time to enjoy the tool (Gardner et al., 2020). Thus, Limayem and Hirt (2003) assert that, as time passes, the influence of behavioural intention on actual usage (behaviour) diminishes, while the influence of habits or habitual behaviour intensifies. This suggests that should academics manage to develop habits of integrating prescribed and casual habits in order to identify customised habits, valuable functions of the different digital platforms and habits would allow their experiences to develop. Ultimately, educational habits will be mastered.

4.4 Strengths of UTAUT-2

UTAUT-2 is a significant amalgamation of extant virtual technology use and acceptance models (El-Masri & Tarhini, 2017). Furthermore, it is a successful model from which to understand users' experiences and perceptions of the technological systems they use on a daily basis (Baptista & Oliveira, 2015). Thus, for the purpose of this study, UTAUT-2 is relevant and significant. Academics' experiences are placed at

three levels: structured, semi-structured, and unstructured, especially now that circumstances are forcing academics in HEIs to use LMSs to deliver lessons and to engage with students. The use of UTAUT-2 will also allow the exploration of the behavioural component and attitudes of academics, and their reasons behind those attitudes. Because HEIs differ, technology users may have a different perspective on the use of digital learning environments. Because of contextual realities, UTAUT-2 also exposes the role of social constructs and institutional cultures which are always controversial even within the same HEI (Venkatesh et al., 2012).

Furthermore, UTAUT-2 raises various interesting issues to explore when it comes to the complex nature of the interactions and moderators, such as gender, age, and experience (Teo & Noyes, 2014). It has also been reported by Khoza and Manik (2015) who share the same sentiments as Prensky (2001), that the use of digital technology is also linked to the age and experience of the user; and that, ultimately, this translates to the generation gap amongst academics. Several other authors (Birch, 2009; Murire & Cilliers, 2017; Mwapwele et al., 2019; Salajan et al., 2015; Tomei, 2017) also concur that when digitalising teaching, learning, and research in education, there will always be a generation gap amongst digital users, which in this study, are academics. Thus, in this study, the unified theory is compatible with the levels of experience that the study aims to explore.

4.5 Limitations of UTAUT-2

The Unified Theory of Acceptance and Use of Technology (UTAUT-2) model is a widely used model for understanding technology acceptance and usage. However, as with any other model, it has its limitations, especially when applied to a specific context such as academics' experiences of using a digital learning environment to teach agricultural sciences modules at a historically disadvantaged South African university. The UTAUT-2 theory has an eloquent explanatory power as Venkatesh et al. (2012) analysed, tested and integrated various major technology acceptance theories and models developed to comprehend the components involved, despite its shortfalls that have been criticised.

El-Masri and Tarhini (2017) assert that UTAUT-2 has been used mainly by Western countries in their context rather than in non-Western countries. The UTAUT-2 model was developed based on studies conducted in developed countries; and it may not fully account for cultural differences in technology acceptance and usage. This study sees all the archetypes that formulate this theory as robust and simple to address academics' experiences in a historically disadvantaged institution in a developing country. This study also accounts for cultural and contextual differences by generating data on participants' cultural background; and examining how such may influence their experiences of using digital learning environments to teach agricultural sciences modules. The study also incorporates qualitative data-generation methods, such as interviews, focus groups, and reflective activities to capture the nuances of participants' experiences.

Furthermore, social influence of UTAUT-2 in educational research does not focus much on socio-economic status and culture at the micro level (Baptista & Oliveira, 2015; Murire & Cilliers, 2017). This limitation in this study is addressed by linking social influence, price value, and hedonic archetypes when exploring experiences. This also provides a more well-rounded perspective on technology. Institutional culture, in addition to the broader African context, is also imbedded in the key elements that inform experiences of academics. This is because this study is conducted in a historically disadvantaged comprehensive university.

The several studies (Agyei & Razi, 2022; Ambarwati et al., 2020; Bervell & Arkorful, 2020; Chávez Herting et al., 2020; Cheng et al., 2020; Cimperman et al., 2016; Jarvie-Eggart et al., 2022) that adopted UTAUT-2 are from different disciplines; however, the majority of them are generic. This is a general model that does not necessarily consider discipline-specific factors. Agricultural sciences modules may have unique features and requirements that affect academics' acceptance and usage of digital learning

environments; and these factors may not be fully captured by the UTAUT-2 model. This study incorporates discipline-specific factors by examining how the unique features and requirements of agricultural sciences modules may influence academics' acceptance and usage of digital learning environments. This comes about by generating data on the specific tools and resources that academics require to effectively teach agricultural sciences modules, and how these align with the features of the digital learning environment.

Analysing research conducted on the conceptualisation of the first UTAUT model by Venkatesh et al. (2003), the expanded UTAUT-2 in Venkatesh et al. (2012, 2016), and on other authors who adopted the model in teaching and learning (Ain et al., 2016; Arain et al., 2019; Ciftci et al., 2023; Gharrah & Aljaafreh, 2021; Tamilmani et al., 2021) shows the scope of focus primarily on individual factors and infrastructure. To address this limitation, this study also analysed institutional policy; and it interacts with university internally published news to gain university stories on ensuring that policies are also in place for the teaching of the subject. Furthermore, many studies, even those that developed the model, used a large sample size to provide statistically significant results. This suggests that this model was developed from a quantitative point of view, so that results may be generalisable to an even larger population. To ensure that findings from this study are generalisable, an education research design is used with a pragmatic paradigm. All available and willing academics recruit a large pool of participants from various agricultural departments in the Faculty of Science and Agriculture. Moreover, for triangulation purposes, quantitative data on lesson observation is statistically analysed using SPSS to increase the robustness of the results and recommendations.

4.6 Conclusion

In conclusion, this chapter has outlined the archetypes of UTAUT-2, and how it provides a valuable theoretical framework for understanding the factors that influence an individual's acceptance and use of technology. The chapter has shown its development as an upgrade to the original UTAUT model, and how

UTAUT-2 has been widely utilised in various study domains to explain the adoption and use of digital technology. One of the key strengths of the UTAUT-2 model is that it also outlines its ability to identify and explain the key factors that influence an individual's acceptance and use of technology. The model considers seven key constructs, including performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit. These constructs have been categorised and linked to the different levels of academics' experiences. The constructs have also been shown as having a significant impact on an individual's decision to adopt and use technology. This makes UTAUT-2 a useful framework for researchers and practitioners in various fields and contexts including agricultural sciences, and previously disadvantaged comprehensive universities, respectively.

Furthermore, the UTAUT-2 model also has its limitations, particularly when applied to a specific context such as academics' experiences of using a digital learning environment to teach agricultural sciences modules at a South African university. Some of the limitations identified in this chapter include the lack of consideration of cultural and individual differences, as well as the dynamic nature of technology adoption and use. Ways in which this study addresses the limitations are outlined, as well as how conducting further research can consider the unique contextual factors that influence technology adoption and use. Therefore, as technology continues to play an increasingly important role in various fields, the UTAUT-2 archetypes that were used as a guide in exploring the experiences in this study were modified and aligned with the context of this study and the nature of the university and subject (agricultural sciences) involved. UTAUT-2 was then recontextualised and customised through academics' experiences, to produce a new theory, the contextual adaptive tech-enhanced pedagogy (CATEP) theory.

CATEP, as built upon the UTAUT-2 model, creates an integrated approach for enhancing pedagogy with technology. In addition to the modification of UTAUT-2, the CATEP framework considers how technology aligns with:

Prescribed experiences: how the digital environment supports the structured teaching and learning experience, practice, and feedback through professional identity;

Casual Experience: how the digital environment enables academics to connect and network with others to build knowledge through social identity; and

Customised experience: how technology facilitates active teaching and learning, collaboration and knowledge construction through self-identity.

Through the above alignment, the CATEP framework emphasises the need for context-specific adaptation of technology and pedagogy and cultural continuity. This takes into account the importance of acknowledging and preserving cultural knowledge, tradition, and practices within a defined subject or field. For instance, Granberry (2022) asserts that the practical nature and purity of agriculture should not compromise the emergence and rapid developments of technology in the universe. Therefore while the digital space undoubtedly brings significant advancements and efficiency in farming, it is essential to strike a balance between modernisation and the fundamental essence of agriculture (Attigah et al., 2020; Shukla et al., 2017). This component is not covered by the UTAUT-2 model. The importance of sustaining precision and ensuring long-term viability of farming through responsive pedagogies and indigenous knowledge systems can never be overemphasised. Thus, I argue that this new theory produced by this study and comprehensively discussed and modelled in Chapter Nine is more specialised and contextually focused. This is because the theory aligns personal identities with needs. It takes cultural sensitivity and personalisation for the effective technology integration. The theory promotes inclusive and transformative educational experiences in historically disadvantaged comprehensive universities. This is while not being oblivious to the significant progress achieved in various HEIs and in diverse contexts.

Figure 4.3 below illustrates the CATEP framework; however, the theory is comprehensively explained in Chapter 9. The next chapter conceptualises the outlook of academics' experiences and the methodological execution of the experiences.

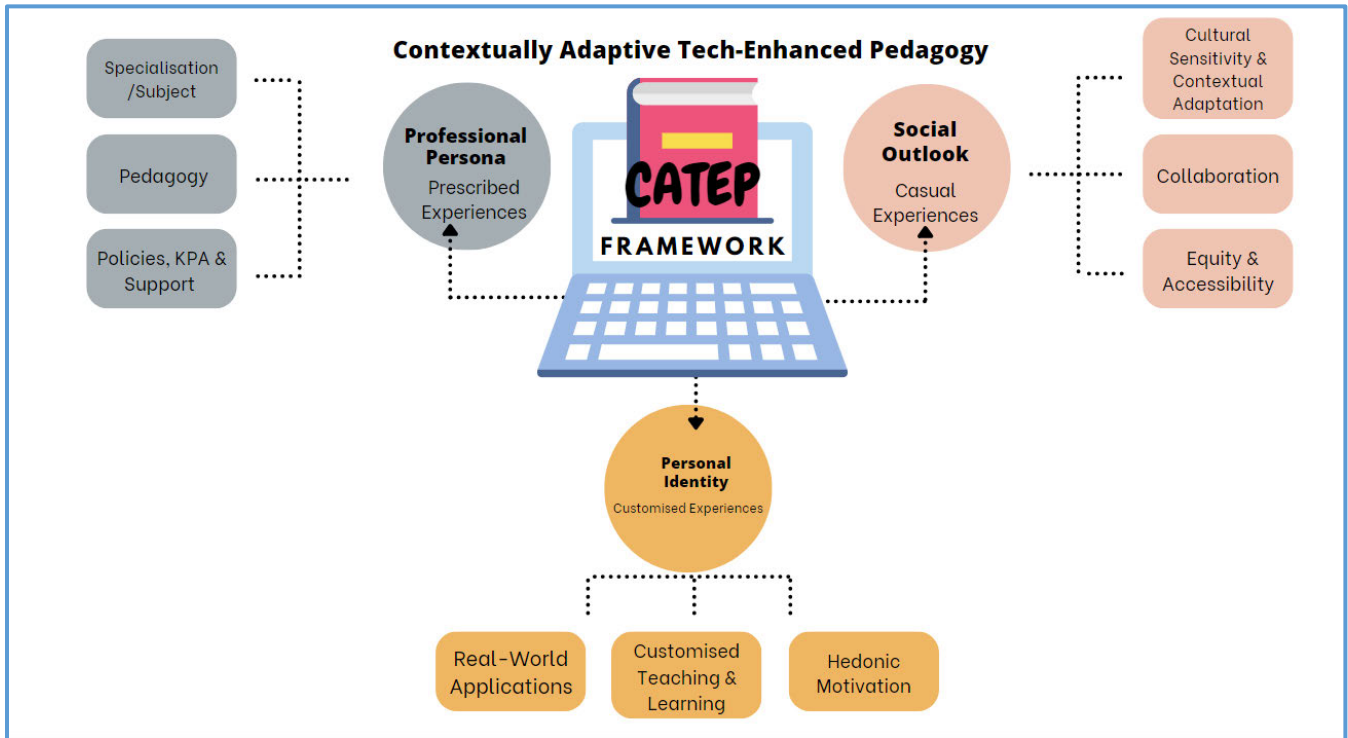


Figure 4.3 CATEP framework

CHAPTER FIVE

CONCEPTUALISING THE OUTLOOK OF ACADEMICS' EXPERIENCES

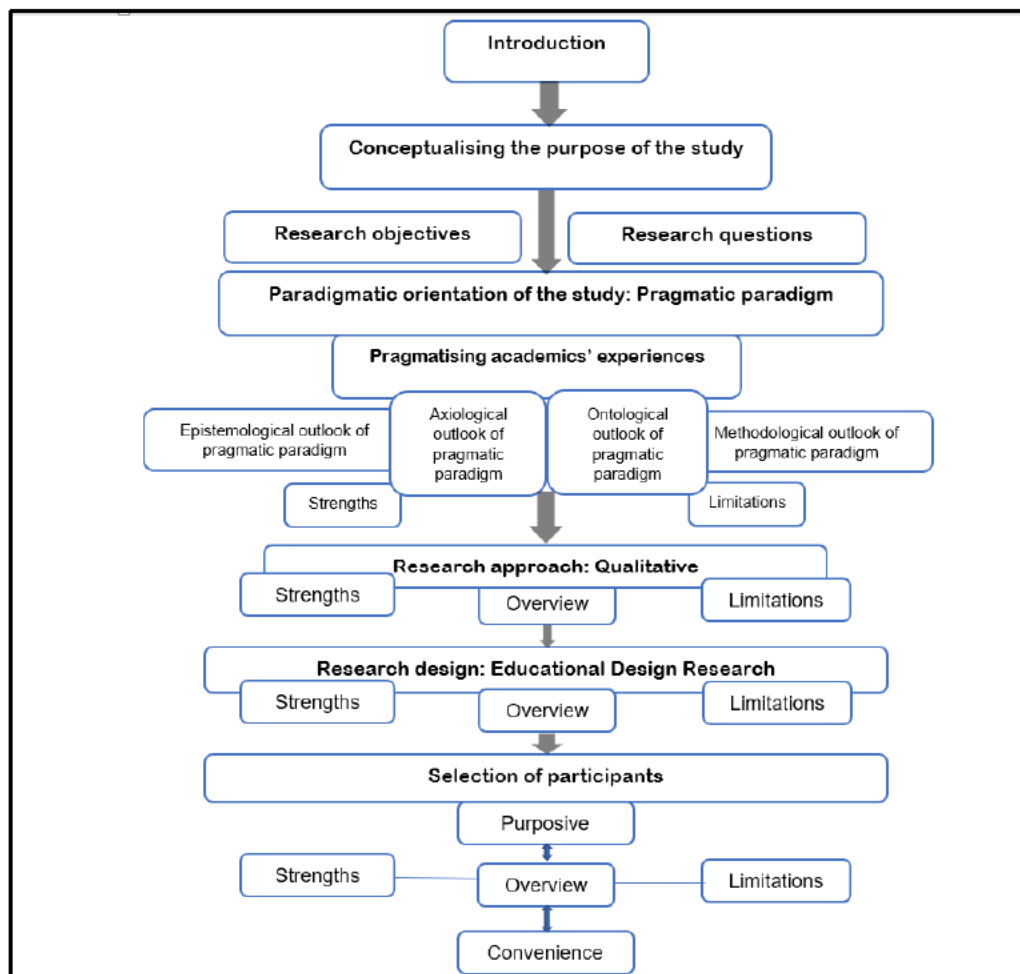


Figure 5.1: The outlook of Chapter Four

5.1 Introduction

The previous chapter extensively discussed the UTAUT-2 theoretical framework drawing from a broad account of conceptualising academics experiences and the nature of universities discussed in Chapter Two. The archetypes of UTAUT-2 that are discussed in the previous chapter provide a comprehensive understanding of the elements that influence the behavioural intention, the adoption and the use of the digital learning environment by technology users, including academics. This chapter then unpacks designing and outlook of academics in terms of the purpose and approach that informs how the data is

generated and analysed using UTAUT-2 principles. In other words, this chapter provides clear prospects of the design and methods used to select or recruit academics who teach agricultural sciences modules. Methodological executing of actions in terms of the actual methods is discussed in the next chapter.

The chapter also outlines that the research question shows the research objective. The study's philosophical paradigm, which is pragmatic, is then discussed with its archetypes, which are epistemology, axiology, ontology, and methodology. Following that comes the unpacking of the methodological approach used, which is qualitative as is the rationale behind employing it with its limitations. Additionally, the study's education research design is addressed. Methods and data analysis techniques are addressed in the next chapter, as well as issues of dependability, transferability, trustworthiness, validity, reliability, and rigour, together with ethical positionality of the study.

5.2 Conceptualising the Focus and Purpose of the Study

Reconceptualising the academics' experiences of using digital learning environments to teach agricultural sciences modules at a South African university is the primary focus of this study. The study intends to unpack how academics' experiences inform their acceptance and usage of the digital learning environments. Academics' experiences in this study are conceptualised as prescribed, casual, customised, and gunpoint experiences. The attainment of the purpose is the following objective:

This study aims to reconceptualise how academics perceive and use digital learning platforms for teaching agricultural sciences modules in a university in South Africa. It seeks to address how the academics' experiences shape their acceptance and utilisation of these digital learning platforms. Academics' experiences are outlined as having four levels, namely, prescribed, casual, customised, and gunpoint experiences. The main purpose is to understand how academics' experiences influence their use of digital

learning platforms. Thus, the idea is to explore ways of improving their experiences with these platforms through the following objectives.

5.3 Research Objectives

- Chronicle academics' experiences on digital learning environments they use to teach agricultural sciences modules at a historically disadvantaged university;
- Rationalise the lessons that can be learned from academics' experiences on the use of digital learning environments to teach agricultural sciences at a historically disadvantaged comprehensive university;
- Understand the rationale that informs academics' experiences on the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university.

5.4 Research Questions

- ***Descriptive 'what' question:***
What are academics' experiences on the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?
- ***Operational 'how' question:***
How can academics' experiences enhance the use of a digital learning environment to teach agricultural sciences modules at a historically disadvantaged comprehensive university?
- ***Philosophical 'why' question:***
Why do academics experience in particular ways the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?

5.5 Philosophical Paradigmatic Orientation of the Study

5.5.1 A brief overview of the research paradigmatic orientation of the study

The term paradigm is of Greek origin, the Greek word being ‘paradeigma’ which means a ‘pattern’. In the context of education, a paradigm refers to a belief system that shapes a researcher’s worldview, as noted by Kivunja and Kuyini (2017) and Denzin and Lincoln (2018). This worldview, according to Kamal (2019), informs the researcher’s research focus and topic. It follows, then, that a paradigm plays a significant role in shaping a researcher’s thinking about a given topic. As Nguyen (2019) argues, a paradigm serves as the philosophical foundation for a researcher’s thought processes, which, in turn, influence the methodological aspects of a study, including data-generation and analysis. Thus, a clear understanding of the paradigmatic assumptions that underlie a study is crucial in evaluating its credibility and generalisability.

Furthermore, Babbie (2013) also declares that a research paradigm refers to the set of beliefs, assumptions, and methods that shape the way researchers approach their investigation. It is essentially the lens through which a researcher views the world while defining how this research should be conducted. According to Kamal (2019) and Taylor and Medina (2011), there are four main components of a research paradigm; namely epistemology, axiology, ontology, and methodology. The next sections discuss these sections in conjunction with the pragmatic paradigm which informs the process of exploring academics’ experiences in teaching agricultural sciences using a digital environment. Nguyen (2019) further outlines three dominant paradigms in education research. These include the positivist, interpretivist, and pragmatic paradigms. Table 5.1 below outlines a summary of the dominant paradigms in conjunction with the phenomenon of this study’s experiences.

Table 5.1: Summary of Dominant Research Paradigms in Conjunction with Experiences (adapted from Nguyen, 2019, pp. 5)

<i>Paradigm</i>	<i>Epistemology</i>	<i>Axiology</i>	<i>Ontology</i>	<i>Methodology</i>	<i>Experience</i>
<i>Positivist</i>	Objective	Beneficent	Naïve realist	Experimental	Prescriptive & gunpoint
<i>Interpretivist</i>	Subjective	Balanced	Relativist	Naturalistic	Casual
<i>Pragmatic</i>	Rational	Value-laden	Non-singular reality	Either one or both methods	Customised

Researchers (Denzin, 2016; Guba & Lincoln, 1994, 2005; Johnson & Onwuegbuzie, 2004; Kamal, 2019; Taylor & Medina, 2011) have described positivism or the positivist paradigm as a research paradigm that emphasises objectivity, quantifiability, and scientific methods. Creswell and Creswell (2018) further assert that this assumes that there is an objective reality that can be studied through empirical observation; research should strive to uncover universal laws and principles. This suggests that, due to differing experiences and the subjective nature of contextual realities, this positivist paradigm does not align with the aim of this study. The second paradigm presented is the interpretivist paradigm that is explained as emphasising the subjective experience of individuals and the importance of understanding their perspective. The second paradigm assumes that individuals must construct their own meanings; and that these meanings cannot be reduced to objective and observable phenomena (Denzin & Lincoln, 2018; Onwuegbuzie et al., 2010; Shah & Al-Bargi, 2013; Tracy, 2013).

This study goes further than understanding academics' experiences through their perspectives as interpretivism is explained. This study values social cohesion and the testing of both old and new ideas that draw from both qualitative and quantitative assumptions (Creswell & Creswell, 2018). The study recognises norms and beliefs about praxis; and aims to emancipate academics' experiences. The study also focuses on issues of power, inequality, and social justice because the context (previously disadvantaged HEI) contributes to power and sociopolitical dynamics. This study has chosen the

pragmatic paradigm because it addresses the latter, and the focal point, according to Kaushik and Walsh (2019) is the outcomes of a study and the questions being asked on the methods.

5.5.2 Pragmatic paradigm

5.5.2.1 Pragmatism academics' experiences

The pragmatic paradigm, according to Kaushik and Walsh (2019) is a philosophical approach to understanding reality and knowledge that emphasises practicality, experimentation, and experience over abstract theories or ideals. The pragmatic paradigm emerged in reaction to the limitations of traditional philosophical approaches, which often emphasise rationality, logic, and abstract reasoning (Johnson & Onwuegbuzie, 2004a). This paradigm is closely associated with the work of American philosopher and psychologist William James (James, 1907), who argued that the truth of an idea should be judged by its usefulness in practice. James emphasised the importance of experience in shaping our understanding of reality. The researcher rejected the idea that there is a fixed, objective reality that can be known independently of human experience. Pragmatism also draws on Charles Peirce's (Peirce, 1905) and John Dewey's (Bernstein, 1961; Dewey, 2005) emphasis of the importance of experimentation, observation, and experience in shaping our understanding of reality. Thus, in the pragmatic paradigm, knowledge is not fixed or absolute, but is instead a constantly evolving and pragmatic process that, in this study, is shaped by academics' experiences, and the practical outcomes of their ideas of using a digital learning environment.

In a review study conducted by Kaushik and Walsh (2019) the pragmatic paradigm was explored as a research paradigm together with its implications for social work research. The study was conceived in response to ongoing debates on the many ways in which social work expertise might be acquired. The review investigated major philosophical foundations and methodological challenges associated with the pragmatic paradigm. It also aimed to explore the works of researchers who have contributed to a better

understanding of pragmatism; and to articulate our thoughts regarding how pragmatism fits within social work research. The relevance of the study to this current research is that education is also a social science due to its dynamic nature. Education is also influenced by and contributes to broader social structures and cultural values in nature (Apple, 2018).

Furthermore, education research is founded on ideologically motivated preconceptions of curriculum as a political, socio-economic, cultural, and psychological discourse (Fomunyam & Damtew, 2017; Hlatshwayo & Shawa, 2020). According to Kaushik and Walsh's (2019) analysis, the pragmatic approach has the potential to enhance the agency of the marginalised by rejecting the assumption that there is a single, objective political perspective or social theory that can generate the best knowledge. Instead, this approach prioritises an ethics-based pursuit of capabilities, justice, and improved experiences for all. In essence, the pragmatic paradigm can be seen as a viable means of promoting equity and social inclusion by emphasising practical outcomes that are sensitive to the digital needs and values of academics in a historically disadvantaged university.

When reviewing the use of pragmatism in Makumane et al. (2021), I found several descriptive, operational and philosophical benefits of using the paradigm for the purpose of this study. The benefits respond directly to the levels on which the research questions of this study are formulated, and how some data is generated. Firstly, the study used a purposive sampling technique to pragmatically select ten scholarly publications that were analysed to understand how the pragmatic paradigm is depicted in digital technology publications related to COVID-19. With purposive sampling, a researcher is able to identify and select subjects and/or objects of the research that are most likely to provide valuable insights into the research question (Etikan et al., 2016). In this research, participants are purposefully identified, and only those who teach agricultural sciences are participating. Moreover, Makumane et al. (2021) performed a document analysis. Findings revealed that a pragmatic paradigm addresses all three levels of experiences

(prescribed, casual, and customised) in the use of digital technology. The integration of SMSs and LMSs were reported as a pragmatic approach for educational experiences, which is one factor explored in the current study.

The above assertions and findings confirm the flexibility and robustness of the pragmatic paradigm even when used in different contexts. Johnson (2011) and Johnson and Onwuegbuzie (2004b) share the same sentiment that a pragmatic paradigm is an approach to research that emphasises the practical usefulness of research findings, rather than the theoretical or philosophical underpinnings of the research methods. The pragmatic paradigm recognises that different research questions require different methods; and that a combination of qualitative and quantitative approaches can provide a more comprehensive understanding of a phenomenon. Similarly, Maarouf (2019) concludes that the pragmatic paradigm is an approach that allows researchers to gain an in-depth understanding of the experiences, perceptions, and perspectives of the participants, qualitatively. It allows generalisation of findings to larger populations and to establish cause-and-effect relationships, quantitatively through collecting and analysing numerical data, such as surveys or experiments. This concurs with Sokhulu's (2021) view that the pragmatic paradigm empowers researchers to identify the most suitable research methods and designs to address their research questions, regardless of whether it involves employing mixed methods, multiple methods or a single method.

This paradigm has made it easier for me to select the five methods that I used to generate and to both quantitatively and qualitatively collect the data. Both data-collection methods are discussed in this chapter. Even the concepts I used to describe the methodology and findings of this study were not restrictive. I chose the pragmatic paradigm; and the next sections elaborate on the epistemology, axiology, ontology, and methodology of the pragmatic paradigm.

5.5.2.2 Epistemological outlook of pragmatic paradigm

Epistemology is the branch of philosophy that deals with the study of knowledge, belief, and justification (Aliyu, 2015). Similarly, Kaushik and Walsh (2019) assert that epistemology is the nature and scope of knowledge, including its sources, validation, and limitations. Guyon et al. (2018) adds that it explores questions such as “What is knowledge?”, “How do we acquire knowledge?”, “What are the criteria for knowledge?”, and “What are the limits of knowledge?” The above deliberations of epistemology suggest that epistemology is a crucial aspect of research because it determines the researcher’s understanding of what counts as knowledge, and how it can be obtained. According to Hofer (2017), the researcher’s epistemological assumptions guide their research design, methodology, and interpretation of results.

Pragmatism as a philosophical position that can liberally draw from both qualitative and quantitative assumptions (Creswell & Creswell, 2018) is therefore not committed to a single system of knowledge acquisition, but to what is working in a particular context. Epistemologically, this means that pragmatists are rational; they consider the possibility of both objective and subjective ideologies in practice (Krauss, 2005). Collins et al. (2007) also utter the same sentiments that the logic in knowledge acquisition includes the use of discovery patterns (induction), testing of hypotheses and theories (deduction), as well as considering the paramount sets of explanations to understand one’s practice and results (abduction). Thus, I had to immerse myself within the context, culture, and experience of academics, and what they know about their reality, while also structuring their experiences to establish statistical differences in experiences. For instance, themes from interviews, focus-group discussions, document analysis, and reflective activity were triangulated and compared with quantitative rating of lessons through observing how academics conduct their lesson observations. This allowed extensive knowledge discovery about the use of a digital learning environment that includes both LMSs and SMSs, and co-creation of new knowledge about teaching agricultural sciences at a previously disadvantaged comprehensive university. Therefore, knowledge is a tool that we use to achieve practical goals and to solve real-world problems

(Östman & Wickman, 2014). With the understanding outlined about epistemology, the next section presents the axiological outlook of the pragmatic paradigm.

5.5.2.3 Axiological outlook of pragmatic paradigm

Axiology, according to Kivunja and Kuyini (2017), refers to the value system and ethics of planning a research proposal or study. Axiology considers the philosophical lens through which the researcher makes valuable and ethical decisions in knowledge formation. Similarly, Aliyu (2015) also shares the same sentiments that axiology is a philosophical branch that addresses what is ethically and morally either wrong or right in a research. In the context of educational research, McNamee's (1998) axiology refers to the study of values and how they influence the educational process. This implies that it is important that I understand the values that underpin my research; and that of experiences of academics who are participating in this study. It is also imperative that I recognise the values that guide the development of those experiences.

Therefore, the collaborative humanistic/interpretivist and positivistic nature of pragmatic paradigm values social cohesion and testing old and new ideas, norms and beliefs about praxis. Since knowledge values are viewed [in pragmatism] as praxis (Thota et al., 2012), political interference can be minimised by the use of appropriate sampling designs that are realistic (Collins et al., 2006). In the pragmatic paradigm, values and ethics are not seen as universal or objective, but rather as relative to the situation and context (Kaushik & Walsh, 2019). This means that what is considered valuable or ethical in one situation may not be in another, and that these values can change over time as academics' understanding and experiences of the digital world change.

Furthermore, in this study, an educational design research informed the nature of the data that will result. Ethical clearance was obtained, and the differing views of participants were also respected. During data

generation, linguistic preferences were taken into consideration and transcription translation was conducted. Finally, conclusions and recommendations will not be exclusive only to participants in this study but are generalised for different contexts outside the scope of this study. This suggests that findings from this study are applicable to other comprehensive universities and even HEIs, such as historically disadvantaged universities of technology and TVET colleges.

5.5.2.4 Ontological outlook of pragmatic paradigm

Ontology, according to Kalmal (2019), is a philosophical assumption about social existence and reality. Guba and Lincoln (1994) define ontology as a branch of philosophy concerned with the study of existence and the nature of reality. Similarly, Nguyen (2019) cites that it is a branch of metaphysics that deals with the study of existence, reality, and the nature of being. It is concerned with the fundamental categories and concepts that underlie the structure of reality, including the nature of entities, properties, and relations. This suggests that reality is constructed and re-constructed through human action and experience. Also, ontology is not fixed or absolute, but is instead constructed through the ongoing interaction between individuals and their environment (Aliyu, 2015). In this study, this interaction involves a process of interpretation and negotiation in which academics make sense of their digital surroundings and act upon them as they teach agricultural sciences.

In addition to the above, according to Guba and Lincoln (2013, p. 39), ontology probes questions such as “What is the nature of reality?” or “What is there that can be known?” Several authors such as Bogdan and Bilken (1998), Daniel and Onwuegbuzie (2002), Guba and Lincoln, (2005), Singh, (2019) and Taylor and Medina (2011) assert that, ontologically, a single and ultimate truth does not exist in the pragmatic paradigm; and that reality considers both subjectivity and objectivity of what is experienced. Hence, I needed to understand that academics’ experiences are informed by the context, and universe in which they live. Their experiences and attitudes towards digital learning differ, and are influenced by their personal,

social, and professional encounters with digital technologies. To understand the nature of their realities, interviews and focus-group discussions were conducted in a language convenient and comfortable to them. According to Orvell et al. (2016) and Pacheco and Miller (2016), language is a primary tool for meaning-making; and language is not just a means of communicating pre-existing ideas or concepts, but is itself a primary tool for constructing and negotiating meaning. Yazan (2019) adds that, through language, individuals create and share meanings, and establish norms, values, and social practices. The methodological nature of the pragmatic paradigm is explained in the next section.

5.5.2.5 Methodological outlook of pragmatic paradigm

Kamal (2019) asserts that methodology as an archetype of a paradigm is the method and process in which investigation is conducted. Thus, Guba and Lincoln (2013, p. 39) probe a fundamental methodological question, “How does one go about acquiring knowledge?” Creswell and Creswell (2018) deliberate that, more often in pragmatic research, methodology must be pluralistic in nature. Methodology must allow various methods to derive knowledge about the phenomenon or a problem that is being studied. It is for the aforementioned reasons that academics’ experiences are explored through the use of both open-ended and close-ended instruments. Five data-generation methods were used. These methods include reflective activity, one-one-one semi-structured interviews, focus-group discussions, classroom observation, and document analysis.

Furthermore, data generated was analysed; accordingly, the above methods include both qualitative and quantitative means. With quantitative data from lesson observations, analysis was conducted using the Statistical Package for Social Sciences (SPSS), and NVIVO thematic analysis for qualitative data.

5.6 Approaching this Study

5.6.1 An overview and position of this study: the qualitative approach

A research approach refers to the method or strategy that a researcher uses to conduct their study. The approach includes the overall plan for collecting and analysing data, as well as the theoretical framework and assumptions that guide the study (Creswell & Creswell, 2018). Various authors have contended that there are several research approaches, including quantitative, qualitative, mixed-methods, and action research. Quantitative research involves collecting numerical data and analysing it using statistical methods. Qualitative research involves collecting non-numerical data such as text, images, and observations, analysing this using technique such as content analysis and thematic analysis. Mixed-methods research combines both quantitative and qualitative approaches; while action research involves actively engaging with stakeholders to improve a particular situation or problem (Abdullah Kamal, 2019; Cohen et al., 2018; Denzin & Lincoln, 2018; Grimalt-Álvaro & Ametller, 2021; Johnson & Onwuegbuzie, 2004a; Kelly, 2006; Leavy, 2014; Onwuegbuzie et al., 2010; Sileyew, 2019; Tracy, 2013).

The difference between the distinct approaches lies primarily in their epistemological, ontological, and axiological assumptions, which are distinct, as discussed above (Onwuegbuzie & Leech, 2005). According to Creswell and Creswell (2018), the qualitative research approach is appropriate for subjective exploration of experiences, reflections, understanding and meanings of individuals' or groups' contextual realities and ways of living. Quantitative research is used for testing objective theories and for examination of relationships among variables. The choice of research approach depends on the research question, the type of data that is being collected, and the researcher's epistemological and ontological assumptions. It was important for me to carefully consider my research approach; and to be transparent about my methodology so that others can evaluate the validity and reliability of my findings. This study employed a qualitative approach as it gained an in-depth understanding of particular phenomenon, exploring meanings, attitudes, and experiences in detail (Farrell, 2020).

According to Tracy (2010), qualitative research aims to understand and interpret human behaviour, experiences, and perspectives by exploring the subjective meaning of participants' experiences in their natural settings. Qualitative research further relies on non-numerical data such as interviews, observations, and open-ended survey responses. This study qualitatively generated data on academics' experiences of using a digital learning environment; this when teaching agricultural sciences using reflective activity, one-on-one semi-structured interviews, focus-group discussions, and document analysis. These methods are discussed in depth in the data-generation section. The data-generation methods used in this study uncovered the complex and multifaceted nature of academics' experiences and behaviour in the acceptance and use of a digital learning environment in various specialisations of agricultural sciences. Thematic analysis using inductive and deductive reasoning assisted in the analysis of the generated data. This method of conducting research further supported the significance of the qualitative approach in the present study, in which, along with participants, we then generated interpretations from the data results. These methods also allowed me to probe deeper into academics' experiences and to understand how they navigate the challenges and opportunities of digitalised learning environments in teaching agricultural sciences. Thus, the focus is on understanding the participants' subjective experiences, perceptions, and interpretations of the phenomena under study (Aspers & Corte, 2019).

As noted by Onwuegbuzie and Leech (2005), while certain research questions are better suited to quantitative methods and others to qualitative approaches, combining both approaches in a study can take advantage of respective strengths to gain a more comprehensive understanding of social phenomena. In other words, using various research orientations can enhance the overall quality of the research (Gobo, 2023). To enhance the reliability and validity of the results obtained in the current study, triangulation was employed. This involved answering the practical or operational question of 'how' academics teach agricultural sciences using digital platforms through the use of an evaluation form during lesson observation. This provided valuable insights into the teaching practices employed by academics in this

field. As Mpungose (2019a) reported, triangulation increases the credibility and accuracy of the research findings by reducing the potential for bias and increasing the confidence in the results.

5.6.2 Embracing the strengths of qualitative approach in this study

In qualitative research, people listen to stories, ask questions and engage in dialogue in order to understand a social phenomenon (Tracy, 2013). Thus, through observing and talking to others (which in this study refers to academics) we study their experiences, interests, quirks, and sense of humour. Cohen et al. (2018) further assert that qualitative research signifies the use of words to make patterns of meaning more than numbers. Hence, I had stronger understanding and in-depth information on structured, unstructured, semi-structured and gunpoint experiences of academics through lesson observation, interviews, focus-group discussion, reflective activity, and document analysis. Through these qualitative data-generation instruments I was able to gain more knowledge thus to enhance use of digital learning environments that respond to their needs as academics at a historically disadvantaged university. I was even able to establish a rapport and build relationships with the participants.

Denzin and Lincoln (2018) further argue that qualitative research offers flexibility and adaptability, enabling researchers to modify their methods and approach as they gain more insights into the phenomenon under investigation. This approach provides a contextual comprehension of social phenomena by exploring the significance and meaning of social practices, interactions, and experiences within specific cultural, social, and historical settings. During the data-generation phase, I engaged in conversations with participants as I gathered primary data in their natural environments. Some preferred face-to-face while others preferred online platforms such as MS Teams. I respected these differences. This also allowed me to simplify my questions to enhance participants' comprehension; and further probed their responses using their preferred language. This method facilitated a comfortable and interactive data-

generation process in which both the participant and I related to the same realities. Additionally, by probing participants during the data-generation process, I obtained insights that I probed into more deeply.

5.6.3 Addressing the limitations of qualitative approach in this study

According to Collins et al. (2007), participants in qualitative research may not have a clear understanding or awareness of the phenomenon being studied; and there may be challenges in conceptualising multiple realities, as noted by Cohen et al. (2018). To address these potential weaknesses, I purposefully and conveniently selected academics who teach agricultural sciences, as they have a deeper understanding of the contextual realities of teaching the subject at a historically disadvantaged university. Additionally, I ensured that participants were well-informed about the study during the planning stages of data collection, satisfying myself that all uncertainties were addressed. During the transcription process, patterns and similarities in the data were identified and categorised into themes to help manage the multiple realities present.

I had to address the potential bias and subjectivity in qualitative research. Johnson et al. (2020) state that bias relies heavily on the researcher's interpretation of the data. I therefore used triangulation and member checking to increase the validity and reliability of the findings. I used multiple sources of data or methods to validate the findings; and also shared the transcript findings with participants to ensure that their experiences had been accurately represented. The above deliberations are aligned with the educational design research that is used in this study.

5.7 Designing the Study

5.7.1 Educational Design Research

A research design is defined by De Vaus (2006) as an inclusive strategy that a researcher selects and adopts to integrate various components of a particular study in a logical and coherent way. The research

design also informs how the problem will be solved, and how the research questions are going to be best answered (Nguyen, 2019). According to Astalin (2013), the choice of research design depends on the research question, the nature of the phenomenon being studied, and the resources available to the researcher. Thus, a well-designed research study should be valid, reliable, and generalisable to the population of interest (Johnson et al., 2007). In qualitative research, there are four most prominently used research designs; they include phenomenology, ethnography, grounded theory, and case study (Creswell & Creswell, 2018; Klopper, 2008; Thanh & Thanh, 2015). van den Akker, Gravemeijer, McKenney, and Nieveen (2006) proposed another type of research design known as the educational design research, which can be adapted to suit various goals and characteristics of the designs. Given the practical focus and pragmatic nature of the current study and the use of quantitative data for both triangulation and detailed exploration of experiences, an educational research design was deemed appropriate for this study.

According to van den Akker et al. (2006), educational design research can be used as a design that is a 'family' of related research designs with diverse objectives and qualities. van den Akker et al. (2006) describe EDR as set of approaches that aims to generate innovative concepts, tools, and techniques that consider and have the potential to influence learning and teaching in realistic environments. The ultimate goal is to develop new theories, artefacts, and practices applicable to real-world situations and that can promote effective teaching and learning outcomes. Similarly, Nieveen et al. (2006) contend that EDR combines theory and practice to improve teaching and learning. Plomp and Nieveen (2013) add that it involves a collaborative and iterative process of designing, implementing, and refining educational interventions, with the goal of improving educational outcomes. This design is particularly useful for studying complex educational settings and for developing innovative approaches to teaching and learning. This design is suitable for this study as it adopted a pragmatic paradigm that is multifaceted. I find educational design research corresponding to the UTAUT-2 a theory that is also applicable to various contexts in exploring the adoption and use of digital technology.

Plomp (2013, pp. 16) defines educational design research as *“the systematic analysis, design and evaluation of educational interventions with the dual aim of generating research-based solutions for complex problems in education practice, and advancing our knowledge about the characteristics of these intervention and the processes of designing and developing them”*. This researcher also defines EDR as *“the study of educational interventions (such as learning processes, learning environment and the like) with the purpose to develop or validate theories about such processes and how these can be designed”*. Therefore, for the purpose of describing, comparing, explaining, and determining effectiveness experiences in order to design/develop solutions to practical problems and realities of digital teaching of agricultural sciences, education design research was ideal.

Taking from the above deliberations, the use of digitalised learning environments to teach agricultural sciences is an area that can benefit from educational design research, as it aims to improve the design, implementation, and evaluation of educational interventions (Reeves et al., 2011). EDR is particularly relevant in this context as it can help to ensure that the digital learning environments used are effective and that they meet the needs of academics, and that of students.

Furthermore, the process of educational design research as described by van den Akker (2013) and Plomp and Nieveen (2013) involves collaboration between researchers, academics, and students. In my capacity as a researcher, I collaborated with academics to create a positive perception and mindset on digital learning environments that were in harmony with the curriculum and instructional objectives. I also generated data to assess the efficacy of these digital learning environments. Also, throughout the process, I engaged in member checking to enhance the quality of the interventions and refine the design and implementation of the study. This enabled ongoing interaction with the participants even after the data collection was completed.

Plomp (2013) refers to the work of McKenney et al. (2006) and van den Akker et al. (2006), affirming that educational design research typically follows a cyclical process that involves several iterative phases. Furthermore, while there is no one-size-fits-all approach, a commonly used systematic educational design process has phases: problem identification; developing of a roadmap to explore solutions; evaluation of a solution in practice; and reflection to enhance solution implementation. The following archetypal model (Figure 5.2) illustrates how educational design research is used in this study; and how processes are involved in answering the research questions.

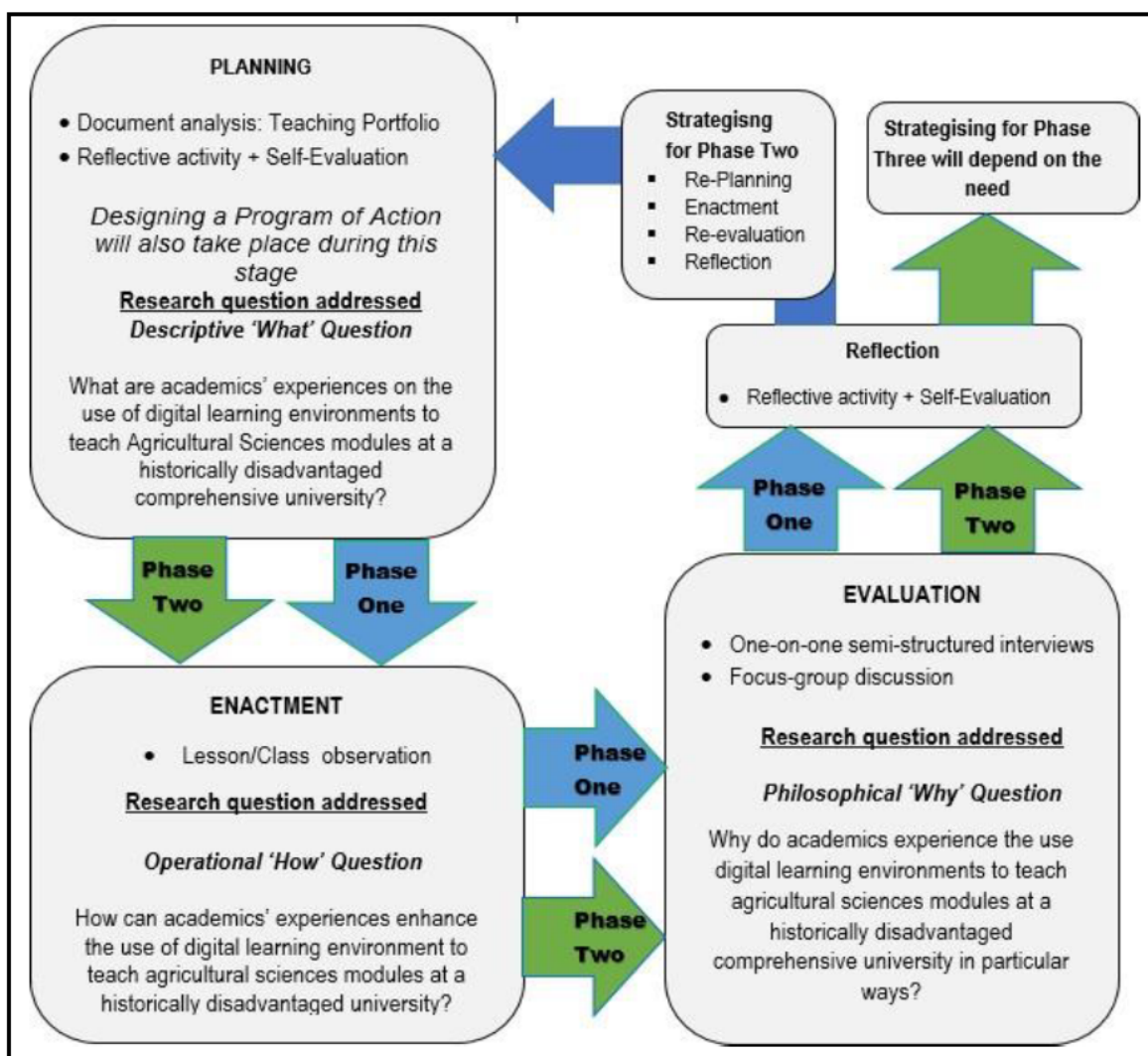


Figure 5.2: Educational design research archetypal model as used in this study

The educational design research archetypal model presented by Figure 5.2 has a minimum of two phases which illustrate how data were generated and collected. Upon identifying challenges, we (participants and I, as researcher) had to explore the experiences and factors that lead to those challenges that academics face when teaching agricultural science using digital platforms. According to van den Akker et al. (2006), the identification of the problem also includes formulating research questions that the study seeks to address. It further means reviewing the literature, consulting with experts, or conducting preliminary studies to identify gaps in existing knowledge and experiences. This was conducted; and the literature review is presented in Chapter Two above.

Furthermore, it was crucial to navigate the planning of participants' teaching. Plomp (2013) asserts that planning encompasses the designing of a framework or roadmap that guides the development of practice and experience. Similarly, Kelly (2006) avers that this stage is informed by existing design, preparation, and technological innovations. Thus, I analysed academics' teaching portfolios or learning guides (document analysis), to ensure that the academics had provided clear and concise instructions on how digital platforms will be used in particular topics; whether the learning outcomes and curriculum objectives are well-defined, specific, and measurable, and to identify ways of enhancing their teaching experience. A reflective activity was also given to academics for self-evaluation about their experiences; and in the process, we designed a programme of action on how the enactment and the evaluation of experiences will unfold. The planning stage was for me to respond to the descriptive or content 'what' research question.

The second stage (enactment) involves observing academics in action (lesson observation). A link to access virtual lectures will also be obtained in order to observe authentic lessons. This allows a first-hand understanding of how lesson times are conducted. Thus, in this study observations address the operational 'how' question. After observing how academics enact the curriculum, they are evaluated using one-on-

one semi-structured interviews and an open-ended semi-structured focus-group discussion. The evaluation stage of Phase One is used to address the philosophical ‘why’ question in order to understand why academics experience in particular ways the use of DLE to teach agricultural sciences. Reflection (reflective activity) follows again on the process and experience thereof.

The execution of the plan (enactment) of educational design research involves putting the plan into action. (Plomp, 2013) and Reeves (2006) refer to this as testing and refinement of a solution in practice. Thus, the operationalisation of the designed plan has to be evaluated from lesson observations in order to answer the operational ‘how’ question. This allowed me to identify potential issues that may hinder the effectiveness of the use of digital technology, and also to identify the strengths that had to be embraced. According to van den Akker et al. (2013), educational design research emphasises that the primary research activity holding the utmost significance in enhancing and perfecting the intervention is formative evaluation. The next stage of the education design research is the evaluation of the reasons for academics to experience the use of a digital learning environment to teach agricultural sciences modules at a historically disadvantaged comprehensive university in particular ways. This was done through engaging with participants during one-on-one semi-structured interviews and focus-group discussion; and this addressed the philosophical ‘why’ question. The engagements each took an average of 60 minutes.

Reflection is the final stage in the educational design cycle. Reflection allows participants and the researcher to critically examine their assumptions, understanding of practice and actions throughout the design, as well as the implementation and evaluation of an educational intervention (Kelly, 2006; Nieveen et al., 2006; van den Akker, 2013; van den Akker et al., 2013). Thus, a reflective activity was issued again. The second phase involved member-checking that also took place throughout the cycle; and the design yielded accurate and precise results as more than one method of data collection and analysis. The rigorous evaluation of educational interventions using both quantitative and qualitative methods helped me explore

academics' prescribed, casual, and customised experiences, and how these experiences, collectively, informed educational habits, and identification of personal identities. Educational research design in this study also complements the pragmatic paradigm that is emancipatory (Khoza & Mpungose, 2020); and connects both qualitative and quantitative methods (Gobo, 2023). This leads to exploring the strengths of educational design research.

5.7.2 Strengths of educational design research

According to McKenney and Reeves (2012), educational design research emphasises the practical application of research findings. The goal is to develop educational interventions that can be implemented in real-world settings to improve student learning outcomes. Similarly, Reeves et al. (2011) mention that this design provides a direct link between research and practice (Reeves et al., 2011). This design has a significant impact on solving digital teaching challenges of academics in historically disadvantaged HEIs. Allowing practice and reflection and feedback processes to take place effectively and efficiently through reflective activities, lesson observations and interviews provided an in-depth understanding of the links between theory and practice; the aim is also to bridge the gap between the two.

This design's iterative process involves multiple cycles of design, implementation, and evaluation. This allows researchers to refine and improve interventions over time (Plomp & Nieveen, 2013). Thus, the use of a pragmatic paradigm and various data-generation methods helped me gain rich information to answer all three research questions. This ensures that interventions are effective, and recommendations are feasible and transferable (Berkvens, 2009).

Furthermore, educational design research is highly applicable to the topic of conceptualising academics' experiences of using digitalised learning environments. EDR ensures that the digital learning environments used are effective, culturally responsive, and inclusive, thereby improving the learning

outcomes of students (Gravemeijer & Cobb, 2013; Mckenney & Reeves, 2012). Through the data-generation process, I managed to persuade academics to identify their specific digital needs, understanding that they come from diverse backgrounds. Academics were also open enough to be vulnerable and to admit to the digital challenges that they face. Academics were open about socio-economic factors also contributing to those challenges, and therefore they design learning environments that meet these needs. Therefore, EDR was helpful in identifying unique features related to how digital technology was used in agricultural education on a daily basis, such as personalisation and social experiences among the participants. Since there is no design that is flawless, there are limitations also in EDR.

5.7.3 Limitations of an education design research

Educational design research is said to require much time and investment because it combines more than one approach, and more research subject units (Kelly, 2013). Thus, I used much time and many resources to access participants, and in analysing the data. However, I adopted a purposive and convenience sampling method to access academics who teach agricultural sciences modules. Furthermore, times for virtual interviews and meetings were arranged at participants' convenience. For those who preferred face-to-face interactions, I set appointments to visit their offices. For two participants who were working from home during the time, I scheduled interviews I could travel to as they lived not far from my hometown. Training and workshops data analysis were attended, and skills learned well were used to transcribe and analyse data.

According to Nieveen et al. (2006), educational research design can limit generalisability of findings to other contexts, since interventions are typically developed for specific educational settings and population. Thus, I also used a quantitative method for triangulation and for strengthening the qualitative methods used.

5.8 Selection of Participants

5.8.1 Recruitment of participants

Selection of participants in a study is also referred to as sampling. This is the process of selecting a representative subset of a population or dataset for analysis or study, and is often conducted when it is not pragmatically possible to analyse the entire population (Leavy, 2014). For instance, Stratton (2021) describes a situation in which it is not always feasible to collect data from an entire population, such as when researching a population affected by a disaster. This may be due to difficulties in identifying or contacting individual members of the population; or the population being too large for a census-based study. In such cases, sampling is used to obtain data considered representative of the target population. Denzin and Lincoln (2018) contend that researchers should only include people who can make meaningful contributions to the data-generation process because this allows researchers to make inferences about the larger population based on data collected from a smaller group of individuals. The process of selecting participants and the methodology used in this study were based on various factors such as the phenomenon under investigation (i.e., academics' experiences), the subject area (i.e., agricultural science), the research questions, and the methods used to collect and analyse the data.

In addition to the above, Cohen et al. (2018) identify two techniques used when selecting participants: probability and non-probability sampling. According to Cohen et al. (2018), probability sampling involves randomly selecting individuals from a community or population in such a way that every individual person has an equal chance of being chosen. This method allows for findings to be generalised to the larger population, the sample selection representing the population. Examples of probability sampling techniques include basic random sampling, cluster sampling, and stratified random sampling (Ames et al., 2019; Etikan & Bala, 2017; Gill, 2020).

In the context of this study, not all academics had a known or non-zero chance of participating. I focused specifically on those who teach agricultural science modules. Because probability sampling is impartial

and gives an equal chance of selection to all members of a population, regardless of their qualifications or potential to meet the research objectives, it is not appropriate to use this sampling technique for this particular study.

Non-probability sampling, on the other hand, as explained by Vehovar et al. (2016), represents the absence of probability and/or likelihood when sampling is conducted. A sample is selected based on subjective judgements rather than random selection (Tracy, 2013). Non-probability sampling methods include quota, accidental, purposive, snowball, heterogeneity, and dimensional sampling methods (Cohen et al., 2018; Etikan & Bala, 2017). The crucial aspect of this technique is that the sample population must have a shared experience regarding a specific issue to produce detailed and comprehensive data, which is commonly referred to as thick data (Sokhulu, 2021). This study adopted purposive and convenience sampling techniques for both qualitative and quantitative data generated/collected. Both techniques belong to the non-probability sampling technique. Thus, purposive sampling was applied only to agricultural science academics, and those who were available, accessible and willing to participate. The Faculty of Science and Agriculture in the institution in which sampling took place had some thirty teaching academics; only fifteen were permanently employed by the university. Others were employed on a temporary contract (time-on-task) basis, of which some were post-doctoral fellows. The study anticipated twenty-five academics; however, owing to the availability and willingness, only twenty-one participated in the reflective activity. Of the twenty-one, only fourteen were available for interviews and focus-group discussion, and seven participants withdrew from the study. Academics sampled in this study were from three departments: Livestock and Pasture Science (LP), Agricultural Economics and Extension (EE) and Agronomy (AG). Table 5.1 shows biographies of academics who participated in this study.

Table 5.1: Academics' Biographies

Participant	Department	Post Level	Qualification	Gender	Ethnicity
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LP1	Livestock & Pasture Science (LP)	Lecturer	M.Sc. Agric.	Male	Black
LP2	Livestock & Pasture Science	Senior Lecturer	Ph.D.	Male	Black
LP3	Livestock & Pasture Science	Senior Lecturer	Ph.D.	Male	Black
LP3	Livestock & Pasture Science	Lecturer	M.Sc. Agric.	Female	Black
LP5	Livestock & Pasture Science	Time-on-Task	Ph.D.	Male	Black
LP6	Livestock & Pasture Science	Time-on-Task/Post-Doc	Ph.D.	Female	Black
EE1	Agricultural Economics & Extension (EE)	Lecturer	M. Agric.	Male	Black
EE2	Agricultural Economics & Extension	Professor	Ph.D.	Male	Black
EE3	Agricultural Economics & Extension	Professor	Ph.D.	Male	White
EE4	Agricultural Economics & Extension	Lecturer	Ph.D.	Female	Black
EE5	Agricultural Economics & Extension	Lecturer	M. Agric.	Female	Black
EE6	Agricultural Economics & Extension	Time-on-Task	M.Sc. Agric.	Female	Black
AG1	Agronomy (AG)	Senior lecturer	Ph.D.	Male	Black
AG2	Agronomy	Professor	Ph.D.	Male	Black

5.8.2 Purposive sampling

According to Vanderstoep and Johnston (2009), purposive sampling is the selection of participants based on a particular attribute. The selected participants should share equal attributes or there should be equal representation of groups that may not necessarily be equally represented in society. Cohen et al. (2018, p. 218) attest to the above assertions that in purposive sampling, a researcher handpicks participants based on their “...*judgement of their typicality or possession of the particular characteristics being sought. They assemble the sample to meet their specific needs*”. In the same vein, and context of this study and design adopted, van den Akker et al. (2013) assert that purposive sampling is appropriate for educational design research as long as the participants are carefully and deliberately chosen even if a small number of them

are involved. van den Akker et al. (2013) further claim that the sample size is less critical. As a result, thick data were produced by the fourteen academics who participated in this study.

Etikan and Bala (2017) hold a similar view to Cohen et al. (2018), that purposive sampling involves making a judgment. In a qualitative study by Sokhulu (2021), purposive sampling was employed to select master's students to investigate their experiences of using digital platforms for research. The study also used a pragmatic paradigm. It anticipated fifteen master's students; however, only ten purposively participated. Similarly, to this study, the number of participants was fewer than those who were anticipated. However, the study used purposive sampling with snowball sampling as opposed to this one that used convenience sampling.

Purposive sampling was used with convenience sampling by Mpungose's (2017) study that explored reflections of five lecturers on the use of MOODLE to teach a physical science module, also at a South African university. This was a qualitative study: it only selected lecturers teaching physical science modules, appropriating purposive sampling even more for this study. Creswell (2014) and Christiansen et al. (2010), as cited in Mpungose (2017), state that purposive sampling is commonly combined with convenience sampling in qualitative research. Such a combination enables researchers to choose participants and study locations that will provide relevant information for their research objectives, research enquiries, and research phenomenon. In other words, purposive sampling is employed alongside convenience sampling to ensure that the selected participants and locations are intentional and purposeful, rather than random or haphazard.

5.8.3 Strengths of purposive sampling

Cohen et al. (2018) note that purposive sampling is more advantageous than other methods because it focuses on a specific and unique characteristic to generate greater depth to the study. This means that since

it ensures that the sample is representative of the population from which it is drawn, the sample is likely to have similar characteristics as the population. Such makes it easier to generalise the findings from the sample to the population. Thus, purposive sampling helped the study to identify and select participants who have the required experience and knowledge in teaching agricultural science during this digital era. This increased the relevance and validity of this study.

Similarly, Marshall (1996) supports the above assertion, stating that the researcher selects the most productive sample to solve the problem and/or answer the research questions. A study by Mutongoza (2021) that also adopted purposive sampling in selecting students and lecturers to explore their experiences on emergency online learning reported that purposive sampling provides a more comprehensive and nuanced understanding of the topic being studied. Hence, participants with a diverse range of backgrounds, experiences, and perspectives in a particular topic are selected. Additionally to that, Berndt (2020) posits that purposive sampling is most appropriate in qualitative studies that involve multiple stages and/or objectives. Therefore, in the context of this study with multiple stages and phases as discussed in the educational design research section, purposive sampling was compatible with the study.

5.8.4 Weaknesses of purposive sampling

Inasmuch as purposive sampling provided greater depth to any study, it provides less breadth to a study (Cohen et al., 2018). Berndt (2020) argues that the utilisation of purposive sampling may lead to the risk of selection bias, wherein the researcher may unintentionally choose participants who are predisposed to offer specific categories of information. The possibility exists that the sample may not be representative of the population, thereby constraining the extent to which the findings can be generalised. Thus, this study targeted all academics in the three departments (LP, EE, and AG) who were approached, and only those who participated were accessible.

Furthermore, the utilisation of purposive sampling may pose difficulties in conducting statistical analyses that necessitate random sampling, as the data may not satisfy the prerequisites essential for specific statistical examinations Berndt (2020). Thus, this study employed an analytical method (lesson-observation schedule) that was suitable for accounting for the non-random nature of the sample. Analysing data from the quantitative data included descriptive statistics and was analysed using the Statistical Package of Social Sciences (SPSS); and the study had multiple data-generation methods.

5.9 Convenience Sampling

5.9.1 Convenient selection of academics in this study

In most research, if not all, results would be more accurate and credible were the whole population selected; however, it is impossible to include every subject. The main reason for this is that the population is always finite to accessibility issues (Etikan et al., 2016). Having mentioned that, researchers select participants who are available and accessible (Shaheen et al., 2018). Thus, I chose participants who were easily accessible and willing to take part in the study. Etikan & Bala (2017) stress that participants are chosen because they are in close proximity for the researcher to access. In other words, the selection of participants is based on their convenience and accessibility, as opposed to a randomised sampling (Collins et al., 2007).

According to studies by Khoza (2015, 2016, 2018; 2020), the utilisation of purposive and convenience sampling techniques together can be advantageous when seeking to identify a targeted population possessing a specific characteristic, while also ensuring ease of accessibility. This sentiment is supported by Scholtz (2021), that convenience sampling involves selecting the most accessible subjects in a research. Marshall (1996) further explains that accessibility could be in terms of costs, time, and effort; and Etikan et al. (2016) add practical criteria such as geographical proximity, and also identified willingness to participate in the study as components of convenience. Consequently, I employed this purposive sampling

technique as a supplementary technique to purposive sampling as the most appropriate method for selecting participants who were highly accessible and amenable to data-generation/-collection procedures. The Faculty of Science and Agriculture has several academics who teach the agricultural science module, but not all evinced interest in engaging with the study, despite my physical presence at their offices. Furthermore, in the province where the study was conducted, the institution was the only historically disadvantaged comprehensive university that offered agricultural science and had the adequate number of academics (fourteen) for a qualitative study. Convenience sampling was employed because of the following strengths:

5.9.2 Strengths of convenience sampling

Taherdoost (2018) argues that convenience sampling is a commonly preferred sampling technique among academics and students due to its cost-effectiveness and ease of implementation compared with alternative sampling methods. Etikan (2016) adds that this is a method of data collection that enables researchers to obtain participants swiftly and easily, without the requirement of an extensive and intricate sampling procedure. This can prove to be especially advantageous in contexts where there are constraints on both time and resources. The academic institution and faculty under consideration are situated in close proximity to my place of employment and the faculty is the exclusive purveyor of agricultural science instruction within the province. Furthermore, they have a track record of being disadvantaged.

The assertion by Etikan and Babatope (2019) that convenience sampling is time- and cost-effective is supported by Mpungose (2017) who reported that combining convenience and purposive sampling was cost-effective during data generation, as it demanded fewer resources than other sampling methods. For instance, the process did not necessitate remunerating participants or enlisting additional assistants for recruiting participants. Mpungose (2017, pp. 290) even mentioned “...*selecting and using both purposive and convenience is free of charge, and it is influenced by both informal and personal reflection. In the*

context of this, I did not spend any funds to do selection of participant, but it was a matter of sending the emails to the participants and to do physically consultation with them.” Similar to the present study, the amalgamation of the two methodologies incurred no financial expenses for participant selection; and emails were used to request participation. However, the technique’s limitations should be acknowledged.

5.9.3 Weaknesses of convenience sampling

According to Scholtz (2021), convenience sampling may not ensure population representativeness, thereby limiting the generalisability of research findings. Similarly, regarding selection bias, the individuals who opt to participate in convenience sampling may not exhibit a representative sample of the broader population due to their distinctive characteristics or experiences that may differ from those who choose not to participate (Stratton, 2021). This study involved the distribution of an electronic mail to the entirety of the academics affiliated with the three aforementioned departments. I attempted to personally meet some participant by visiting their offices, but for various understandable reasons, some declined to participate. The fourteen academics who took part in the study were those who expressed interest and had availability. The participants were not selectively chosen by me. Had all academics consented to participate, the entire group would have been considered participants. Thus, no bias was present.

Furthermore, selection of accessible participants may result in lack of intellectual credibility, and ultimately yield poor quality data; as such, the findings may not be generalisable to other populations or contexts (Marshall, 1996). This limitation was addressed by also relying on purposive sampling; and greater depth and good quality data emanate when both methods are combined. Fortunately, all three departments were represented and all the levels from a time-on-task to senior professors were also represented. Etikan and Bala (2017) add to the weaknesses that in convenience sampling, the researcher will have settle for the available feature of the population. These include age, gender, ethnic group, religion, and experience. Categories for age, gender, and academic experience match UTAUT-2 which

serves as the study's theoretical foundation. After selection of participants, data was generated. The following section discusses the data-generation methods used in this study.

5.10 Conclusion

This chapter began with conceptualising the purpose of the study and identifying the research objectives and questions that helped in understanding how academics experience their practice of using digital learning environments. This chapter then contextualised the pragmatic outlook taken in the study, which aimed to uncover the participants' experiences. It also described the approach and design of the study that led to how participants were selected. The next chapter discusses methods and data analysis techniques, as well as issues of validity, reliability, and rigour, together with ethical positionality of the study.

CHAPTER SIX

ACTUALISING ACADEMICS' EXPERIENCE

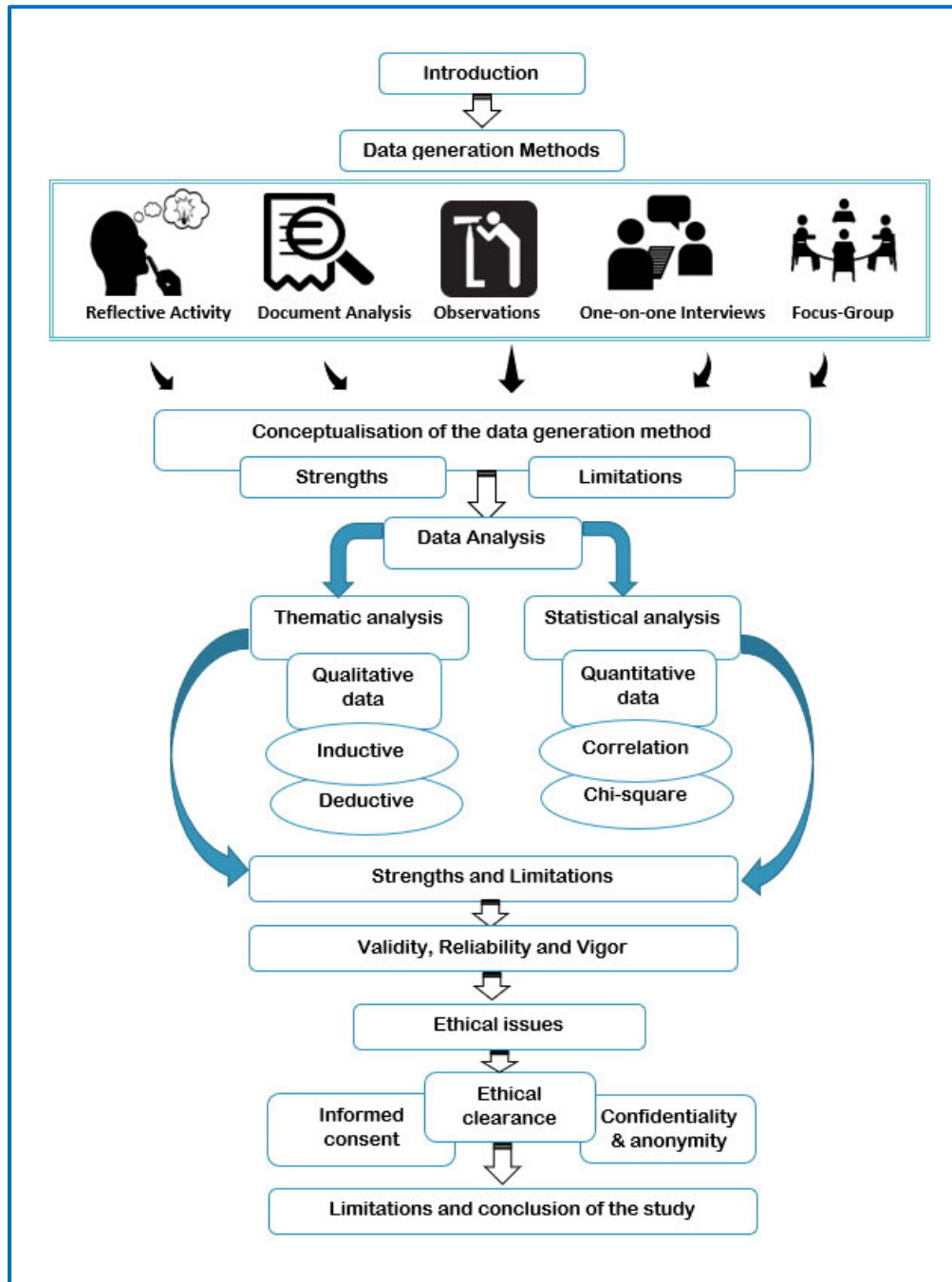


Figure 6.1: The outlook of Chapter 5

6.1 Introduction

The prior chapter (Chapter Five) presented the first portion of the research and design methodology, which conceptualised the design and outlook of this study, and the philosophical outlook that informed the methods and processes presented in this chapter. This chapter will focus on the research and design methodology. Consequently, this chapter goes one step further to address the actual research methodology as well as its potential outcomes. This chapter presents a clear picture of how the experiences of academics were implemented and executed.

Reflective activity, document analysis, lesson observation, one-on-one semi-structured interviews, and focus-group discussion are the data-generation techniques conceptualised in detail, along with how the data was analysed. This chapter clarifies not only how the limitations of the methods, and the entire study were addressed but also the processes that involve ethical concerns. The following section outlines the data-generation and collection methods as outlined by Figure 6.2 below.

6.2 Data Generation

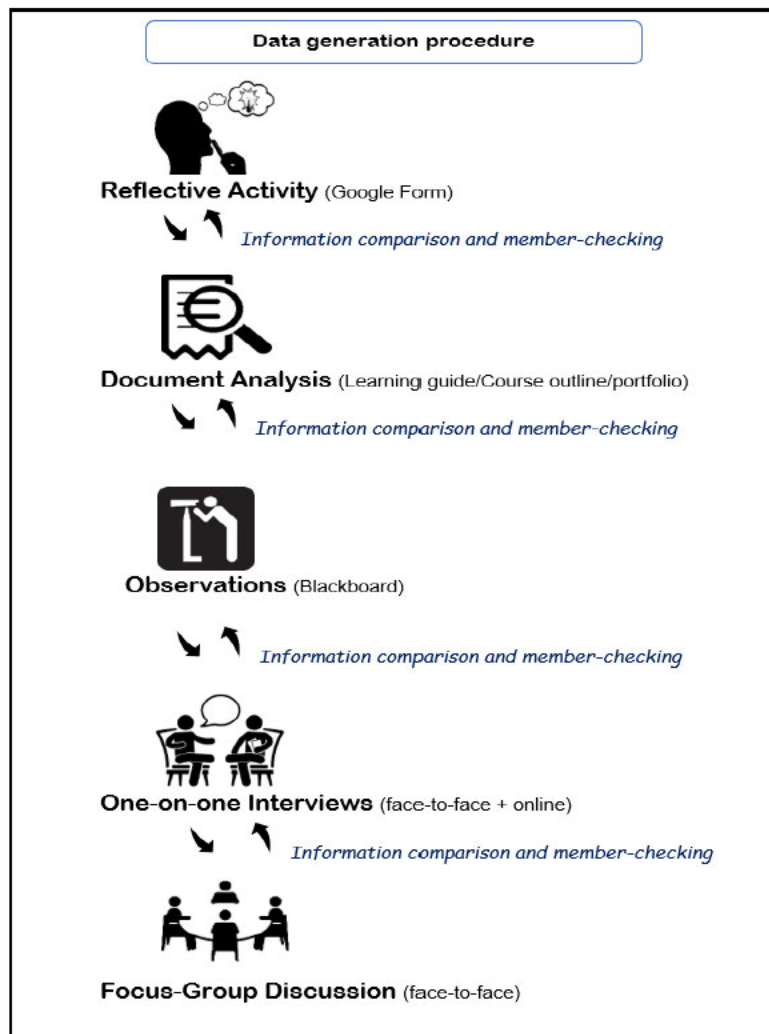


Figure 6.2: Data generation procedure followed in this study

When it comes to undertaking a research project, the term ‘data generation’ describes the process of gathering, making, or producing new data. Data generation entails the use of various research methods and techniques to gather pertinent and trustworthy information to answer research questions or to test theories or hypotheses (Tracy, 2013). Figure 6.2 above illustrates the procedure followed when data was generated in this study. According to Stratton (2021), data generation occurs when the researcher collects information from a selected population. Similarly, Cresswell and Miler (2000) assert that in order to conduct research in a proficient manner, participants must be engaged in the data-collection process to

gain insights that can aid in comprehending the research objective, purpose, and enquiries. On that note, Thomas (2017) states that active participation of participants in a research study is essential for elucidating the research objectives and in achieving a deeper understanding of the subject matter. Thus, in any research, regardless of the design approach or paradigm, data have to be collected and analysed in order to answer research objectives and/or hypotheses (Morgan & Harmon, 2001).

To address the key research questions of this study, data were generated qualitatively through document analysis by reviewing academics' portfolios or course guides; reflective activity, semi-structured (open-ended) interviews, and focus-group discussions. Quantitative data were collected through observation (lesson observation) using a closed-ended evaluation tool. Interviews were set to be conducted via Microsoft Teams and Zoom; but for the majority of participants, I had to visit their offices and be interviewed. Focus-group discussions were conducted via Microsoft Teams. The following sections unpack in detail the order in which data was generated for this study chronologically, following the stages and phases of the educational design research model.

6.2.1 Conceptualising reflective activity

In the context of this study and its design, reflective activity is the first data-generation method used to establish “*What are academics’ experiences on the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?*” which is also the first objective. This method answers the descriptive or content ‘what’ question. I intended to understand the descriptions of academics’ experiences before delving into ‘why’ (philosophical) and ‘how’ (operational/pragmatic) they were the way they were. A reflective activity on Google Forms was emailed to a group of academics. Some 21 of prospective participants initially responded, as shown by Figure 6.3 below. However, only 14 of these were able to participate further. Participants were given two

weeks to return their reflections. However, some only submitted on the third week after I sent out reminders.

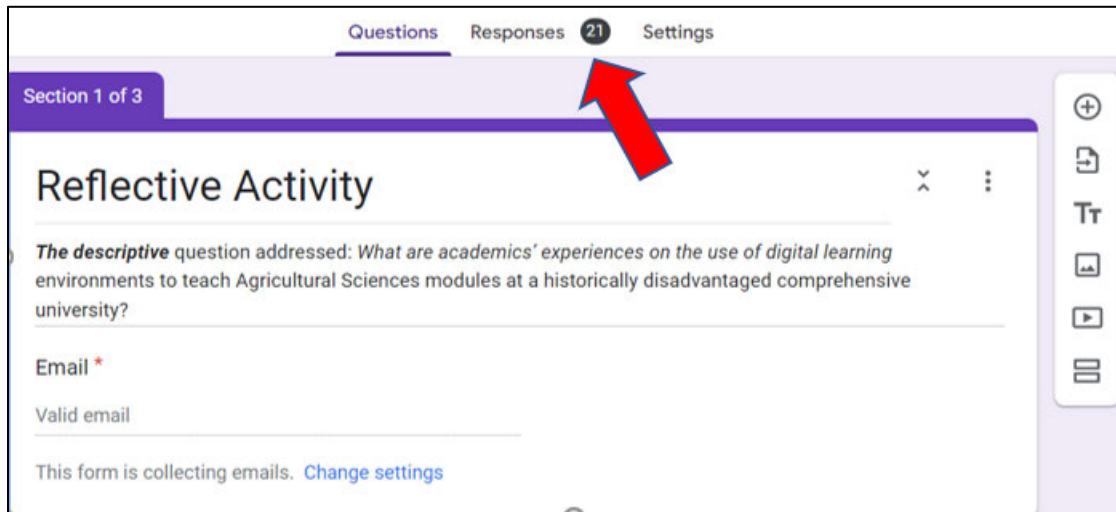


Figure 6.3: Number of responses to the reflective activity

Google Forms was used because it is a free online tool that helps in the collection and analysis of data, and provides spreadsheet functions that can be used to analyse data in various formats (Hsu & Wang, 2017). Opara et al. (2021) argue that the use of online tools for qualitative data collection has become a widespread practice in academia. This approach offers a faster and more convenient means of collecting data, resulting in increased accessibility and accuracy. According to Haimson and Marathe (2023), the use of a reflective activity or reflective exercise serves as a valuable means of gathering data in qualitative research, particularly in studies that centre on personal experiences and subjective viewpoints. Gorna et al. (2021), Pekkarinen and Hirsto (2017) and Thorburn (2020) add that reflective activities in research commonly entail an introspection and contemplation of personal experiences, thoughts, and emotions pertaining to a specific topic or phenomenon of interest. Frequently, individuals record their reflections by means of written narratives, audio recordings, or video recordings (McGlacken, 2023).

Zulfikar and Mujiburrahman (2018) suggest that engaging in reflective activities is an intentional and consistent approach that academics can use to analyse their practices, generate new ideas and solutions, and enhance their teaching methods. In other words, reflective activity involves a purposeful effort by academics to critically evaluate their approaches and devise strategies for improvement. Thus, in order to prompt participants to consider their actions and to effect change in both the present and future, it was necessary to administer a set of predetermined questions regarding academics' experiences. Studies that employed reflective activities show that this method can provide rich, detailed, and context-specific information on experiences and insights. Reflective activities can help to build rapport and trust between researchers and participants. Participants are given an opportunity to share their personal, professional, and social experiences in a safe and supportive environment as a primary data-generation tool (Fomunyam, 2016; Khoza, 2019; Mabuza & Khoza, 2019; Makumane & Khoza, 2020; Ndlovu, 2022; Sokhulu, 2020).

6.2.1.1 Strengths of reflective activity

The utilisation of reflective activity is a valuable mechanism for enhancing one's comprehension of personal professional practice. This tool facilitates professional development by enabling individuals to identify their strengths and areas requiring improvement, thereby enhancing their overall experience (Cohen et al., 2018). Thus, the reflective activities produced comprehensive and detailed data that facilitated my comprehension of the experiences of academics regarding their acceptance and use of digital platforms for agricultural instruction.

Opara et al. (2021) further state that people often reflect on their own time and in their own space, and that allows one to think and critically rethink personal experiences. The process becomes easier and more convenient when conducted online. The claim is supported in that participants were able to provide their reflections through Google Forms, eliminating the need for travel between individuals. Additionally, the

academic institution provided computers and data to its academic staff, resulting in no additional costs incurred during the completion of reflective activities. From this study, this approach has been observed to yield greater efficacy and significance in comprehending experiences, thereby leading to enhanced professional outcomes. Despite its numerous strengths, reflective activity is not without limitations. However, measures were taken to mitigate these limitations and to ensure that the process was as effective as possible.

6.2.1.2 Overcoming limitations of reflective activity

Cohen et al. (2018) assert that practitioners who are not well informed about reflections or being reflective may themselves struggle to reflect. Cohen et al. (2018) writes about ‘reflective ability’ which may be a challenge for academics and researchers. Thus, I first informed the participants of the significance of reflecting on practice experience: reflective activity aiding in yielding in-depth understanding of experiences. In any HEI academics are expected to engage in research as one of their key performance areas. Therefore, the academics were familiar with research, and understood the meaning of reflecting.

Furthermore, according to McGlacken (2023), reflective activity requires specific experiences to reflect on: sometimes it can be challenging to identify these experiences. Challenge to this activity can limit the effectiveness of the process. Similarly, participants may sometimes feel isolated and unsupported when they are simply allowed to reflect individually; this limits their ability to reflect effectively (Walsh & Mann, 2015). To address the above limitations, I constantly checked on participants even on WhatsApp; I also responded when they needed further clarity. After explaining the nature of the research, I ensured that the participants understood the archetypes that should guide their reflections on each question of the activity. To support participants further, I provided assistance as needed. I also requested the modules’ learning guides and/or course outlines to gain a better understanding of participant’s experiences.

6.2.2. Document analysis

Onwuegbuzie et al. (2012) state that qualitative document analysis is noted when the researcher systematically reviews printed or digital texts in order to understand, interpret and make meaning of a phenomenon. Morgan (2022) also argues that empirical knowledge and understanding of experiences or practices can be gained by reviewing or evaluating documents, among other techniques or methods. The analysis or evaluation of documents can be conducted through the usage of either traditional hard copy or modern electronic formats, including computer-based and internet-transmitted materials (Bowen, 2009). On that note, Tracy (2013) suggests that, upon selecting the documents, these items be thoroughly examined and condensed to extract significant patterns, themes, ideas, or data across various pieces of information. In this study, documents that were analysed included electronic versions of teaching portfolios and/or learning/course guides.

In addition to the latter, document analysis was conducted to address the descriptive content ‘*what*’ question: “***What are academics’ experiences on the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?***” This was the second data-generation method of this study. As I was not present during the document development process, the data I received was unaltered to cater to my needs as the researcher. A neutral colleague from one of the teaching centres was also asked to review the documents. Bowen (2009) highlights the importance of utilising documents that consist of both textual and visual elements, which have been obtained without any researcher’s intervention. The aforementioned statement aligns with the timing in which I received the documents. Analysis was executed between the commencement of the first semester and the end of the second semester. During that period, academics had already completed the development of their course guides for the instructional units they imparted, which were subsequently disseminated to their students.

Altheide et al. (2008) and Bowen (2009) share the same sentiment that document analysis is usually employed in conjunction with other qualitative research methodologies as a triangulation. Wood et al. (2020) identify interviews and observations as main methods that complement document analysis. By reviewing the learning guides or course outlines, I gained a clear understanding of the various topics and goals that were being taught by the academics. This included information on the specific content covered, assessment tasks, resources, and teaching methods and platforms used during the module. Overall, this review helped me to better comprehend the overall structure and objectives of the course.

Portfolio/ Learning Guide/ Course Outline Evaluation Tool	
1. <u>Digital learning environment used when teaching agricultural sciences modules.</u>	Comments:.....
2. <u>Resources used to when using digital environment for to teach agricultural sciences</u>	Comments:.....
3. <u>Philosophy statement outlines rationale of using particular digital learning environment in teaching agricultural sciences</u>	Comments:.....
4. <u>Evidence of different forms of ease of access in to use particular digital learning environment</u>	Comments:.....
5. <u>Evidence of effective teaching and attainment of goals with the use of digital learning environments.</u>	Comments:.....
6. <u>Relevant and responsive digital learning environment to teach agricultural sciences content are you teaching using digital learning environment</u>	Comment:.....
7. <u>Digital learning activities are relevant and effective for the teaching of Agricultural Sciences</u>	Comments:.....
8. <u>Roles of the instructor and student are clearly stipulated and there is evidence of enactment during digital teaching of agricultural sciences modules</u>	Comments:.....
9. <u>Appropriate and conducive environments used when teaching agricultural sciences modules using digital environments</u>	Comments:.....
10. <u>Time for digital teaching is clearly stipulated, and is conducive for the instructor.</u>	Comments
11. <u>Evidence of assessment of agricultural sciences modules using digital learning environment?</u>	Comments:.....

Figure 6.4: Document analysis evaluation tool

In addition to reviewing the learning guides or course outlines guided by the tool above, I also wanted to assess how the educators incorporated the latest developments in agricultural sciences and technology into their teaching plan. I also looked to see how the plan accommodated vulnerable students. To evaluate the documents, I used an evaluation tool represented by Figure 6.4, which informed my comments and feedback. The evaluation tool I used contained eleven prompts that guided me in extracting information on how the educators planned their lessons. This allowed me to gain a better understanding of the context and planning behind each module, which in turn helped me to connect the planning and execution when observing the lessons. Furthermore, I noted how the overall learning outcomes of the module linked with the digital learning environment used for agricultural science.

In a study, Sommerhoff et al. (2018) conducted a document analysis of seventy-five learning sciences programmes to determine the topics covered and when they were taught. The study was guided by various questions, such as the programmes' location, the concepts and methods used, and the relationship between the programmes' learning outcomes and the concepts taught. Sommerhoff et al. (2018) managed to perform a comprehensive analysis of the programmes, including their objectives, outcomes, and implementation strategies. Thus, findings of the study suggest that document analysis provides a holistic understanding of the programmes' strengths and weaknesses. Even in the context of this study, document analysis was an effective tool for identifying the alignment between the content and outcomes of a programme or module, as well as the learning environment in which the programme is taught.

6.2.2.1 Strengths of document analysis

Altheide et al. (2008) posit that document analysis serves as a complement to thematic analysis. Document analysis places greater emphasis on written communication patterns and discourses, rather than relationships that are inferred through statistical means. This affords the study an opportunity to obtain a varied set of generated data, with the aim of exploring academics' experiences of using digital platforms

in teaching agricultural science modules. In addition to that, Bowen (2009) and Owen (2014) highlight a positive aspect of documents: that they provide valuable information regarding the contextual environment in which research participants are situated. Wood et al. (2020) also share the same sentiment. These researchers emphasise that documents serve the purpose of providing contextual information and historical perspective and experiences. The provision of information and insights can aid researchers in comprehending the historical origins of particular issues; and may reveal the circumstances that impact the phenomena presently being explored. These assertions were observed; I was able to have a broader picture of the objectives and outcomes of the modules. Furthermore, the teaching, learning, and assessment activities that were planned to be conducted on- and off-line were identified. This method gave me a baseline indication of how teaching using digitalised environment is planned; and it prepared me for the next data-generation method, lesson observation.

According to Bowen's (2009) assertion, document analysis is an economical method that offers extensive coverage of events and settings. Perusing the course outlines/learning guides did not incur any expenses. I was able expeditiously to scrutinise the documents in contrast to alternative techniques of data production that were more laborious and time-consuming.

6.2.2.2: Overcoming the limitations of qualitative document analysis

Bowen (2009) and Puddester et al. (2023) have pointed out that document analysis can be challenging because documents may be outdated and not reflect recent experiences. Documents may also lack context or be incomplete, which can lead to incomplete or incorrect analysis. To address this challenge, the latest course structures and learning guides were requested, as well as a previous guide developed during the COVID-19 pandemic when face-to-face teaching was prohibited. This allowed for identification of trends and developments in the participants' experiences with digital learning environments.

The issue of bias is raised by Bowen (2009, 2010), that documents may be manipulated and/or the researcher may be subjective and thus misinterpret the information to suit their research purpose. I was not present when the documents were developed and approved, therefore I could not have interfered with the contents of the guides. In addition, an impartial evaluator from the teaching and learning centre, who had no knowledge of the identities of the individuals involved and had received training and attended workshops on developing curriculums and learning guides, was asked to help with the assessments. This study employed lesson observations as a means of data generation, in addition to document analysis.

6.2.3 Conceptualising lesson observation as a quantitative method in a qualitative study

According to Cohen (1995) and Morgan et al. (2017), participant observation is a method of collecting data in which a researcher observes events, specific behaviours, and practical characteristics in their natural context. The researcher utilises the physical and visual environment; various techniques are involved such as examining archival records, documenting observations, engaging in participant observation, and making direct observations (Sileyew, 2019). In the context of this study, direct lesson observations were conducted to closely examine the practices of typical experiences and to obtain direct impressions of the ongoing implementation of what was planned and stipulated in the course or module outline and learning guides. Observing lessons helped me see the practical nature of the reflections and what was analysed from the documents. Therefore, the operationalising of the plan answered the operational/pragmatic research ‘how’ question: *“How can academics’ experiences enhance the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?”* This question revealed the teaching techniques utilised by academics, exploring ways of enhancing those teaching approaches. A structured observation form (Appendix H) with Likert scaling (ranging from ‘unsatisfactory’ to ‘outstanding’) was used; and the findings from the lesson observations were integrated into the conversations that occurred during interviews and focus-group discussion.

Virtual classes were observed, and links to access previously recorded sessions were obtained from participants. This allowed me to explore how teaching was conducted using the digital learning platforms that were stipulated. These included Blackboard as the LMS that the university prescribed. Due to ethical and confidentiality issues, participants refused to grant me access to their WhatsApp groups. However, participants sent me screenshots (figures 7.9 and 7.10) of the nature of teaching and learning that happened in that space.

According to Siedlecki (2020), observation is a highly favoured data-collection technique to collect descriptive data from individuals or groups of individuals. In education, lesson observations, according to Bostic et al. (2021), are an integral part of education research and instructional development. Similarly, Morgan et al. (2017) comment that the observation method entails the direct observation and recording of the behaviour of research participants in their operational environment. In light of this, I observed sessions as a non-participant; each session lasted one hour thirty minutes. Onwuegbuzie et al. (2012) remark that, after documenting the observations, the information can be subjected to coding and breaking apart. The chunked codes can then be arranged into themes that may either generate new theories or more commonly, corroborate and/or triangulate data obtained from alternative sources. Quantitative observational data was collected through lesson observation, which was subsequently employed for triangulation purposes in order to facilitate a more comprehensive and in-depth exploration of the experiences associated with the use of LMSs and SMSs to teach agricultural sciences.

Zainuddin et al. (2019) conducted a study that employed class observation to investigate the development of self-directed learning in university students who were taught using a flipped-class pedagogical approach. The focus was to see how impactful the LMS 'TES Blend Space' was in promoting students' independent learning. From the study, it was evident that lesson observation was the only method through

which the planned learning activities, taught content, overall learning experiences, and student interactions could be clearly observed and understood. Other methods, such as interviews and group discussions, were not capable of providing the same level of explicitness. Similarly, Dzikite et al. (2017) conducted a qualitative study to explore competitiveness of lecturers in using ICT in textiles and clothing qualifications. Interviews and observations were employed to generate data. By observing lecturers, the researcher saw that lecturers were really not comfortable with using ICT as pedagogical tools.

The observations conducted in this study served to corroborate the data provided by participants through reflective exercises and document scrutiny. In educational design research, observations are considered a crucial component of data production (Bernard et al., 2013; Bzowycyk et al., 2017). Thus, using lesson observations, I was able to statistically analyse and interpret data to draw conclusions and make informed decisions and recommendations on the use of digital learning environments in academic experiences.

6.2.3.1 Strengths of participant observation

According to Sargent and Casey (2020), lesson observations provide an opportunity to directly observe teaching experience and give feedback that is tailored to the individual participants. This allows for personalised and informed feedback to be provided based on the firsthand account of the observer or researcher. Consequently, it was imperative for me not only to conduct document analysis and interviews, but also to engage in classroom observation in order to gain insight into the integration of theory and practice, as well as the ways in which digital pedagogies are applied in response to the pragmatic demands of agricultural sciences. Paterson et al. (2003) also affirm that participant observation gives authenticity to the study because the observer sees actions in their natural environment.

The above suggests that observing academics teaching reveals more insights that may be accessible from other methods of data collection; this may include processes and behaviours that they may not even be

aware of themselves in the environment in which they teach. Bostic et al. (2021) further argue that the utilisation of a participant observation method facilitates the establishment of a positive rapport between the researcher and participants. Such is crucial for the participants to disclose the concealed ‘backstage realities’ of their experiences typically hidden from external observers. The purpose of the study was to also to uncover the potential of digital tools that even the academics involved were not aware of. This was achieved by observing the participants as they taught, which allowed for a deeper understanding of the impact of the digital world both on an individual and on the collective level. Through this process, together with the participants, we gained valuable insights into the various dimensions of the digital world. I further found it advantageous to observe participants before conducting interviews and focus-group discussions. This allowed interview sessions to be more rigorous in responding to the philosophical ‘why’ question; and prompted participants to reflect and provide reasons for why they taught agriculture the way they did, offering the theories that informed how they teach.

6.2.3.2 Limitations of participant observation

Morgan et al. (2017), Canteloup et al. (2020), and Paterson et al. (2003) report that observation as a data-collection method can, however, be time-consuming, requiring a researcher to devote significant amounts of time to observe and record behaviours, actions, or events. Depending on the context, setting up observation may also require significant costs in terms of equipment, personnel, or other resources. In this study, planning of observations was conducted. I had access to the university timetable (Figure 7.12) with module groups to see which module was taught during which slot. Furthermore, having to request recorded classes made it easier to watch the recording in my own time. I incurred no cost nor additional equipment and personnel, since I was also familiar with and had the digital platforms (Blackboard, MS Teams, and WhatsApp) that were mostly used by academics to teach their agriculture modules.

6.2.4 Conceptualising one-on-one semi-structured interviews

Following the observations that addressed the operational/pragmatic question, data were generated to answer the third research and philosophical ‘why’ question: “*Why do academics experience in particular ways the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?*” While both semi-structured interviews and focus-group discussions were conducted, this section will only focus on the interviews. Sileyew (2019) posits that semi-structured interviews serve as a means of generating data, wherein the researcher employs a predetermined set of guiding questions to elicit responses from individuals who have consented to participate in the study. According to Creswell and Creswell (2018) and Denzin and Lincoln (2018), establishing a clear research question is crucial for conducting a fruitful interview, as it provides a framework to steer the entire process, and to elicit relevant information from the interviewee that will effectively address that research question. Thus, in this study, the education design research model clearly specifies the research question addressed by each research method. The methods are presented in chronological order, reflecting the sequence in which they were implemented.

Various studies have shown that researchers have long utilised semi-structured interviews as a valuable tool in their research methodologies. This includes qualitative and mixed methods. These methods are increasingly viewed as a moral enquiry (Creswell & Creswell, 2018; Denzin & Lincoln, 2018; Gill, 2020; Onwuegbuzie et al., 2012; Onwuegbuzie & Leech, 2005; Owen, 2014; Tracy, 2013). In this study, the selection of interviews was based on their robustness and flexibility. Such was instrumental in obtaining comprehensive insights from participants; and in gathering substantial data on their particular experiences. The studies mentioned describe the use of individual semi-structured interviews as a data-generation method that draws from reflecting on experiences. This method involves the researcher engaging in a developmental conversation or dialogue with participants in order to gather information related to the phenomenon.

As per Owen (2014), the primary objective of conducting an interview is to comprehend an individual's perception of an event or object; and more importantly, the level of significance they attach to it. This perception by Owen encouraged the use of interviews in exploring the acceptance and use of digital technology in a study that used UTAUT-2. The UTAUT-2 model includes various archetypes such as performance expectancy, hedonic motivation, and price value. During interviews, participants expressed the importance of digital technology in various types of experiences, such as prescriptive, casual, customised, and even urgent situations, in relation to UTAUT-2 archetypes. Participants recognised the significant value that technology brings to these experiences.

Interviews were hoped to be conducted using any of the digital platforms. However, because of load shedding power cuts affecting power supply in South Africa, most academics could spare time during hours when power cuts were scheduled. I even visited some participants in their homes, while others worked from home. Thus, interviews were face-to-face, and were recorded using a Dictaphone. Each interview lasted for about 50 to 60 minutes. According to Tracy (2013), using a digital voice-recording device can prove to be an effective and convenient method of conducting qualitative interviews. Moreover, this can facilitate the researcher in precisely documenting the participants' deliberation; and can ease the transcription process of the generated data. Three days prior to conducting the interviews, I shared the interview schedule with the academics. This helped to expedite the interview process as the academics were able to comprehend the questions more quickly. The interview schedule included questions that were also included in the reflective activity, but with additional sub-questions aimed at eliciting more detailed responses about their experiences.

Supporting the above, Haven and Van Grootel (2019); Muzari et al. (2022); Onwuegbuzie et al. (2010) also highlight that interviews are employed to elicit spoken information from participants, which can be

analysed by researchers to gain insight into their experiences and perspectives. Creswell (2014) adds that recording during interviews allows smooth flow of the interview. However, it sometimes negatively affects the interviewee who might have to pause whilst the researcher is note taking. Therefore, recording can aid in the transcription process. As such, I highlighted a few points for clarity-seeking and follow-up questions; then made transcripts later. The following strengths were noted during the interviews with participants.

6.2.4.1 Strengths of one-on-one semi-structured interviews

One-on-one interviews possess the benefit of interactivity, enabling the researcher to explore unforeseen topics that may arise during the interview process (Busetto et al., 2020). Another strength noted by Ramrathan (2017) is that one-on-one semi-structured interviews also provide an opportunity for participants to elaborate on their experiences and viewpoints, yielding intricate and thick data that can facilitate a more in-depth knowledge of the research phenomenon. These strengths were noted in this study as participants expressed interest in understanding more about the use of digital technology in teaching agricultural sciences. The rapport that was developed as a result of the safe environment I created allowed participants to be at ease as they engaged. Even after answering a question, they would say “*Let us please go [return] to that question, I forgot to mention that...*” This gave me a sense that they were also keen to share their experiences in detail, and were not just responding to the questions simply to complete the interview. Even during member-checking, participants added more insights per the WhatsApp platform.

Moreover, Dumlao and Pinatacan (2019) deliberate that semi-structured interviews allow the researcher to obtain in-depth details mainly in addressing the ‘*how*’, ‘*what*’, and ‘*why*’ questions. Onwuegbuzie, Leech and Collins (2010) add that face-to-face interviews also give the researcher non-verbal communication when the interviewee uses gestures. These include facial expressions, head nodding, shoulder lifting and sometimes rapid circling of fingers. I was able to sense from the smiles, frowns,

laughs, eye-squinting, and rolling eyes how participants felt about a particular experience. This therefore gives the researcher an idea of how the participants feel about their experiences. The one-on-one interchange of views between myself and participants on experiences of using virtual environments assisted significantly in knowledge production, and responding to the study's questions.

6.2.4.2 Limitations of one-on-one semi-structured interviews

Cohen et al. (2018) state that interviews in educational research can also intimidate the participants or interviewees when the interviewer sees him- or herself as the one with superior knowledge. Power relations can negatively affect how participants respond, and the type of information they are willing to give out. This was addressed by firstly explaining the purpose of the study even during the planning stage. I assured participants that I am also vulnerable to the same predicaments that face academics in teaching agriculture using digital learning environments at a historically disadvantaged comprehensive university. This involved having a talk and explanation about mutual vulnerability; and how elements of both digital natives and digital immigrants affect all ranks of academia. This eased their concerns of superiority, and realized that the study would also be beneficial to them.

One-on-one semi-structured interviews are reported to be time-consuming; sometimes the nature of the questions asked could be confusing and could result in prolonged comprehension of the questions and expectations (Köhler et al., 2022; Onwuegbuzie et al., 2012; Yadav, 2022). This was addressed by first explaining the significance of the study, the research questions and the plan according to the educational design research. All the steps and phases were explained, including the time that each interview would take; interviews lasted between forty-five to sixty minutes on average. Appointments were made at participants' convenience in terms of time and place.

6.2.5 Focus-group discussion

Focus group was the fifth method used in this study for ascertaining academics' experiences with the use of a digital learning environment. It was a very informative and interactive session in which participants, collectively, critically discussed and pondered their lived experiences as academics. According to Onwuegbuzie et al. (2010), a focus-group discussion is a qualitative method of generating data from more than one individual at a time on a particular topic. Cohen et al. (2018) describe this as interviewing a group of individuals in which reliance is entrenched in the engagement and interaction within the group. Cohen et al. (2018) further state that the topic to be discussed is supplied by the researcher: it yields a collective opinion rather than an individual's view. From this collective engagement thick data on experiences were generated.

There were two focus groups conducted. The first group had six participants and the second group had five participants. Three participants were not available for the focus group due to various personal reasons. Both focus groups were conducted face to face. The number of participants was deemed appropriate because research on qualitative methods states that for an effective focus-group interview there should be from five to a maximum of ten participants (Creswell, 2007; Denzin, 2016; Nassaji, 2020; Onwuegbuzie et al., 2010; Smithson, 2000). Furthermore, attempts were made to have interviews online via Microsoft Teams or Zoom. However, either because of commitments or load shedding schedules that differed, we had to capitalise on the face-to-face option when there was a power cut. Most participants preferred this because when the power was on, they had much work to conduct. A common venue at the participants' campus was identified. A Dictaphone was used to capture the discussion as we were seated in close proximity to one another, round-table style. The focus groups had similar open-ended questions to those of the interviews. The questions were philosophically structured to understand academics' reasoning behind their experiences of using a digital learning environment the way they did in teaching agricultural sciences (see Appendix J). The discussion lasted for about an hour (sixty minutes) due to the nature of discussions that emerged.

Participants in the study dominated the discussion. This is supported by Tracy (2013) who maintains that a focus group should evoke Socratic and philosophical dialogues that keep the participants actively engaged. As such, I was only facilitating the discussion that generated further deep knowledge, supplementing all data generated from other methods, mainly from the interviews.

6.2.5.1 Strengths of focus-group discussion

According to Denzin and Lincoln (2018), focus-group discussion can be empowering to both the researcher and participants. In this study, I gave all participants ownership of the knowledge that was co-constructed by awarding equal chances to deliberate on issues of using digital resources in teaching. Furthermore, there was freedom to connect and interact with one another even though job levels of participants were different. With focus-group discussions, self-confidence is uplifted Cohen et al. (2018). This study also connected academics from different departments of the same faculty. This included digitally savvy academics and those who were referred to as refugees. In addition, since they faced either similar or different experiences, they all learned from one another's experiences.

6.2.5.2 Limitations of focus-group discussion

Data generated through focus-group discussion cannot be numerical, and cannot be quantifiable or generalisable (Cohen et al., 2018). To mitigate this limitation, I used a variety of data-generation methods that supplemented the focus-group generated data. This included observational data that was quantitative; this data was statistically analysed to increase generalisability of findings of this study.

Smithson (2000) insists that focus groups be carefully planned; and Creswell and Creswell (2018), together with Denzin and Lincoln (2018), share the sentiment that focus groups comprise a limited number of participants, ranging from 6 to 10 individuals, and thus may not be fully representative of the

perspectives held by the wider population. Furthermore, the dynamics of a group have the potential to impact the responses of its members and to introduce bias into the data that is gathered. Focus-group data was integrated with other qualitative and quantitative data sources. Additionally, I used member checking, in which participants reviewed and validated the findings, to ensure the validity and relevance of the results.

To draw meaningful conclusions from the generated data, the data has to be examined and analysed. According to Belotto (2018), data analysis is an essential component of the research process as it enables researchers to discern patterns, relationships, and trends within the data. Thus, the next section discusses how data generated from the five research methods discussed above was analysed. For the complex data to make sense, it had to be analysed to provide meanings (Sakyi & Agomor, 2020).

6.3 Data Analysis

The data generated were both qualitative (reflective activity, document analysis, one-on-one semi-structured interviews, and focus-group discussion) and quantitative (observations) because of the pragmatic nature of this study. Bailey (2008) stipulates that qualitative research data can be collected in the form of written texts, such as documents or field notes, as well as audible and visual data, such as recordings of interviews or focus-group discussions. To analyse this data, recordings are typically transcribed into written form and then linked with analytic notes or coded for further examination. Cohen et al. (2018) instruct that data analysis is the process of looking at and interpreting data to draw out important information, meanings and ideas. By interpreting and explaining the data, the scholar is able to make sense of it (Lochmiller, 2021). Qualitative data were analysed inductively by identifying patterns and reducing them, formulating the patterns into themes (thematic analysis). Quantitative data were coded numerically, and chi-square was used to statistically analyse data using descriptive statistics of the statistical package for the social sciences (SPSS).

6.3.1 Thematic analysis

According to Braun and Clarke (2006, 2012), thematic analysis is a crucial technique employed in qualitative and mixed-method research, wherein the researcher identifies, scrutinises, and presents recurrent patterns or themes in the data. The process entails an in-depth review of the data with a focus on identifying significant patterns that offer valuable insights into the research question and/or phenomenon in question. The ultimate objective of thematic analysis is to produce a comprehensive, meaningful and significant analysis and interpretation of the generated data (Lochmiller, 2021). Various researchers (Castleberry & Nolen, 2018; Lawless & Chen, 2019; Vaismoradi, Jones, Turunen, & Snelgrove, 2016) have noted that thematic analysis has been criticised by other researchers claiming that it lacks a proper definition and clear or concise guidelines. However, Braun and Clarke (2006) respond that capturing important aspects about the data in relation to research questions is a guideline. In addition, categorising patterned responses or meanings within a data set is what constitutes a thematic analysis. A theme refers to a significant aspect of the data relevant to the research question and reflecting a level of structured response or significance within the data set (Braun & Clarke, 2006; Javadi & Zarea, 2016). In this study, meaningful patterns emerged from the data; and I was able to thematise, interpret, and make sense of academics' experiences.

Javadi and Zarea (2016) also emphasise that thematic analysis as a methodology extracts meanings and concepts from data. This approach involves the identification, examination, and documentation of patterns into themes. Vaismoradi et al. (2016) characterise thematic analysis as not limited to a particular method, but rather as a versatile tool that can be employed to analyse data generated per various methods. Thematic analysis has the potential to offer an in-depth and comprehensive depiction of information (Nowell et al., 2017). Aronson (1994) states that, by analysing the transcribed conversations, it is possible to identify recurring patterns of experiences, which can be derived from either verbatim quotes or via restating

common themes. The use of thematic analysis in this study was therefore informed by the six phases that are suggested and presented by Braun and Clarke (2006), shown in Figure 6.6 below:

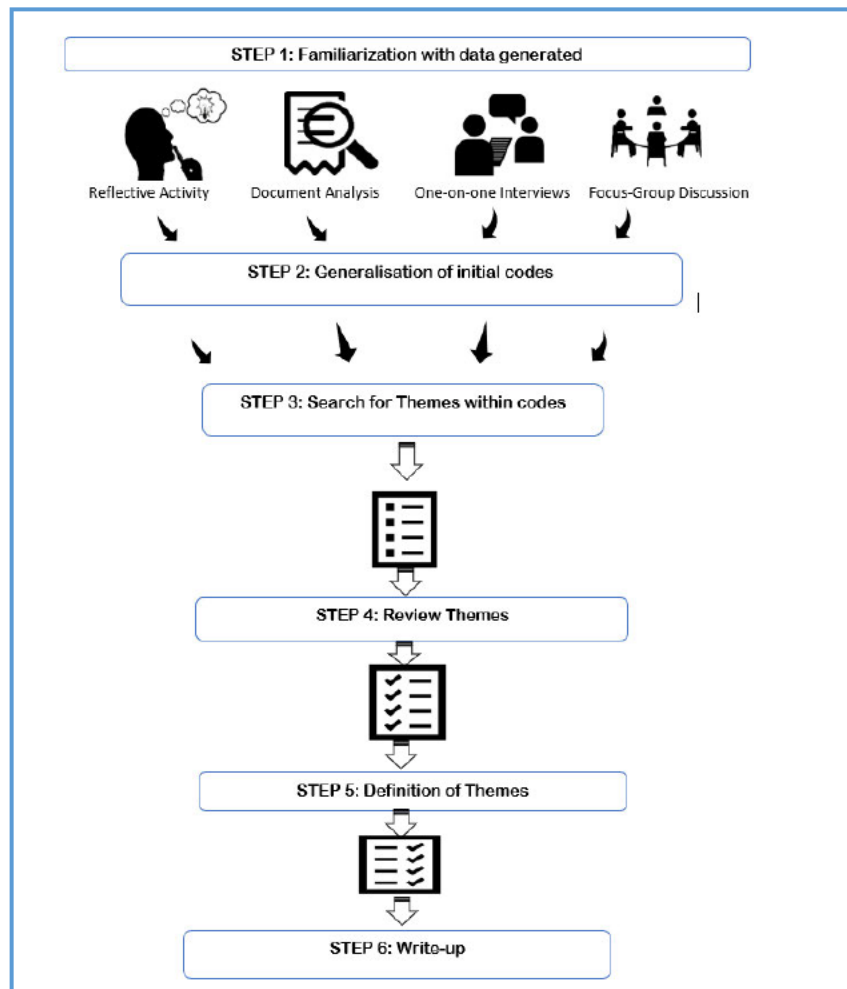


Figure 6.6: Six-phase guide for thematic analysis as used in this study [adapted from Braun and Clarke]

Braun and Clarke's (2006) six phases for thematic analysis informed how I managed the qualitative data generated in this study. The phases guided the way in which I systematically analysed the data, made logical sense of the transcripts, and formulated themes from similar and important patterns. Nowell et al. (2017) further stipulate that researchers follow these structured steps or phases when conducting thematic analysis on qualitative data. The steps significantly assist in organising the data into coherent themes aligned with the research questions, providing a detailed analysis of the data to support the findings. By doing so, researchers can effectively generate a narrative from the data, and provide a robust analysis of

their research findings. Thus, thematic analysis ensured a rigorous and transparent analysis process and led to accurate and reliable findings.

The first step, which is familiarisation with the data, according to Braun and Clarke (2006), involves immersing oneself in the data thus becoming thoroughly familiar with it. Such includes reading and re-reading the data several times to gain a deep understanding of the content. This helps to identify patterns and ideas that may be relevant to the research question. Thus, data after generation was transcribed to readable text when initial ideas were noted. Using multiple methods of data collection, as suggested by Guba and Lincoln (2005) helps to enhance the credibility of the research findings and interpretations. I actively engaged with the data by repeatedly reading it and searching for patterns and meanings within it. Braun and Clarke (2012) and Nowell et al. (2017) emphasise that during this stage one must document theoretical and reflective thoughts, as well as potential or preliminary codes/themes. After this step, initial codes were generated.

Once the data were thoroughly read and understood, relevant features, patterns, and ideas within the data set were identified (Braun & Clarke, 2006). This was achieved through a process of close reading, note-taking and reflecting on all meetings, engagements, and debriefings. Roberts et al. (2019) state that coding enables the researcher to streamline and concentrate on particular attributes of the data. I used codes or labels to help categorise these initial observations. The focus was patterns that captured the qualitative richness of experiences informed by the archetypes of UTAUT-2.

Searching for themes was the third step in which researcher looks for patterns and connections between codes to identify potential themes that emerge from the data (Braun & Clarke, 2006, 2012). In this step, I carefully and systematically examined the data to identify recurring patterns, connections, and relationships from the triangulations. Hierarchies of patterns and concepts that formulated themes were

identified and listed. The researcher may use software programmes to assist with this process. Components of academics' experiences were brought together to inductively generate themes from the raw data. Braun and Clarke (2006) state that reviewing themes is conducted after their research, ensuring that the themes fit with the coded extracts and transcriptions or full data set. This was the stage at which I conceptualised the themes against UTAUT-2 together with the research questions to ensure that they made an engaging narrative from the data generated. Some themes, at this stage were collapsed, others discarded, and others refined. This is supported by Braun & Clarke (2012) and Vaismoradi et al. (2016) who indicated that this stage necessitates the merging and breaking of themes. Thus, the researcher reviews the themes and refines them by re-examining the data to ensure that each theme is distinct, clear, and relevant to the research question (Braun & Clarke, 2006).

At the fifth stage (definition of themes) the researchers ascertain the specific facet of the data that each theme encapsulates, distinguishing the significance of these themes and the rationale behind their relevance (Braun & Clarke, 2006). This step involved defining and naming each theme based on its content, meaning, and relevance to the research question. I then determined how UTAUT-2 fits into the emerged themes. Finally, a report describing the themes that emerged from the analysis, supported by relevant examples from the data set and literature was consolidated. A clear, concise, and comprehensive understanding of the research findings emanated from this step. This report is unpacked in the next chapter (data findings and presentation).

To add more on the above processes and steps, in qualitative research, a theme refers to a recurring pattern or concept that emerges from the analysis of data. Themes can be generated inductively, meaning that they arise directly from the raw data without preconceived notions or pre-existing theories; or deductively, in that they are derived from existing theories or prior research (Aronson, 1994; Bailey, 2008; Castleberry & Nolen, 2018; Lawless & Chen, 2019). This study used both inductive and deductive analyses. Themes

emerged purely from thorough analysis of the raw data, having concepts that were relevant to the research question. Thus, during Stages Four and Five of the steps, those themes were scrutinised and conceptualised against the archetypes of UTAUT-2. This was an existing theory that underpinned academics' experiences in accepting and using digital learning environment to teach agricultural sciences. Because UTAUT-2 had its own principles with which the themes had to align, the themes that emerged from the data were conceptualised, refined, and defined, together with existing archetypes. Ultimately, themes of this study were from both inductive and deductive analysis processes; and all aligned with the aim of the study.

Several researchers have indicated that it is also important to note that inductive and deductive approaches are not mutually exclusive – they can be used together in a complementary way. For example, a researcher may use a deductive approach to generate initial themes and then use an inductive approach to refine and expand upon those themes based on the data. This mixed-methods approach can enhance the rigour and validity of qualitative research findings (Aronson, 1994; Javadi & Zarea, 2016; Johnson & Onwuegbuzie, 2004a; Morgan, 2022; Nowell et al., 2017). However, thematic analysis does not come without limitations. The next section discusses its strengths and how its limitations were addressed in this study.

6.3.2 Strengths of thematic analysis

The application of thematic analysis is feasible across various theoretical frameworks (Javadi & Zarea, 2016). Javadi and Zarea (2016) further acknowledge the high level of flexibility and simplicity of thematic analysis. Thus, it was possible for this study to follow the Braun and Clarke's steps even though multiple data-generation methods were used. Braun and Clarke (2012) also aver that this method of analysis is easily accessible to less-experienced researchers in qualitative research. These assertions were evident in this study because the analysis, interpretation, and presentation of academics' experiences are reader-friendly and understandable also for the public audience that may have less expertise in research or education.

6.3.3 Conceptualising the limitations of thematic analysis

Javadi and Zarea (2016) assert that one major limitation of thematic analysis is that sometimes there may be a mismatch between the theories or research questions and the actual analytical process or thematic analysis form used. Such mismatches can result in inaccurate or incomplete interpretations of the data. Braun and Clarke (2006) further outline that, in conducting a thematic analysis, it is essential always to ensure that the interpretations of the data align with the underlying theoretical framework or research question. Should such not be aligned this can compromise the validity and reliability of the research findings. Thus, both inductive and deductive processes were employed to develop themes for this study. Furthermore, the data were generated using educational design research, responding to the pragmatic nature of the study and the experience of academics. The archetypes of UTAUT-2 were brought into all the stages of the analysis, particularly from searching to definition of themes.

When analysing data, there could be too much overlap between themes, and that may affect coherence and consistency (Braun & Clarke, 2006). This was addressed by categorising themes that emanated from the data and theory according to the main levels of prepositions that inform experiences, which are prescribed, casual, customised, and according to the research questions. This method allowed information and ideas to be placed consistently and appropriately to avoid any data displacement and mismatch. All findings were also compared with those analysed through SPSS; and that increased precision and accuracy in data gathered and findings thereof.

6.3.4 Statistically analysing observations using SPSS

According to Collins et al. (2007), statistical analysis is collecting, interpreting, and presenting a large amount of data in order to uncover patterns, similarities and trends from a sample. Data scores from lesson observations as discussed above were collected from the evaluation and were analysed using the statistical

software Statistical Package for the Social Sciences (SPSS) version 28. All the data captured were treated as quantitative variables. According to Sileyew (2019), a variable refers to a characteristic or attribute that can take on different values or levels. Variables can be classified as either numerical (e.g., age, years of teaching) or categorical (e.g., gender, occupation). Analysis was conducted on the primary data, and Cronbach's alpha scores were used to determine the reliability and consistency of each sub-scale of the instrument.

This study used Excel, SPSS 28.0, and Office Word to analyse numerical data obtained from an evaluation form. Before analysis, responses were coded and assigned numerical or character symbols using SPSS 28.0. All scores were pre-coded, and this process was applied to every question. The data were then analysed using descriptive statistics and graphical analysis. The aim was to explore the relationship between variables; and to compare groups to understand how they affect one another. Overall, the analysis focused on quantitative data; and the results were interpreted accordingly.

The observation tool was first pilot tested on a 0.05 confidence level to academics from other faculties representing the participants of this study. This was to test and validate the instrument's reliability; the instrument was found reliable. A correlational statistical test in multivariate analysis context was also used. The UTAUT-2 as a guiding theory showed more than two variables that informed how, why, and when academics used digital technology to facilitate teaching and learning. Dependent variables of this study were behavioural intention and use of digital learning environments. Independent variables were performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, age, gender, and experience.

6.3.5 Strengths and limitations of statistical analysis (SPSS)

Statistical analysis, that includes SPSS computer software, is associated with large-scale studies, even though it also serves smaller-scale research including case studies, action research, and correlational research (Cohen et al., 2018). Statistical analysis analyses quantifiable numerical data. In this study, points from the Likert scale were coded to test significant differences between variables.

Statistical analysis such as SPSS provides efficient tools for data management, such as data cleaning, merging, and recoding that can make analysis easier (Johnson, 2011). However, statistical analysis does not cater for reflections and perceptions that cannot be quantifiable (Johnson, 2011). This research therefore adopted a pragmatic paradigm that included a quantitative approach by which to generate and statistically analyse data. The qualitative data will be generated using qualitative methods that cater for reflections and perceptions. Data was triangulated from reliability, validity, transferability, and dependability of findings.

6.4 Dependability, Transferability, trustworthiness, Validity, Reliability, and Rigour

6.4.1 Dependability, Transferability and Trustworthiness

Dependability in qualitative research refers to the consistency and reliability of the process used in research Cohen et al. (2018). In this study, that is warranted by by data generated by UTAUT-2 and relevant literature. This is further measured by the explicit application of both qualitative and quantitative methods, along with the theorisation and application of the methods. Furthermore, the extent to which this study can be transferred to other settings and context is reflected using reflective activity, document analysis, lesson observation, interviews and focus groupd discussins. The consideration of UTAUT-2 archetypes further supports the applicability of the study to similar contexts. The mix of both qualitative and quantitative methods of data generation and analysis demonstrates trustorthines.

6.4.2 Validity and Reliability

Validity and reliability are strengths of a research study. These features inform whether findings are accurate from the position of the researcher, the participant, and the readers (Creswell & Creswell, 2018). According to Cohen et al. (2018), validity is a demonstration that what is intended to be measured and described by a particular instrument is sufficiently and accurately measured. In addition, its account accurately represents all features that are intended to be explained and theorised. I maintained validity and reliability by warranting data generated by UTAUT-2 and the literature explored in this study. Thus, all questions were informed by principles and archetypes of UTAUT-2, which also informed the deductive processes or thematic analysis that was employed in this study. According to Vanderstoep and Johnston (2009), research findings cannot be considered useful unless they possess both validity and reliability.

Reliability, according to Cohen et al. (2018), is a comprehensive description that includes dependability, replicability and consistency over the instruments and the population in a particular study. Reliability addresses issues of precision and accuracy. Furthermore, Creswell and Creswell (2018) deliberate that reliability must demonstrate that similar results would be found were the same study conducted on a similar group of participants in a similar context. In other words, a study is valid when it accurately assesses the concept or phenomenon it claims to measure (Firdaus et al., 2022). A lack of validity in a study means that the findings may not accurately represent the phenomenon or concept under investigation, making the results meaningless or misleading (Johnson et al., 2020). Using both qualitative and quantitative instruments and methods to generate, collect, and analyse data yielded precise, accurate, valid, trustworthy and credible results which could be yielded in any other historically disadvantaged comprehensive university or HEI. I theorised each of the methods used (reflective activity, document analysis, lesson observation, one-on-one semi-structured interviews and focus-group discussion), demonstrated their application in previous research, and provided explicit explanations for how they were utilised in the current study.

Cohen et al. (2018) describe rigour in research as matching complexities of the phenomenon with those of the theoretical constructs. This involves constructs such as context, data that support all claims made, sampling, time and data analysis. It is for this reason that all questions on the reflective activity, document analysis, observation schedule, interviews and focus group were clearly formulated according the specific objectives and research questions. All the instruments yielded answers to the three levels of this study's research questions (descriptive, operational, and philosophical) which ultimately address the archetypes of experiences.

6.5 Ethical Issues

6.5.1 Ethical clearance

Almost all qualitative research involving humans has to adhere to firm ethical principles (Cohen et al., 2018; Creswell, 2003), and this study is no exception. Guba and Lincoln (1994) describe ethics as principles of right and wrong that are accepted by individuals or a social group. Therefore, it is a system of principles governing morality and acceptable conduct. I was sensitive and considerate about the morals and rights of participants, and everyone who was involved in and/or affected by this study. This began from the obtaining of ethical clearance, informed consent, and ensuring anonymity when reporting participants' deliberations. All these features must be dealt with before data can be generated.

According to Muzari et al. (2022), obtaining ethical clearance from appropriate committees is crucial when conducting research that involves human subjects. The study involved sending a request letter to the registrar of a previously disadvantaged comprehensive university to obtain ethical approval, which was ultimately granted. In addition, all necessary approvals were obtained from gatekeepers before applying to the University of KwaZulu-Natal's Humanities and Social Sciences Research Ethics Committee

(HSSREC). This study was granted full approval by UKZN-HSSREC, after which participants were approached for their consent.

6.5.2 Informed participant consent

Participants' consent refers to the process of obtaining voluntary and informed agreement from individuals to participate in a research study. This involves providing participants with clear and concise information about the study's purpose, procedures, risks, benefits, confidentiality, and the right to withdraw from the study at any time (Christensen et al., 2014; Tracy, 2013). Participants must also have the capacity to understand the information provided and to provide their consent freely and without coercion (Denzin & Lincoln, 2018). Informed consent forms were explained and issued to participants, with a clear explanation of all consequences. It was also made clear that, should participants feel any discomfort or emotional distress, they could discontinue with interviews or any participation in the research. Permission and links to access Blackboard virtual lessons were also requested from respective academics. After they had signed the letter of consent, I requested participants' active email addresses, sending them a Google Forms reflective activity.

6.5.3 Confidentiality and anonymity

Confidentiality refers to the privacy and secrecy with regard to identification of participants. Anonymity refers to identity hiding or simply unknown authorship (Walford, 2005). These are ethical considerations aimed at providing participants with confidence, by masking their names in the data (Creswell, 2007). Thus, to protect the identity of participants I maintained confidentiality of academics involved in this study. Pseudonyms were used for both academics and the university involved to hide their identities from the readers. Since lesson observation involved students, their data and identities were not utilised; they were not of interest to the study. Student identities were, however, also kept anonymous.

6.6 Limitations of the Study

It is typical for any type of research, be it qualitative or quantitative, to encounter some degree of constraint. As with research methods, there are no completely flawless or faultless methods (Christensen et al., 2014; Creswell & Creswell, 2018; Sileyew, 2019). Limitations have already been stated under each research design and method sections. However, to add to them, a study of this nature is supposed to be involving a wider range of historically disadvantaged HEIs including colleges. Due to the scope of the study, time constraints, and monetary restrictions, the study was confined to only one comprehensive university. It would have been much better had the study also included more academics from other faculties; however, because of purposive and convenience sampling, only agricultural science academics were relevant in reflecting on their experiences in order to answer the stated research questions.

Furthermore, as a doctoral student and a lecturer who is a victim of the same circumstances, I recognised that I may have certain biases and expectations that could potentially impact my research. To address this limitation, I made a conscious effort to remain impartial while collecting and analysing data. Specifically, I ensured that the participants had the freedom to express their views and experiences without any interference from me. Participants were also academics but from a different faculty. This approach allowed for unbiased data generation and analysis. Combining both deductive and inductive analysis when analysing data, as well as having multiple data-generation methods that included a quantitative observation schedule minimized the bias. Also, gaining assistance from a neutral person to review learning guides further eliminated bias and any possible interference.

6.7 Conclusion

This chapter outlines a research plan for conceptualising academics' experiences of using a digital learning environment in which to teach agricultural sciences. The objectives and questions that guide the study, along with the research paradigm, design, and sampling methods were described in the previous chapter.

Data-generation methods and analysis techniques are outlined in this chapter. Furthermore, discussion on the importance of trustworthiness, validity, reliability, rigour, and ethical issues were outlined in the chapter. Limitations that may affect the validity of the study are also addressed. In the next chapter, the research findings and data presentation derived from the tools outlined in this chapter are presented.

CHAPTER SEVEN

THEMATIC PRESENTATION AND CONCEPTUALISING FINDINGS:

[QUALITATIVE DATA]

7.1 Introduction

The processes followed in actualising academics' experiences were presented in the previous chapter (Chapter Six). This chapter focuses on presenting and conceptualising the findings of the thematic analysis conducted on the qualitative data generated through qualitative data-generation methods already discussed in Chapter Six. Thematic analysis that is presented in this chapter involves the process of identifying initial patterns and codes, which were inductively and deductively formulated into themes. Deductive formulation was rooted in the archetypes of UTAUT-2 that guides this study. The aim of the analysis was to gain insights into various aspects related to digital learning environments and their adoption and use in an academic context by academics who teach agriculture modules in a historically disadvantaged university. The analysis revealed five key themes that emerged from the data. Each theme represents a distinct area of concern or consideration related to the implementation and effectiveness of digital learning environments.

According to Muzari et al. (2022), researchers, after analysing data, are expected to interpret and communicate findings in a comprehensive and sensible manner. Morgan (2022) asserts that making sense of the data is crucial as it provides the much-needed understanding about a particular phenomenon. Mezmir (2020) supports this assertion by further averring that the phenomenon first needs to make sense in its own context before it can be applied to another outside its origin. Braun and Clarke (2019) articulate that conceptualising thematically analysed data is reflected by highlighting important passages and verbatim utterances or exclamations shared by participants. Themes that emerged are presented in Table 7.1 below; and findings are conceptualised in Section 7.2.

Table 7.1 Outline of Themes and Formulating Patterns/Codes

Reviewed Themes (Step 4 of thematic analysis)	Description of Themes: Initial patterns and codes that inductively and deductively formulated themes (Stages 2 and 3 of thematic analysis)
THEME ONE <i>Effectiveness and quality assurance</i>	This theme includes perceptions of effectiveness, quality assurance and academic integrity, and performance expectancy. Theme One emphasises the importance of ensuring that digital learning environments are effective, high-quality, and that they meet academic standards and expectations.
THEME TWO <i>Ease of implementation, digital access and support</i>	This theme includes accessibility, technical difficulties, support and training, resource constraints, together with barriers to and facilitators in adoption. Theme Two addresses the practical considerations for implementing digital teaching, including providing necessary resources and training to support academics and students.
THEME THREE <i>Fostering student engagement</i>	This theme includes pedagogical concerns, engagements with students, together with motivation and hedonic motivation. Theme Three highlights the importance of creating engaging and motivating digital learning experiences that meet the needs and preferences of academics and students.
THEME FOUR <i>Convenience and flexibility</i>	This theme includes convenience and flexibility, effort expectancy, and price value. Theme Four focuses on the benefits of digital learning in terms of convenience, flexibility, and cost-effectiveness; also the importance of managing academics' effort expectations.
THEME FIVE <i>Social influence</i>	This theme includes social influence, which refers to the impact of social and cultural factors on digital learning adoption and use. Theme Five highlights the importance of considering cultural norms, social relationships, and other contextual factors that may affect academics' engagement with a digitalised learning environment.

7.2 Conceptualising Themes, Findings and Discussion

7.2.1 Theme One: *Effectiveness and quality assurance*

This theme was constructed by patterns and/or archetypes such as perceptions of effectiveness, quality assurance and academic integrity, and performance expectancy that informed academics' experiences and the actual use of a digital learning environment in the teaching of agricultural sciences. Theme One involved the singular and integrative use of LMSs and SMSs that was informed by the various archetypes of experiences (prescribed, casual, customised, and gunpoint experiences). The theme emphasises the importance of ensuring that digital learning environments are effective, high-quality, and that they meet academic standards and expectations. Therefore, the construction of this theme was based on broader responses from the following broad questions that were asked in the reflective activities, one-one-one semi-structured interviews, and focus-group discussion schedules. Also, some questions arose from the observed lessons and the documents analysed. The questions included:

- *Why do you use a particular digital learning environment in teaching agricultural sciences?*
- *How do you ensure effectiveness of the digital learning environments in attaining goals of the agricultural sciences modules that you are teaching?*
- *What content of agricultural sciences are you teaching using a digital learning environment?*
- *How do you teach your practical content in agricultural sciences using a digital environment?*
- *How do you assess agricultural sciences using a digital learning environment?*
- *What digital learning activities do you use when teaching agricultural sciences?*

However, due to the flowing nature of the conversations and the depth of participants' reflections on their experiences, this theme's archetypes were not limited only to responses from the above questions. It is worth noting that these questions, including their sub-questions, also triggered responses that produced codes and patterns of other themes. As Castleberry and Nolen (2018) and Peel (2020) affirm, the primary

source of data in thematic analysis is the responses provided by participants, which are typically gathered through interviews, focus groups, or open-ended questionnaires; and the responses can overlap from one theme to the next.

For all the participants, effectiveness and quality assurance were linked to a particular digital learning environment since all the participants reported that the use of both prescribed and casual (social) digital platforms were effective in performing various purposes and/or functions. Blackboard as a learning management system (LMS) for prescribed and gunpoint experiences, WhatsApp as a social media site (SMS) for casual experience, and their integration including Microsoft Teams for customised experiences emerged as key digital learning environments used to attain modules and/or educational goals for agricultural studies. This is affirmed by Cunha et al. (2020), Mashau and Nyawo (2021), Ndimande-Hlongwa (2020) and Ndlovu (2022), that the use of LMSs has garnered significant traction in higher education institutions (HEIs). Nevertheless, the use of these tools in isolation may not serve sufficiently effectively to involve and motivate students in their educational goals. Supplementing LMSs with social media sites (SMSs) can potentially augment the educational experience of both academics and students by fostering a more interactive and cooperative environment for teaching and learning (Khoza, 2020b; Mpungose, 2020a).

On that note, **LP1** cited: *“They are effective, convenient, compatible to mobile phones,”* when responding to why he was using digital platforms to teach agriculture modules. After understanding the depth and being aware of the level or archetypes of experiences in which academics were supposed to reflect, (**LP1**) showed being empowered during Phase Two. LP1 responded to the same question during Phase Two by writing: *“the prescribed Blackboard is used as an effective tool to conduct classes, set examinations, tasks and manage agricultural activities in ways that WhatsApp cannot.”* This was supported by all the

academics, who shared the same sentiment in all the interviews and group discussions by declaring that there is no formal assessment taking place on any social media platform.

EE4: *“...the only assessment and instructions that take place via WhatsApp platform are informal and formative. For instance, when they ask questions on WhatsApp I sometimes first ask if there is anyone from the group who understands the question being asked to explain, then from reading their responses and listening to their voice notes, I manage to get where they may be confused, and I provide clarity where needed.”*

LP2: *“Agricultural science is a science for which many students find difficulties to grasp the subject as science subjects are a challenge for many students coming from marginalised environments. Digital platforms such as Blackboard, Teams and YouTube ensure a continued revisit of a student to reading and video material not clearly understood during lessons which slow catching students can grasp using second or third attempt listening or practicing a task.”*

LP5: *“to supplement my teaching”* when asked why he was using a digital learning environment.

LP5: *“Because the move was tough not only for us as lecturers but also for students, I had to make sure that the aims and rationale of using the digital learning environment were clearly stated in order to ensure the effectiveness of different digital learning environments in achieving the learning outcomes of different modules. ... this was necessary in order to ensure that the digital platforms are also accepted by them (students) because, when you consider the context and background of both our students and the university at large, you can probably see that it was, and still, not easy to do that.”*

LP5: *“... I was against the use of WhatsApp with students since they can be unruly and disruptive. It is even worse in modules with a large number of students, like 200 for an example. I have a bad experience.”*

However, I was forced to utilise that platform because they are not as active and quick in responding to emails and on Blackboard announcements as they are with WhatsApp.”

EE3: *“the usage of digital resources such as multimedia presentations, online discussion forums, and virtual laboratories somehow increased student engagement and fostered active learning. This is because I also recommended YouTube videos, which I also used while setting questions. Therefore, it was required of the students that they watch the videos.”*

Nevertheless, when I followed up during a focus-group discussion with a question about aligning the entire learning guide and course outline with the digital tools, I observed some strange and guilty looks from most of the participants.

EE4: *“If I am being really honest, matching the usage of digital resources with the learning objectives and assessment criteria of the module is still not something that is easy for me. I have not done much justice in changing my learning guide, I teach the same content. The only difference is that I teach using Blackboard. In fact, I teach using Microsoft Teams, then assess using Blackboard. I still do not know how to use Blackboard, I only asked a colleague who is also my friend to at least show me how to set an exam. I am more comfortable with teams most of my colleagues I believe are also using. The only reason I assess using Blackboard is that Microsoft Teams do not have such options and the university forced us into Blackboard, during covid-19.”*

Based on the accounts provided by academics, incorporating digital resources into their teaching and assessment practices has proven to be somewhat challenging. Participants conveyed that, apart from migrating to digital platforms, they have not made significant changes to their teaching materials and learning guides. Participants may lack confidence in their ability to use the assessment tools offered by prescribed LMS Blackboard. Moreover, it appears that some academics are relying heavily on Microsoft Teams, this being the platform they are most comfortable with, having used it prior to being required to

use Blackboard LMS. Most academics have also stated that they use Blackboard mainly for compliance purposes.

EE1: *“I only upload all the material and set tests on Blackboard”*, while Microsoft Teams and WhatsApp are the primary tools they use to interact with their students. UTAUT-2’s constructs of perceived usefulness and perceived ease of use pertain to the extent to which academics perceive technology as facilitating their academic expectations or performance. The degree to which technology is perceived as easy or challenging to use (Bervell et al., 2022) by academics reflects that academics derive greater pleasure from informal (casual experience) use of digital technology than from mandated (prescribed experience) use. Sokhulu (2021) reports the same outcome. Even the way the academics in this study thought about the impact of prescribed and casual experiences on student participation in the learning of agriculture, could have been similar to the view of students. A recommendation and/or proposal by Khoza (2020b) and Khumalo et al. (2023) of customising experiences for developing educational habits holds importance for future educational endeavours.

Correspondingly, participants **EE1**, **EE5**, and **AC2** also confirmed and agreed with **EE6** that the learning guides have not changed much; only the mode of teaching has changed. Even from the evaluation of the learning guides, it was not obvious to most academics how teaching and learning activities had been incorporated with the digital learning environments used. Figure 7.1 below is a screenshot of **EE6**’s teaching-learning methods and activities’ section on her learning guide.

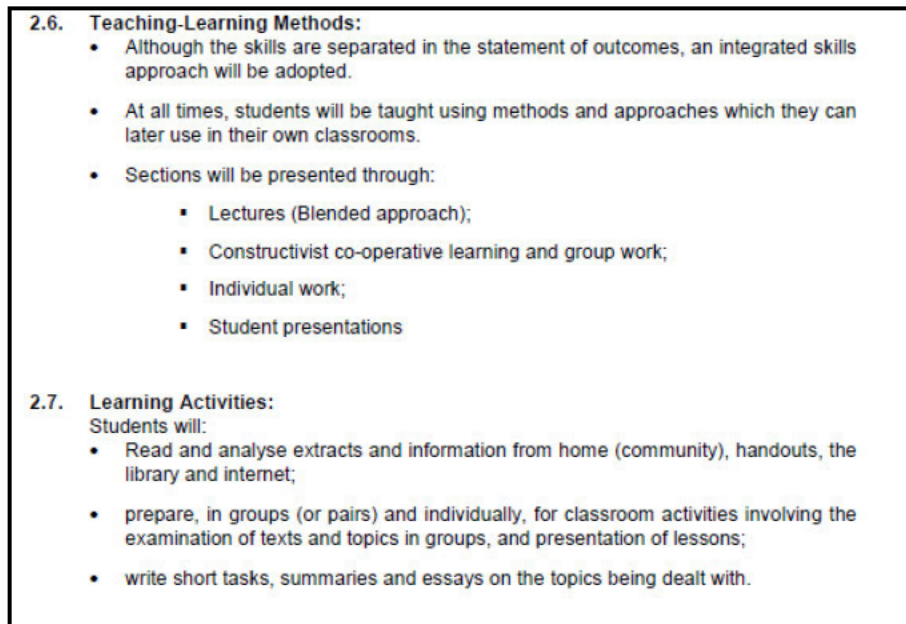


Figure 7.1 EE6's teaching and learning methods, and learning activity sections

Section 2.6 in Figure 7.1 only indicated 'blended approach' on how lectures were composed, and in Section 2.7 (learning activities), only the generics were given of activities employed. There was no explicit guidance in terms of how the stated activities were conducted and facilitated virtually. Similarly, Figure 6.3 below presents a screenshot of the section in an individual performance assessment (IPA) teaching portfolio from **EE5**. The screenshot below only shows the teaching and learning component. Even from the learning guide/course outline, as with Sections 1.2 and 1.3, there is no explicit indication of how digital learning environments are incorporated to meet the performance expectancy, except '*create Blackboard course for all modules and lead all relevant material onto Blackboard.*'

Employee Details	LECTURER			Manager	LECTURER and HOD			
Goals	Goals							
1. Pursue High Quality and Innovative Teaching and Learning	4. Enhance the University's Regional, National and International Standing and Impact							
2. Build the University's Research and Innovation Profile	5. Strengthen Good Governance to Ensure Effective Management and Leadership							
3. Improve the Quality of Student Life and Enhance Student Experience	6. Provide Efficient and Fit For Purpose Infrastructure and Support Services							
	7. Ensure Financial Sustainability and a Broader Resource Base							
IRA NO.	Key Results Area	Weight	Activity No.	Activities/Tasks	KPI No.	Key Performance Indicators (An Activity/Task can have one or more Key Performance Indicators)	Timeframe, Quality, Quantity, Productivity, Financial, Cost Effectiveness	Resources Required (Budget, Human Resources)
IRA 1:	Teaching and Learning	45%	1.1	Updating course material to ensure that course content is in line with the current socio-economic status of the industry / employers and for development students	1.1.1	Develop course outlines, course content and outcomes for each module	[Redacted]	[Redacted]
					1.1.2	Provide assessments methods and dates		
					1.1.3			
			1.2	Create Black Board Course for all modules and load all relevant course material onto Black Board	1.2.1	Provide course outlines, assessment methods and dates, course content and outcomes to students for each module		
					1.2.2	Monitor student throughputs and implement relevant interventions		
					1.2.3			
			1.3	Provide appropriate and relevant assessments	1.3.1	Create tests and assignments that are in line with current issues in the industry		
					1.3.2	Create practicals for student exposure and practical application		
					1.3.3			
			1.4	Curriculum Recirculation for the department	1.4.1	Collecting and providing relevant information for the programme to be relevant in the industry		
					1.4.2	Consult with other Universities to update content based on the purpose of the programme		
					1.4.3			

Figure 7.2: Individual Performance Assessment (IPA) from EE4

The majority of academics' stipulated learning outcomes and teaching-learning activities did not have a direct link to the digital mode of teaching. These outcomes merely specified the general outcome of the module without making specific reference to the digital context that they are teaching in. On the other hand, in responding to the quality of teaching, all the participants shared the same sentiments or experiences of EE2.

EE2: *"I do not think the online platform really works as it is supposed to. For me, I need to see the students, physically, in order to identify, through nonverbal language if they understand or not, and also for me to properly engage and see facial expressions. If they are there and I have my camera off, I do not pay much attention to body language because I cannot see anything. I cannot see if they understand or not. You ask a question, they just keep quiet, and the only thing you can do is just continue because you are also rushing against time. It is so different than being in a classroom. They also do not pay much attention, so one just teaches to cover what was planned for the day."*

In both focus groups, this issue of the importance of physical interaction weighed heavily and concerned all academics. It also emerged that this issue is not just affecting the teaching of agricultural sciences.

AC1: *“I am also registered for a Post Graduate Diploma in Higher Education with Experience University (pseudonym) and we attend block sessions online. I am really not enjoying the sessions, and lectures would make more sense if we physically engaged with lecturers. I sometimes lose concentration from the concentration and do other stuff like responding to emails, if I am home I easily get distracted.”*

LP3: *“Online teaching is convenient but can also be challenging as students sometimes who struggle with self-motivation and discipline required for independent learning, fail to even attend classes but in the end, they obtain high marks in their assignments, tests, and examinations. ...the level of cheating is horrible. I am happy now that this year, 2023, we are going back to face-to-face teaching and sit-in examinations.”*

EE3 showed some sense of dissatisfaction with the quality of graduates that the institution has produced, particularly from the year 2020 when it was mandatory to use Blackboard. There was a moratorium on face-to-face teaching and learning all over the world due to the outbreak of COVID-19. When responding to mechanisms that academics put in place to maintain good quality teaching and assessment, managing cheating and plagiarism, in a reflective activity:

EE3: *“I suppose I don’t.”*

In an interview **EE3:** *“we are all fairly desperate to go back to sit down assessments and examinations again. Online assessment is not entirely working for us. The level of cheating is horrible.”* Plagiarism amongst students has grown, and academics are frustrated, and according to Peytcheva-Forsyth et al. (2018), a drawback of incorporating digital technology in education, particularly for assessment purposes, is its capacity to enable academic dishonesty by providing students with opportunities to cheat and engage

in plagiarism. All the participants clearly outlined that plagiarism challenges the quality and ethical standards of any online assessment activity. It was frequently necessary to remind students of the significance of originality and acknowledging sources, together with proper citation thereof. Academics also indicated that the institution does offer a workshop on the use of Turnitin, and the consequences of plagiarism. As alluded to in Khoza's (2015a) study, it is crucial for students to acquire the relevant information and essential skills to avoid plagiarism. Furthermore, assessment design should aim to minimise plagiarism. The utilisation of Turnitin should have stable policies, procedures, and guidelines to address any arising issues at all levels of higher education.

Following up on measures of dealing with plagiarism when writing examinations, **AC1** said something similar to EE3: *“what frustrates is marking the same answers in almost half of the students during examinations, and unfortunately, we do not check, or let me rather say I cannot check plagiarism in examinations and test because they just write on Blackboard. You just have to mark because the whole class would repeat the module. I do not think our students take plagiarism seriously.”* Academics only used Turnitin for submitted assignments, and not for tests and examinations. Thus, **EE2, LP1, LP2** suggested that the questioning and assessment strategies should change to high-order questions that encourage critical thinking, creativity, and application. According to McLafferty and Foust (2004), it is imperative to know your students and their abilities, so that the lecturer can identify incongruities between what is purportedly written by the student, and what the student is capable of producing under supervision. Project-based assessment, case-studies and individual or group presentations are some of the assessment activities identified by the participants as fostering originality by reducing the temptation to plagiarise.

It also emerged from the participants that academics were also not innocent as far as plagiarism was concerned. Accounts of quality assurance and academic integrity on the part of academics came after data was generated, and literature was consulted. Various authors highlight that any material, text or graphic

taken from the internet and used without acknowledging the authors is considered plagiarism (Anyanwu, 2004; Khoza, 2015a; Verhoef & Coetser, 2021). Going back to participants randomly asking whether they had ever taken any content such as notes from the internet, passing it off as their own, some acknowledged doing that. Upon analysing the submitted course outlines, plagiarism could not be detected because there were no notes submitted.

LP5: *“I have done it several times. Sometimes the notes do not have any author, so I take them in incorporate in my notes...I am aware that it is wrong though...”*

LP6: *“I am not sure, as a time-on-task lecturer the material was handed over. I just changed the dates and lecturer name and added mine. Does that account to plagiarism? Sometimes I take common and general information that can be found in multiple sources.”*

EE3 seemed to be cautious and well-informed about this matter.

EE3: *“all the material I use with my students are acknowledged. However, I mostly create my own material for teaching.”*

LP1: *“One way or the next, all of us have done it before, I won’t lie, but we will not admit to it because we always stress the serious legal implications and academic penalties that it comes with.”* These accounts reveal that some academics are well aware of their own vulnerabilities to plagiarism, and how it could damage the institution’s and one’s own reputation. From the assertion by LP1, some academics may deny any wrongful behaviour, knowing full well that plagiarism compromises academic integrity and violates intellectual property rights.

When participants were asked about the overall comment or reflection on their experiences on using digital teaching and learning environment, their comments were inclined more to effectiveness and quality assurance issues. Thus, this theme became the first and leading theme. Nevertheless, some of the

accounts/deliberations mentioned were also relevant to other themes because of the interconnectedness of the deliberations. Academics' accounts can be restated as follows:

LP1: *“The use of digital learning environments is a good initiative, and the university must invest more on it than face-to-face methods. Invest more on video conferencing. Introduce hybrid systems for teaching and learning.”*

LP2: *“Digital learning is vital to help reach a wider scope of students, whom at times would not be available during scheduled physical classes. At times, a student could be available in class but through many distractions such as non-availability of food allowances and other challenges that they face impacting negatively on their ability to listen or contribute to lessons conducted. Furthermore, some students may also fail to capture aspects taught in class on first attempt hence access to a lecturer's uploaded material class is ensured. Sometimes, online tutorials and SI sessions. The use of digital platforms bridges the gap so that the student could have access to content taught using recordings and referral to online learning materials such as journal articles and YouTube. Also, digital platforms assist the students recall taught content during revision ahead of tests and exams used to gauge the knowledge and understanding of content amongst students.”*

LP3: *“it should be complementary and should not be entirely and solely used in the teaching agriculture students.”*

LP3: *“It has been a good experience however face to face learning environment is much better because as a lecturer you are able to assess the student concentration and understanding of the module. With digital learning it is impossible because some may have connectivity issues, it is difficult to manage plagiarism (copy and pasting) during tests.”*

LP5: *“It has its pro's and cons. Pro's: It makes marking the assessments easy. Cons: The students copy a lot. They google when writing tests. It's best to incorporate. I recommend that all the tests and exams must be written face to face.”*

LP6: *“This has been a challenging, yet convenient form of teaching. It has helped students to build some presentation and communication skills, time management and independency. However, with load shedding and network issues, this way of teaching has been challenged.”*

EE1: *“I will always recommend digital learning as it comes with lot of skills that students will need beyond they spell at the university and also the professionalism. However, load shedding and poor network reception sometimes hiders effectiveness of digital learning environment.”*

EE2: *“Digital learning is an effective teaching tool. However, it is limiting when teaching agricultural science modules. As a lecturer, I personally prefer in contact teaching.”*

EE3: *“No. No further comment.”*

EE4: *“It saves time and makes communication easier and quicker.”*

EE5: *“We should not go back to 100 % face-to-face. It should be 50:50 online: face-to-face It saves time and makes communication easier and quicker.”*

EE6: *“Quality of education is a bit compromised because most students do not take assessments seriously; they copy and paste from the notes.”*

AC1: *“Online learning system is a way to go for the future, and we can try to find new ways of avoiding the issue of students copying and plagiarism. Try to maybe install some softwares that would detect when someone is trying to cheat when writing assignments. This online is very efficient for both students and lectures. But maybe we can use blended learning in trying to assist the most struggling students, especially at first year level.”*

AC2: *“Poor network connectivity affects effective learning, students also have serious challenges with network connectivity. Lastly students copy each other's work. If those can be resolved, we would not be having problems with teaching in all these platforms.”*

The above utterances from academics about their experience of using digital platforms when teaching agricultural sciences suggests that digital learning environments are a good initiative; and that HEIs should

invest more in introducing hybrid systems for teaching and learning. This indicates a belief that digital learning has value and can be improved through increased investment (Oke & Fernandes, 2020). As **LP1**, **LP2**, **EE1**, **EE2**, **EE5**, **AC1** and **LP2** have asserted on the latter ponderings, digital learning can help reach a wider scope of students who may not be available during scheduled real-life classes (Mpungose, 2020b) or who may struggle to concentrate in a classroom environment (Cunha et al., 2020). These researchers also note that digital platforms can provide access to content taught using recordings and online learning materials. Nkonki et al. (2016) noted that LMSs assist students with revision and recall of taught content even after classes. This suggests a belief of various authors that digital learning has professional benefits which are informed by academics' accounts on prescribed experiences, effectiveness, and the quality of teaching and learning.

Furthermore, **LP3**'s proclamation of integrating LMSs and SMSs for educational experiences was an indication of the significance of understanding and collaboratively employing prescribed and casual experiences, particularly when teaching in the 21st century. This is in line with deliberations from authors such as Chawinga (2017), Gorghiu et al. (2018), Kutu and Kutu (2022) who enunciated that prescribed digital learning environment can be valuable; however, it should not be the sole method used in teaching students. Flexibility with using and navigating social media platforms that entice students to perform excellently is equally important. Qamar et al. (2019) and Zulu (2022) assert that, by integrating various platforms and encouraging regular communication, it is possible to overcome the challenges posed by the moratorium on face-to-face teaching, providing quality teaching by academics, and learning by students. Equally, from the avowals made by academics, it is evident that there is a need for an integrated approach to digital teaching and learning in agricultural sciences. The use of Blackboard, Microsoft Teams, and WhatsApp indicates that academics require multiple channels of communication and interaction to keep up with the demands of their programmes and modules. Furthermore, accepting multiple digital learning

environments facilitates the recognition and attainment of societal demands (Mpungose, 2020a) and personal identities (Khoza, 2021a).

However, in the appreciation of the use and integration of various digital learning environments for either professional, social, or personal reasons, a professional and prescriptive position was also emphasised mainly by participants **LP5**, **EE2**, **AG1** of the practical nature of agriculture. These participants indicated that students miss out on practical experiences that they would have acquired at the farm, laboratory, or simply from field trips and walks. The aspect of practical significance was of concern to many academics at the department of livestock and pasture sciences (LP) that teaches animal studies, and agronomy (AG) which harbours crop and soil sciences. From the learning guides evaluated, it was also evident that some modules are more practical than others. Learning guides from the LP department had modules that included in their content wool sharing, feeding of piglets, chick management, injecting and oral drug administration, dehorning, castration, artificial insemination, apiculture, and testing attributes of meat, to name a few. Participants from this department indicated that the theoretical component of these modules can be taught using digital learning environments; however, **LP1**: *“It is a must that students do the actual husbandry practice. It is like passing a learner’s license and assume that the person can drive because they know all the controls, signs and rules. They must drive and pass the driving test. So, this was the case with the students we produced during COVID-19 lockdown period. Even the practical was taught online through videos and showing diagrams (**shaking head**).”*

Amongst the expectations from the learning guides evaluated, others included that students are expected to observe animal behaviour and determine their flight zones; students must safely handle and restrain animals, administer treatments to animals, milk cows, and determine teats that have mastitis. These were all on-farm practices. This suggests that academics’ experiences were shaped by the instructional content delivered in conjunction with practical objectives, as well as the degree to which students demonstrated

mastery of module expectations. Such posits that academic accounts were influenced by a prescriptive experience, with the aim of accommodating vertical curriculum signals to digital technology education technology, as noted by Khoza (2016) and van den Akker (2013).

LP3 (who taught animal health modules): *“Students need to touch animals. They need to feel and smell animals because some diagnostic techniques require one to smell the odour and feel the pressure. For instance, sometimes the skin coat has a sharp smell when an animal is sick with as a result of us skin mange and pathogens. On top of that, when you are injecting an animal you need to use a particular pressure which is different in cattle than in a sheep or goat because of the thickness of the skin coat. How do we expect students to be able to do that when they only watch videos and read on books?”*

In that regard, Apple (2018) argues that, in whatever transformation that is being conducted on curriculum and pedagogy, the natural nature of the agriculture curriculum must be preserved. In addition, Kidane and Worth (2012) reported that the persistent issue of some insufficiently prepared agricultural sciences academics, who possess a greater understanding of theoretical concepts than practical application, remains a significant concern that needs attention. Therefore digital teaching has the potential to escalate the current issues in teaching the subject. Content and pedagogical efficacy in both theory and practice is crucial in agricultural studies (Mathenjwa & Dlamini, 2021).

AG1 and **AG2** who teach modules from pedology, horticulture, to vermiculture also agreed that contact teaching and learning still has a role to play in the education of agricultural students. No agricultural graduate should pass without getting their hands dirty with soil.

AG1: *“Students must feel and play with soil particles to understand the its physical properties.”* However, it was also noted that the practical nature of modules that included agribusiness, economics, farm management and policies, and agricultural extension and rural development, that were offered by

department of EE, was not a significant issue in the use of a digital learning environment. When asked about the practical component of their modules, a participant confirmed the above observation by saying:

EE3: *“I mean, I am not disagreeing but practical has a different meaning in our department, if you are talking about crop science versus economics and extension. For crop science for instance practical generally means students need to be doing hands-on work in the lab or in the field but our main tools are computers and softwares. To some extent, to conduct interviews with farmers. So, I don't think we were as compromised perhaps as others. Yeah, I mean, just teaching online has a whole bunch of implications but it's not because of the practical nature of agriculture for us.”*

The above accords with the beliefs of Mpungose (2017) that practical work assigned to students is designed to align with the content covered in the module. Practical work provides an opportunity for students to develop their skills and abilities in each module topic. Its irrelevance to EE suggests that academics' use of digital technology to teach was also informed by casual and customised experiences of the general competencies of using technology, which is social and personal (Govender & Khoza, 2019; Makumane, 2021; Sokhulu, 2020). Be that as it may, academics' experiences in terms of ease of implementation and support were explored.

7.2.2 Theme Two: *Ease of implementation, digital access, and support*

This theme includes technical difficulties, digital access, support and training, resource constraints, barriers and facilitators' adoption. Theme Two addresses the practical considerations for implementing digital learning, including providing necessary resources and training to support academics and students. Several studies that have explored the use of digital learning environment for teaching students, have discovered, amongst other factors, that the ease of integrating technology into existing educational programmes has been a crucial factor (Egielewa et al., 2022; El-Masri & Tarhini, 2017; Ntlabathi et al., 2014; Scherer et al., 2019). As such, ease of implementation dominated in academics' experiences, and

academics integrated SMSs into their teaching, customising them to suit what they preferred and what worked best for their students.

Furthermore, digital access which included connectivity, understanding the devices (hardware resources) and applications (software resources), were found to likely affect the use and adoption of a digital learning environment by academics who teach agriculture. Lastly, the technological and pedagogical support (ideological-ware resource) available and accessible to academics were found to be crucial. This theme was primarily constructed from responses that addressed the pragmatic and/or operational questions, so as to understand the ‘how’ in academics’ experiences. The main archetypes of this theme came from responses to questions:

- *How do you teach agricultural sciences using digital learning environments?*
- *What strategies can enhance the experience of using digital learning environments in teaching agricultural sciences?*
- *How can both structured and unstructured digital resources be used to enrich the teaching of agricultural sciences?*
- *What is the process for accessing digital learning environments used in teaching agricultural sciences; and how easy is it to access prescribed and casual digital learning environments?*
- *How do you manage the cost implications of accessing digital learning environments to teach agricultural sciences; and what support is available?*
- *How do you plan and teach practical content in agricultural sciences using digital learning environments?*
- *How do you use digital activities to respond to the content to be taught; and ensure maximum attendance of students in your lectures?*

LP1: *“Having a central platform that is able to bring together and organise all teaching and learning materials, assessment tasks has been a wonderful component because you can access whatever you have uploaded where ever you are. Sometimes, information shared via email get lost as sometimes I delete old emails. My computer was once faulty and had to book it in to be fixed at ICT. I lost some of my stuff but everything that I uploaded on Blackboard I could retrieve.”* Similarly, **LP2** conveyed *“Blackboard allow one to revisit the posted material, and students are also able to access recorded classes. Also, because YouTube is freely accessible, they can watch videos I recommended unlimited times since they all have access to university Wi-Fi and computer labs for those who may not have computers. Otherwise, the university provides computers and data dongles (router) for when I am home or travelling.”*

All fourteen participants indicated three main platforms that were accessible to them and their students: Blackboard, Microsoft Teams, and WhatsApp. Microsoft office for emailing announcements was also commonly used, as were YouTube videos. The above experiences shared by **LP1** and **LP2** were at prescriptive level. No matter what platform they use, material had to be uploaded on the LMS. Even should the computer or other devices be used, course material still had to be uploaded.

LP2: *“I am also familiar with Moodle that I was using in my previous university where I used to work.”* The various functions of these platforms were discussed. **LP2:***“Moodle and Blackboard are not very much different because they are learning management systems used to connect lecturers and students. They have the same functions, just like referencing tools that I used in my previous university which is endnote, and here, the university uses Mendeley. Both do the same thing.”* Participants **EE1**, **EE2**, **AC1** and **LP2** also mentioned Zoom meetings as another platform that was dominant, especially with postgraduate or senior students.

EE2: *“I also supervise agricultural economics research modules and postgraduate students where Zoom is most preferred especially with students who are not based on campus. Most postgraduate part-time*

students use their personal emails and would prefer zoom.” This suggests that, pragmatically, it is essential for academics to understand and consider what works best in practice for both themselves and students in facilitating teaching Khoza (2021a). Also, reflecting on operational/pragmatic questions addresses both casual and customised experiences. Reflecting leads to noting the digital spaces other people are using; and also what you personally prefer or deem effective at that moment (Sokhulu, 2020).

LP6: *“I mostly use teams, because it is easy to navigate, and students are able to use it as well. WhatsApp is easy for updates and quick communication as emails and blackboard needs good network coverage to access.”* The deliberation by **LP6** supports the integrating of different platforms when teaching and not relying on the one that is prescribed (Mpungose, 2019b).

EE3: *“Using either Blackboard or Microsoft teams has somehow made teaching an easier because since there struggle of accessing a projector, lecture halls for big classes, and having to fight with other colleagues for the same venues. Particularly, venues in the arts and law buildings that are also used by other faculties due to their carrying capacity. Sometimes, you cannot squeeze students into venues that do not have furniture, and students are standing or seating on the floor yet we are a university. and making various types of information available to students. It was terrible.”*

Further to the above, academics, including the time-on-task employed, all agreed that accessing the prescribed systems in terms of logging in through the university website was not a challenge; and even contract academics were given access to the software. However, **LP5** and **LP6** who were employed on time-on-task shared the same experience as **EE6**.

LP5 and **LP6:** *“Unfortunately, us, TOTs, are not provided laptops and data routers to be able to work from home. We use our own resource, and data is extremely expensive. I need to travel every day to the office so that I can use the university wi-fi.”*

LP5 who was a postdoctoral fellow added: *“They gave me an old laptop that has problems and is slow in processing information. However, I am not using because it also freezes in the middle of my work and even during classes. I am using my own.”* All three of them shared the same sentiment that they wish to be treated as permanent staff because they are doing the same job as these employees, sometimes even more, yet there will be support that is exclusive. *“We even mark assignments for modules that we do not teach without proper guidance on all these online platforms,”* **EE6** deliberated.

In terms of support and training, all the participants shared the same experience with **AC2** that *“the university’s TLC (Teaching and Learning Centre) has always offered training sessions and/or workshops to help lecturers develop more than the basic skills to teach online effectively.”* On a follow-up question on the exact focus of the workshops, **AC2**: *“Online module design, navigating blackboard, online assessment, using chatrooms.”*

EE5: *“We however, saw the need to attend all those trainings when were forced to online teaching as of 2020.”* **EE4** mentioned that she did not attend any support workshop during and post COVID-19 lockdown for personal reasons. She added that she had to ask one of her friends and a colleague just to show her how to upload material and set tests.

EE4: *“Blackboard is complicated for me, or maybe it is me who has a negative attitude toward it since I am so used with teaching on MS Teams. I am fine with MS Teams, so I do not see a need of knowing how to teach on Blackboard when Teams does the same thing and my students are happy with that.”*

LP1 indicated that he was taught at another institution in another province.

LP1: *“It was not my first time using blackboard here. At the university where I previously taught before joining comprehensive university (**pseudonym**) we used blackboard. You know, before COVID, after my arrival here, I tried to use it and even advised the then HOD, but at that time, everyone seemed to be*

happy and comfortable with contact sessions, and we were not forced to use blackboard. I did not win. Even the reception from students was not welcoming the idea because other lecturers were not using it. So, I only uploaded material. You know, when I hear people here talking about hybrid teaching, I often feel that they do not fully understand the concept. Simply alternating between online and face-to-face teaching is not really hybrid teaching. True hybrid teaching occurs when both online and face-to-face teaching happens simultaneously at the same time, with some students physically present one lecture hall while others participate virtually. Unfortunately, our only has that technology, as far as I am concerned, in two if not three boardrooms, which are primarily provided to hold some meetings and workshops only for staff. The screens may however not be functioning correctly in one. Such facilities are not available for student use.” This suggested that some academics may not really understand the concept of hybrid teaching even though they claim to use this approach. However, **EE2**, **EE3**, and **LP1** also understood the concepts, and through explaining it in a focus group, it made sense to all participants.

LP3: *“The library team has also been very helpful throughout in supporting academic staff with online teaching resources and how to access different databases, e-journals, e-books, and so on.”* **LP3** even advised that academics should always visit the university’s library page. Figure 7.3 below shows the resources that the university trained academics on; and how to use and access various online platforms for their teaching and research.

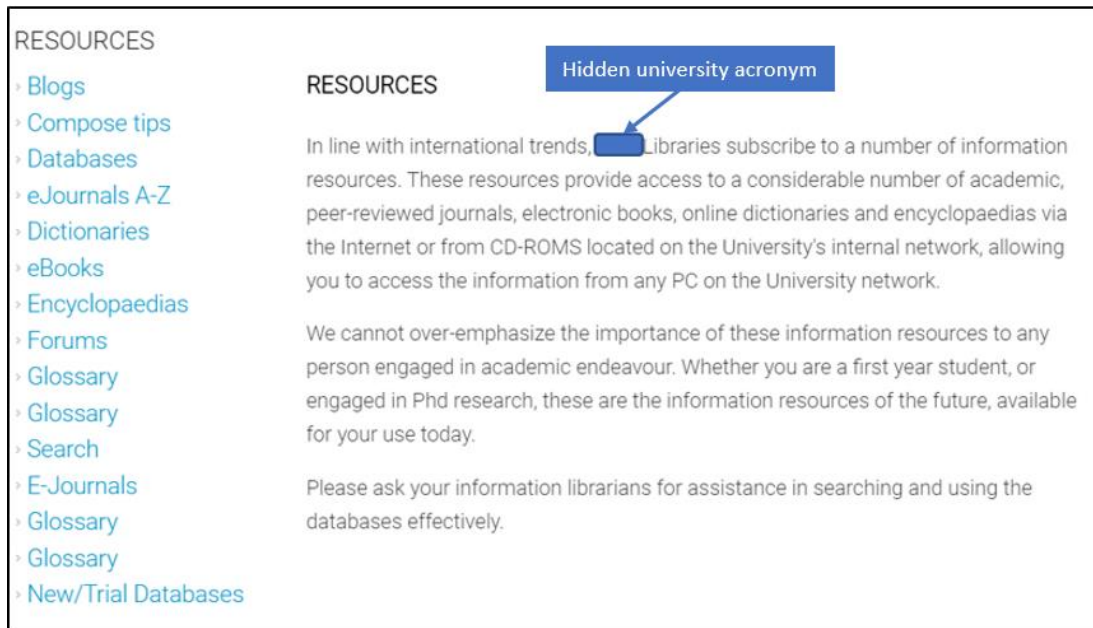


Figure 7.3: A screenshot of the library e-resources

Other resources that were confirmed by all academics to be accessible were study material sent to students in MS Word documents, PDF, PowerPoint slides, and Excel files.

AC2: *“...the same documents that I upload on blackboard, I also send via emails as students also sometimes struggle to log in and access blackboard content.”*

EE1: *“I also share some word, PDF and video links via WhatsApp platform in order to speed up accessibility, and also for quick response and announcements.”*

The academics' accounts presented above suggest that when it comes to digital access, ease of implementation and required support, all the ages, educational experiences, and qualifications experience similar challenges, and required the same support. The responses above address the pragmatic realities which Fouche and Andrews (2022) refer to as structural and operational. Furthermore, Fouche and Andrews (2022) is supported by Makumane (2021), who avers that access to devices and facilitating conditions include all the hardware resources such as computers with stable internet connection, smartphones, webcams, microphones, and headphones to improve audio quality and minimise background sound, is crucial in this digital age.

According to Ranga (2017) and Türel and Johnson (2012), teaching venues' properties should have video-conferencing tools, interactive Whiteboards that one can write, draw and illustrate figures on when teaching, and can be seen by both in-person and those students attending virtually. This is in line with the suggestion made by **LP1** who explained hybrid teaching; and challenges that they face in their institution. Türel and Johnson (2012) reminded us of that video conferencing in several countries, particularly in Europe, has long been one digital teaching tool that HEIs invested in as part of the ICT integration strategies. South Africa may be behind, if even during the COVID-19 lockdown, there are some HEIs that still struggle with offering effective conditions for academics to implement and facilitate teaching and learning (Mhlanga & Moloji, 2020).

With the above being mentioned, several authors have confirmed that HEIs were, and still are, not entirely ready and/or prepared for maximum use of a virtual learning environment (Landa et al., 2021; Maphosa et al., 2020; Simamora, 2020; Sunardi et al., 2022). Apart from institutional readiness, academic staff readiness is still a challenge, despite the enormous number of training sessions and workshops universities have conducted for academics (Maphalala & Adigun, 2021). This was confirmed by academics in this study and emphasised by **EE5** and **LP6**. Academics should be allowed within specific parameters to be flexible in their teaching. SMSs should also be recognised even in university newsletters. Academics all indicated that the use of WhatsApp, Zoom, MS Teams, Skype and other platforms was not prescribed; however, they were deemed easy to access, and academics have been using them even when they had to migrate 100% online at 'gunpoint'.

Nwabude, Ogwueleka and Irhebhude's (2020) argument that the flexibility of digital learning environments does offer great advantages in supporting teaching and learning, was confirmed by academics' experiences, particularly in terms of the shared casual and customised experiences. According to Khoza (2021a), this benefits academics, and to a certain degree their students, in forming their distinct

identities by collaboratively constructing and comprehending their varied experiences and utilisation of digital learning environments. The validation of the usage of different resources by the academics with the main goal of attaining educational habits, demands, and experiences is confirmed by Mpungose (2020a). Mpungose reminds us of that hardware resources, or tools that include computers, assist academics during teaching. It is essential to use these tools; and reflection on their use is informed by prescribed experiences. Software resources such as LMSs, MS Teams, WhatsApp, Zoom, and other platforms are driven by casual experiences. Such experiences are rooted in institutional culture, social influence, and ease of use. Habit and social influence being the main influencers were also noticed – all the academics seemed to prefer MS Teams for teaching. Even **EE4** without formal training, had been using MS Teams, and did not see the need to invest too much time on Blackboard because MS Teams enabled her to teach her students. **EE1**, **LP6**, and **AC2** also confirmed that they had been using MS Teams more frequently than Blackboard, even during the period when contact classes were not allowed. These participants reported using the Blackboard platform mainly to upload course materials, as well as to set tests and exams. However, customising all these software resources into the hardware in use is said to be dependent on each academic's ideology and understanding of what is best for his or her own class. This choice is informed by customised experience (Khoza, 2021b). The participants reported that most students would have laptops from the rollout when universities procured laptops for needy students. Data was also reported to have been provided to all students.

AC2: “ *but students always complain that the data provided gets depleted quickly... but that could be because they also use the data for other things that are not school related.*” Even so, Kajjiita et al. (2020) proclaim that not all students will have smartphones to download SMSs that most students can easily gain access to; and students could be left behind should they live in areas where there is not network connectivity, and their data is depleted.

The academics also identified a national challenge of frequent electricity outages by Eskom, the national electricity provider, as a factor affecting the ease of implementation, access, and support for digital teaching. Azionya and Nhedzi (2021) reported that the national rolling blackouts were being implemented to stabilise the national power grid. The academics detailed that lectures, according to the timetable, classes that were scheduled during ‘load shedding’ or power cuts were disrupted. Academics reported that power outage also affected internet connectivity, agreeing with sentiments expressed by **LP2** below.

LP2: *“At times, I conduct classes where some students attend off campus, maybe at their homes and may face power cuts and network disruptions during the session, resulting in them leaving the class. But the positive aspect is that they can always access the recorded session later. The biggest difficulty arises when they are writing assessments, and their connection gets disrupted, leading to the need for reopening the test. This situation creates an opportunity for those who have already completed the test to share answers with others. Sometimes you are forced to set another test for those who were affected.”* This account was informed by casual experience because it was a common national issue that affected everyone.

Since the above electricity outage issue was out of their control as well as that of the university, planning is always disrupted.

EE5: *“Students will always make excuses that they had no power, and unfortunately as a lecturer you need to make a plan or provide a make-up assessment task. Even with submission, you just have to take late submission because once they report you to the either the Dean or even SRC, you will just be instructed to always do what’s best for the student, regardless.”* Kajiita, Nomgcoyiya and KangEthe (2020) claim that all virtual learning environments are primarily supported by electricity-powered computer systems. Participants state that they do not have supplementary power sources such as generators or power converters as a backup; at the university only, the library has a generator. However, their library does not have venues in which to teach students. **LP6:** *“Even if they had, it would not be able to*

accommodate the entire university or faculties.” The unavailability and affordability of electricity negatively affects teaching, learning, and assessment.

7.2.3 Theme Three: *Fostering student engagement*

This theme includes pedagogical concerns, student engagement and motivation, how academics observed student responses, and hedonic motivation. Theme Three highlights the importance of creating engaging and motivating digital learning experiences that meet the needs and preferences of both academics and students. The questions on archetypes, including a follow-up that provided patterns for themes form a collective analysis of all the data-generation methods:

- *How do you ensure students attend your classes when using a digital learning platform?*
- *Which mechanisms do you put in place to encourage students to be active participants in your modules?*
- *How do you see your role both as a facilitator and an instructor when teaching using a digital learning environment?*
- *Which platform do you prefer, and which one do you think your students enjoy the most; and how do you keep them focused?*
- *How do you find your philosophy and pedagogy responding to today’s generation of students who are mostly digitally savvy?*

According to Hu Au and Lee (2017), the transition from the information age to the digital experience age presents significant obstacles for academics, researchers, and students. Sargent and Casey (2020) assert that the transition does affect how technology users engage and enjoy a particular system.

EE2: *“As a lecturer you cannot ignore students’ experiences and what they enjoy, especially when it comes to the digital platform that they prefer. If WhatsApp had all the functions that Blackboard and*

Microsoft Teams have, I would definitely migrate and follow them (students). Otherwise, you will force them to where they are not comfortable.” This account seems to agree with the views of Khoza (2012), who argues that should a lecturer or any educator facilitate teaching and learning in a way that does not seem relevant to the students, they might lose interest, and ultimately stop participating actively, becoming passive. This underscores the significance of using teaching methods that are more adaptable and relevant to the specific context of today’s students.

Following up on that account and how to foster student engagement:

EE2: *“When it was face-to-face, attendance in my lectures used to be 100% because I used to just give random exercises or tasks to check their understanding where they answered individually or in pairs or even in groups, and submitted immediately in class. Those little tasks contributed to their DPs as a practical mark because Agricultural Economics practical component can be done in class. Unlike other modules where you need to go to the farm. So initially, I did that right after the lesson started, and as soon as I announce that they will be doing a practical task, they would WhatsApp and call each other to come to class. I then decided to announce that halfway through the lecture and not to accept any students coming late. I tried introducing that with online quiz or ask them to type their responses on the chat box, and as soon as I announce that, I see attendance going up, and I cannot block anyone from joining the session. They will be telling stories that they could not log in earlier due to connectivity issues and all that. So, I am struggling. It is difficult. Sometimes, you call the name, eg John, to respond to a particular question, and they just keep quiet. This is the biggest weakness in fostering attendance and participation.”*

LP5: *“By doing impromptu quizzes to encourage class attendance, encourage class participation, questions and clarity during lectures; and by asking students questions during lectures.”*

LP1: “Through YouTube video links that I sometimes play activate learning, and we discuss what we have watched. Sometimes, I would give them different topic to research and the presentation of the work done online. Also, I would instruct them to activate their video during classes, particularly for classes with less numbers. This helps so that they they are not distracted by other things. They stick to the screen while I teach.” However, **LP1** further indicated that it becomes a struggle to promote such in large classes.

LP1: “Activating videos in large classes affect the quality and audibility when teaching. Sometimes what I share or ask them to share freezes.” Part of how **LP1** used videos to enhance student participation through flipped classroom is also reported by Su Ping et al. (2020), who illustrated how traditional and digital teaching using videos is instructed and facilitated, respectively, as shown in Figure 7.4 below:

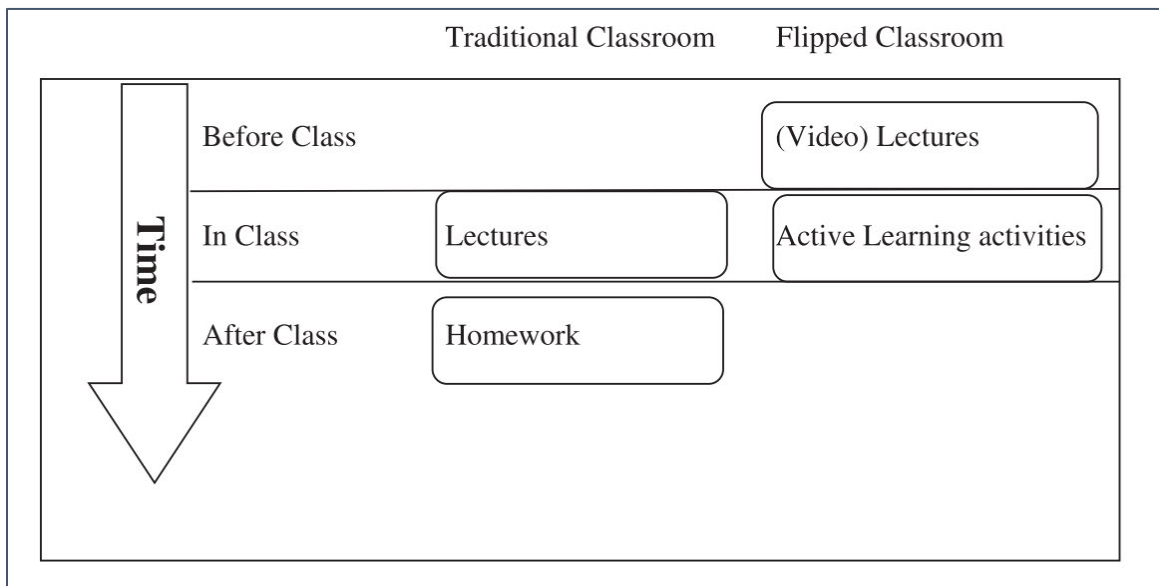


Figure 7.4: A comparison between teaching and learning in traditional and flipped classrooms using videos [adopted from Su Ping et al. (2020)]

Nyawo (2021) also finds the flipped classroom promoting active participation in class because students are given time to look at learning material such as videos before coming to class. Students engage with the videos in the own time and space, as long as they are given some guidelines and told what is expected of them. Homework is conducted before the class instead of after the class as in traditional classroom

setup (Su Ping et al., 2020). LP3: *“I use multimedia such as videos and images which I upload on blackboard so that students can access, and at times I ask them to use the interactive discussion forums to encourage participation and collaboration even before they come to class. I would sometime tell them that I will collate all your responses, and they will form the bases of the next lesson.”*

AC1: *“...ensuring attendance and participation in digital leaning platform can be challenging and frustrating and needs you as the instructor to provide clear expectations and deadlines because not all the students will even engage with the content you want them to prepare whether before or during the lesson. When others decide not to engage, it does not even help anymore to ‘threaten’ [he made inverted commas gesture] them that they will not get marks because they all make excuses with internet access especially when they are not on campus. As academics, we can use all the tools and material we want, but some students just decide they will not do the task and you also just need to continue with those that know what they are here for.”* When this also came up in focus-group discussions, participants seemed to all agree that *“students need to understand that they are not primary or high school kids anymore, this is university.”*

LP4: *“By asking questions and giving the students tasks that need to be answered during the lecture slot. I also check attendance and conduct regular check-in to see who logged in and left. I record the names down. Such students forfeit the five percent I award to everyone for participation in class.”* According to Rapanta et al. (2020), students who lack motivation to participate online due to lack of interest or feeling overwhelmed with the teaching method and connectivity issues can easily find themselves distanced from the class. Some students could also be on their social media accounts while in online class (Haimson & Marathe, 2023).

According to Gee (2009), in order for students to actively participate on any chosen platform for delivering sessions using digital technology, it is necessary for the lecturer to facilitate and integrate teaching and

learning into their lives. Furthermore, Hu Au and Lee (2017) affirmed the importance of 21st century academics considering skills such as empathy, systems thinking, creativity, computational literacy, and abstract reasoning when teaching through digital platforms.

EE2 (did not have much to say on his practice in ensuring that students attend): *“I suppose I don’t.”* However, this question was probed and followed up during the data-generation and member-checking.

EE2: *“To make the most of technology in education, we should view it as a valuable learning tool and not just a hindrance. It is essential to equip students with the necessary skills to use technology effectively and responsibly, while also facilitating meaningful collaborating and connection with others. Once they see the significance of digital citizenship, they will definitely see the reason to always be in your class as they will navigate the digital world with confidence and awareness.”* This account indicates that if prescribed experience also capacitates and influences digital users to develop skills they can also use in social spaces, students are more likely to encourage other students to attend and enjoy a lecturer’s class. Czerniewicz and Brown (2014) affirm the context of rurality and its significance in hedonic motivation of both students’ and academics’ experience of using a digital platform. This aligns with social influence of the UTAUT-2. Thus, the ethical use of technology also has an impact on society (Chávez Herting et al., 2020).

LP2: *“I try to use teaching approaches that entail utilising digital technologies to construct captivating and interactive educational discussions that motivate students to assume an active stance in their education. This include online discussion forum on Blackboard and even on WhatsApp where students share their insights. I am still to learn how to use gaming. During presentations, I ask them to develop their own PowerPoint and present. I think the use student-centered approach through the utilisation of digital learning environment promotes the exploration of individual interests and passions. This is important, not only for their academic achievement but also for their readiness to face the global digital world. Once they understand all that, students will always see a reason to come to your class.”*

EE4 mentioned that teaching agricultural extension using a digital learning environment comes with its challenges. According to Dooley and Roberts (2020) and Adara et al. (2022), agricultural extension services involve primarily training and advisory services. Extension officers provide farmers with advice, training, and guidance on best practices for agricultural production, including marketing and business planning. Therefore, both **EE1** and **EE4** shared the same experience that the best approach to facilitating one's role when teaching agricultural sciences virtually is through the use of case studies, and creating theoretical concepts to explain real-world scenarios. Reid et al. (2005) argue that bringing context to scenarios always connects with reality, and in teaching bringing context to classroom scenarios connects learning to reality.

EE4: *“Incorporating real-world examples, situations and application of extension services through case studies, newspapers and articles from magazines such as Farmer’s weekly, Stock farm, and others, always makes sense to students. Case studies taken from current magazines, news bulletins provide real issues that face the agriculture from production to consumption, and when you refer students to those articles, they also understand current affairs in agriculture.”*

On that note, **LP3 EE2**, **EE3** and **AC2** shared another online magazine, African Farming, that publishes monthly issues that they always read. They shared its link <https://www.africanfarming.com/magazine/>. Figure 7.5 shows its monthly issue freely accessible online.

EE2: *“The magazine is a useful resource I share to students, and I sometimes extract articles to incorporate in activities such as assignments, classroom discussions. That compels them to read and engage with current issues. They become well informed, and enjoy it.”*

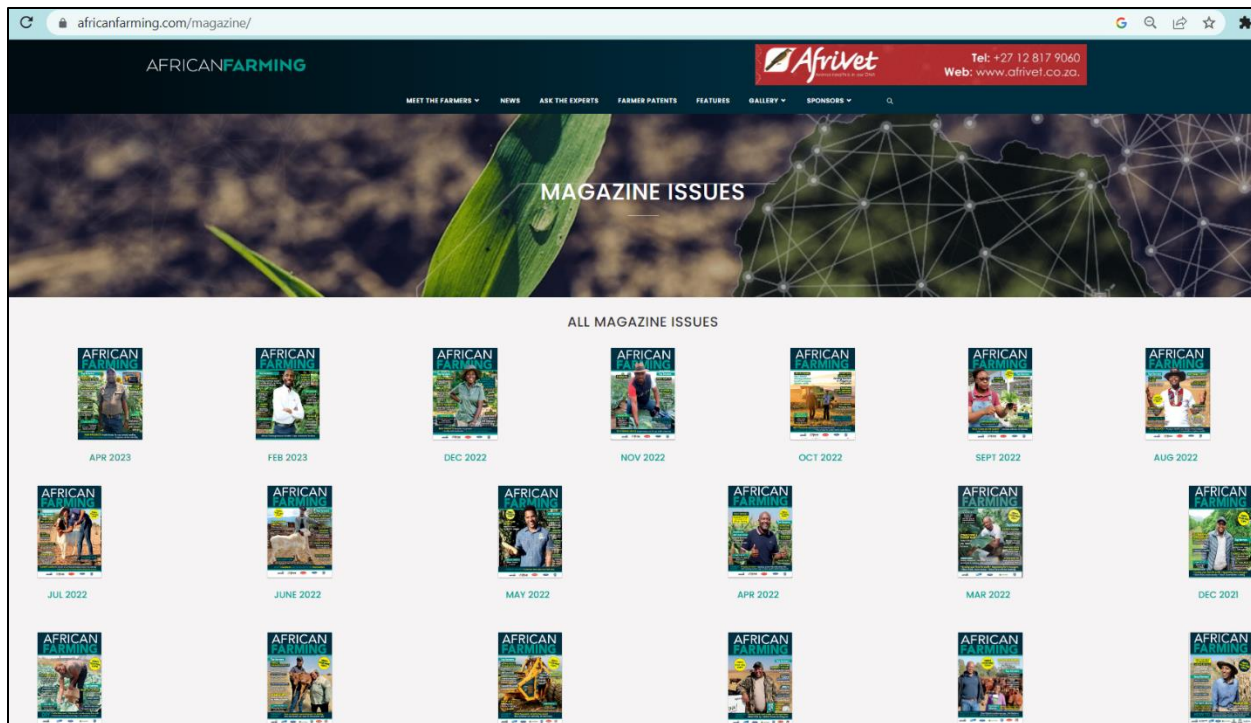


Figure 7.5 African Farming online magazine issues

Further discussions on the significance of using cases from reputable magazines and news articles to foster students' interests seemed to be supported even by academics who did not use them. Some of the stories from the articles came across as motivational to the students. **LP3** is also a veterinarian and teaches animal health modules.

LP3: *“I am more interested in page ASK A VET section of the African Farming magazine because that page in all issues only talks about animal diseases a vet responds to questions also asked by local emerging farmers about common diseases that also affect our communities that some students also see in their parents' livestock.”* Below is Figure 7.6, page 30 of two issues of the magazine, to which LP3 referred his students in his animal health modules.



Figure 7.6 Ask a vet section of the African Farming online magazine

Academics' revealed that even other online sources such as YouTube videos encourage students to analyse the content and consider multiple perspectives that allow them to recognise that what they learn in a lecture room setup can be applied beyond academic boundaries. Such recognition aligns with an assertion by Ranga (2017) that YouTube videos enhance the attainment of learning outcomes. Engaging with the videos and graphics, pausing and replaying when convenient is enjoyable to students. Online videos also form a basis for discussion in a flipped classroom session, enhancing active and critical thinking during the learning phase. On observing agronomy agricultural economics sessions, Figures 7.7 and 7.8 show one of the YouTube videos used by AC1 and EE5 in which students engaged actively in various aspects of the lessons.

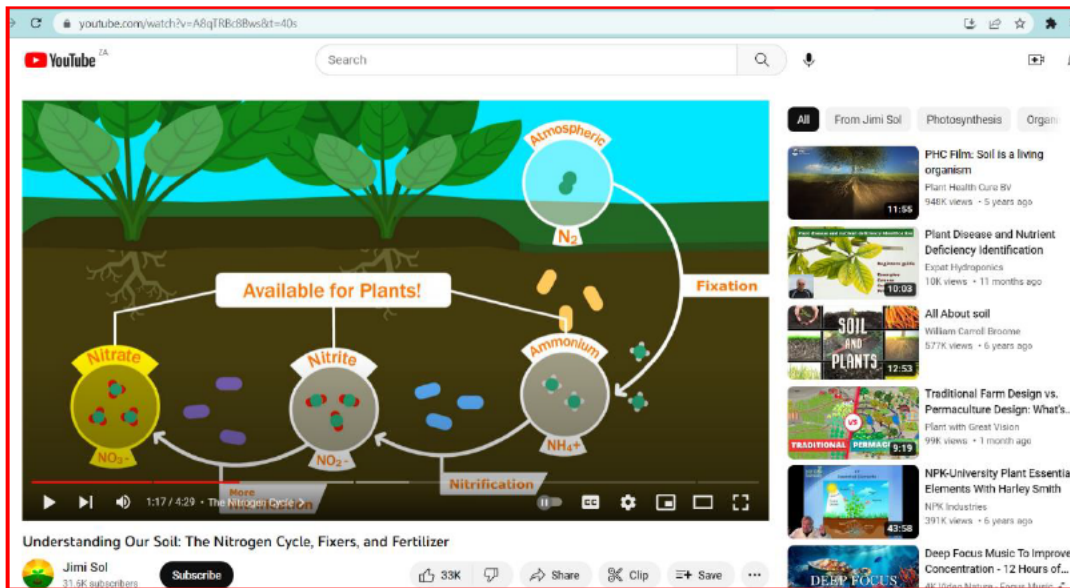


Figure 7.7: YouTube session on soil fertility

(Source: <https://www.youtube.com/watch?v=A8qTRBc8Bws&t=40s>)

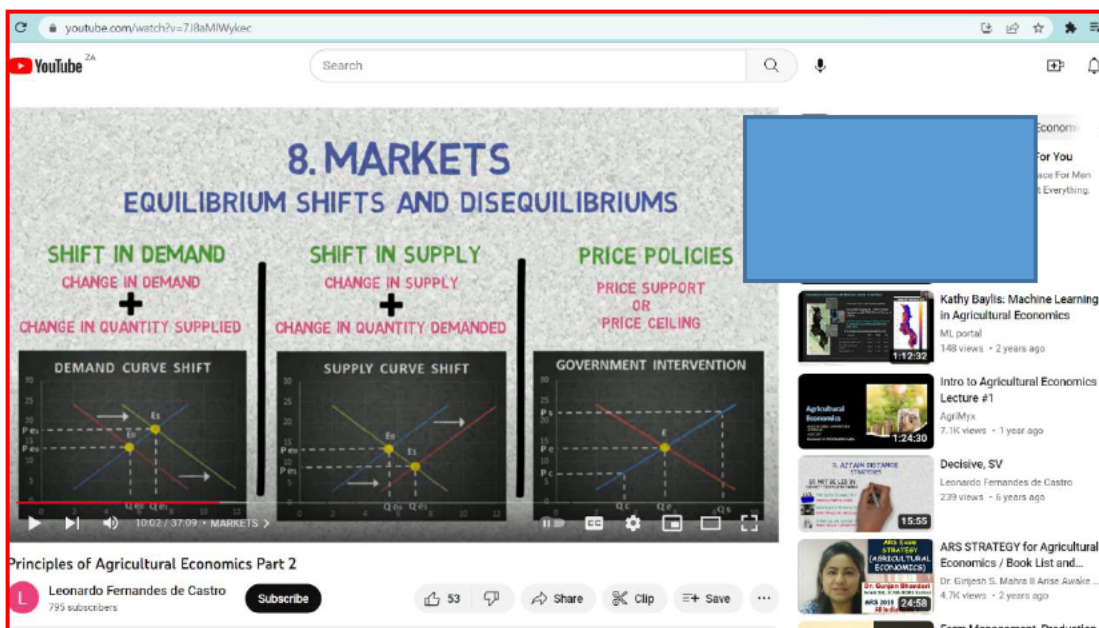


Figure 7.8 YouTube session on agricultural economics

(Source: <https://www.youtube.com/watch?v=7J8aMIWykec>)

All academics and also the literature (Dube, 2020; Maphosa et al., 2020; Mawere et al., 2021; Mpungose, 2019b) reported that students are more responsive and active on the WhatsApp platform than on a formal LMS. Engagement can continue after lectures and even after working hours. The screenshot presented by Figure 7.10 below was shared by AC2 to confirm the above assertion. This further confirms that inasmuch

as WhatsApp lacks the structured learning environment provided by prescribed platforms, it provides quick and flexible exchange of information (Mpungose, 2020a). Furthermore, students prefer WhatsApp because of its features such as random messaging, voice and video calls, and group chats. WhatsApp is convenient and familiar even to share files and to collaborate in real-time (Qamar et al., 2019).

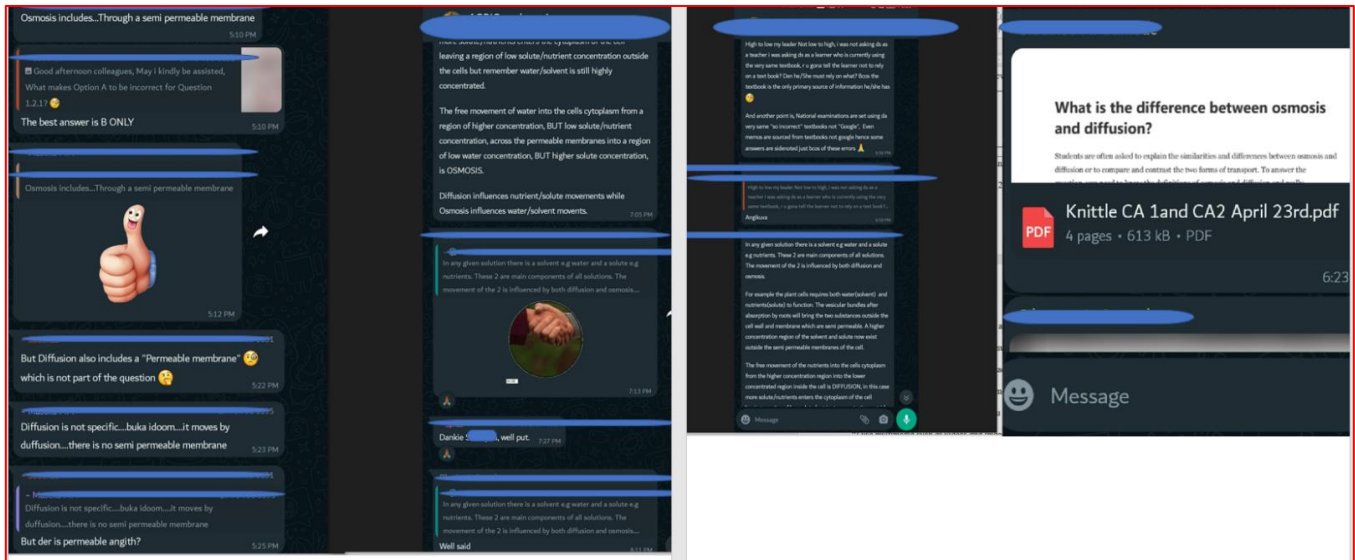


Figure 7.9 Discussion and learning through WhatsApp platform

The shared document shown in Figure 7.9 above is presented in Figure 7.10 below as further proof that SMSs such as WhatsApp are used by academics for sharing academic documents. The document seen in the screenshot above is shown by Figure 7.10 below which was also used to explain the difference between osmosis and diffusion. The accessibility and popularity of WhatsApp has made it easier to connect students and academics, and to engage in discussions anytime and anywhere, as long as there is internet connectivity (Maphosa et al., 2020).

<p>What is the difference between osmosis and diffusion?</p> <p>Students are often asked to explain the similarities and differences between osmosis and diffusion or to compare and contrast the two forms of transport. To answer the question, you need to know the definitions of osmosis and diffusion and really understand what they mean.</p> <p>Osmosis And Diffusion Definitions</p> <p>Osmosis: Osmosis is the movement of solvent particles across a semipermeable membrane from a dilute solution into a concentrated solution. The solvent moves to dilute the concentrated solution and equalize the concentration on both sides of the membrane.</p> <p>Diffusion: Diffusion is the movement of particles from an area of higher concentration to lower concentration. The overall effect is to equalize concentration throughout the medium.</p> <p>Osmosis And Diffusion Examples</p> <p>Examples of Osmosis: Examples of osmosis include red blood cells swelling up when exposed to fresh water and plant root hairs taking up water. To see an easy demonstration of osmosis, soak gummy candies in water. The gel of the candies acts as a semipermeable membrane.</p> <p>Examples of Diffusion: Examples of diffusion include perfume filling a whole room and the movement of small molecules across a cell membrane. One of the simplest demonstrations of diffusion is adding a drop of food coloring to water. Although other transport processes do occur, diffusion is the key player.</p> <p>Osmosis And Diffusion Similarities</p>	<p>Osmosis and diffusion are related processes that display similarities. Both osmosis and diffusion equalize the concentration of two solutions. Both diffusion and osmosis are passive transport processes, which means they do not require any input of extra energy to occur. In both diffusion and osmosis, particles move from an area of higher concentration to one of lower concentration.</p> <p>Osmosis And Diffusion Differences</p> <p>Diffusion can occur in any mixture, including one that includes a semipermeable membrane, while osmosis always occurs across a semipermeable membrane. When people discuss osmosis in biology, it always refers to the movement of water. In chemistry, it's possible for other solvents to be involved. In biology, this is a difference between the two processes.</p> <p>One big difference between osmosis and diffusion is that both solvent and solute particles are free to move in diffusion, but when we talk about osmosis, only the solvent molecules (water molecules) cross the membrane. This can be confusing to understand because while the solvent particles are moving from higher to lower solvent concentration across the membrane, they are moving from lower to higher solute concentration (from a more dilute solution to a region of more concentrated solution). This occurs naturally because the system seeks balance or equilibrium. If the solute particles can't cross a barrier, the only way to equalize concentration on both sides of the membrane is for the solvent particles to move in. You can consider osmosis to be a special case of diffusion in which diffusion occurs across a semipermeable membrane and only the water or other solvent moves.</p> <p>Key Points</p> <p>Diffusion and osmosis are both passive transport processes that act to equalize the concentration of a solution.</p>
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Figure 7.10: Academic information shared on WhatsApp platform

The above accounts and assertions suggest that academics do incorporate the use of popular informal communication platforms into their teaching strategies in order to enhance and foster student engagement for collaborative learning. It is also important to note that the use of Microsoft Teams by the majority of academics who teach agricultural sciences modules for conducting classes has been effective.

LP6: “Students are most active in platforms they enjoy than those they feel like they are forced and prescribed to use.” According to Tan et al. (2021), the adoption and use of any digital platform has a great deal to do with convenience, flexibility, and effort expectancy. Thus, the following theme outlines these archetypes.

7.2.4 Theme Four: *Convenience and flexibility*

This theme is centred on convenience, flexibility, effort expectancy, and cost-effectiveness of using a digital learning environment. The theme also highlights the significance of managing academics' effort and student expectations. The integration of prescribed and casual digital resources played a crucial role in shaping this theme, as it enabled the singular and integrated use of various digital platforms. The experiences from academics outlined below were informed by various archetypes, namely, prescribed, casual, customised, and gunpoint experiences; and each experience provided unique insights into the significance of convenience and flexibility issues. The questions on archetypes, including a follow-up that provided patterns for themes from a collective analysis of all the data generation methods, included the following:

- *How is digital teaching and learning convenient and flexible for you compared with traditional contact teaching?*
- *Why do you use a particular digital learning environment in teaching agricultural sciences?*
- *How do you manage the convenience of cost implications in using a digital learning environment?*
- *Why do you use particular digital teaching, learning, and assessment activities when engaging students in your agricultural sciences modules?*
- *Where and when do you use a digital learning environment when teaching agricultural sciences modules?*

The accounts below show that the digitalised learning environment facilitated a more flexible approach to learning, allowing academics to tailor their schedules and teaching to times that also suited their personal needs. They also highlighted the economic benefits that were associated with the reduced travel expenses, textbook costs, and the overall affordability of adopting and using digitalised learning environments.

LP1 (enthusiastically and loudly): *“Heeey Bro... (smiling and laughing out loud), you have no idea how it became so convenient for me to be teaching virtually. With all the negatives that we may think of, the positive side of it is being able to work at the comfort of your space.”* **LP2**: *“Digital learning has been a game-changer for me. I do not have to worry about being physically present in a lecture room, and it fits in with my hectic schedule. I teach large classes, and I am worried after all this, we might go back to 100% face-to-face again in venues that do not have just basic furniture and projectors to teach. However, I am not very worried with small classes and postgraduate students. The Small stock science third year class and introduction to animal science second year class have more than 250 students. Now you can image how easy it is to teach even if not all attend, and you send a recording.”*

EE3: *“As we go back to contact classes, I am going to still take advantage of multiple choice on blackboard, especially for the bigger modules. I won’t have to mark multiple choice.”* Being able to teach remotely also came as a convenience issue in focus-group discussions in that even when there are protests, teaching, learning and assessment activities do continue. If students decide not to attend, one can record voiceover slides, then upload these for students.

EE1: *“There is no excuse of not completing the syllabus. Even if you are attending a workshop or conference off campus, you can move out of the conference venue or ask to be excused to teach your class and come back. However, the only challenge becomes load shedding power-cuts that are schedules for different times for different towns or areas. But still, one can record and upload a lesson. So, convenient.”*

Participants **AC1**, **LP3**, and **EE5** shared a similar experience and practice with that of **EE4**. **EE4**: *“I print tasks and assignments and physically mark them because when I am marking I need to comment as I read the script. On blackboard you only make comments on the comment section. You cannot do that line by line. As a result, it makes things much easier even when students come and complain how they obtained the marks that they see on ITS.”*

EE6: *“Marking online is overwhelming and also draining my eyes, but I have to because I do not have a choice. Even now, inasmuch as we sometimes meet our students face-to-face, we are still obliged to set all assignments on Blackboard.”*

LP4: *“Online submission works well for me. I do not need to carry loads of scripts, and having students queueing and flooding my office. When I mark, I can pause at any given time and resume where I left off. I can even track when students submit and I am able to manage or restrict late submissions. I do not need to be in office or ask students to sign a submission register.”* Interestingly, some academics prefer real-life marking while others prefer marking online. Some academics find it easier to mark reflective and discussion questions by printing the tasks on which each gradable point can be marked or commented on.

EE5: *“When I mark, I want to make more detailed and specific comments. Blackboard only has a general comment section where comments are not line-by-line.”* This convenience aspect could also influence credibility and quality of assessment and feedback when using a digital learning environment. The preference for physical marking implies a desire for a more interactive and efficient marking process. Being able to print and mark offline suggests that academics are also at liberty to use assessment options that suit their needs (customised experiences).

LP3: *“The ability of importing and exporting tasks from one module code to the next makes it easy to modify tasks from previous years and saves me from setting from scratch. Also, taking what I have uploaded in previous years and transferring it to current year is convenient. It keeps everything centrally organised and can be accessed wherever and whenever.”* This experience was common to all participants – they all acknowledged and embraced the convenience of organising and accessing teaching and learning material. This account is in accordance with Uziak et al. (2018), who assert that the LMSs’ features of centralising content and enabling asynchronous online discussions amongst students are some of the advantages of digitalised teaching and learning.

Furthermore, Abduvakhidov et al. (2021) deliberate that the convenience that comes with mobile accessibility in which mobile apps are downloaded on smartphones also allows access to course materials and assessment activities remotely. According to Alokuk (2018), Blackboard can be accessed through a computer, smartphone or a tablet. For academics, being able to monitor and track students' attendance, submissions, and to generate attendance reports, is convenient; and makes the recording of attendance data efficient. Responding to the effort expectancy, the majority of participants also expressed another common satisfaction with how the digital learning environment allows for collaborative learning; and facilitates communication effortlessly between academics and students, and also amongst students themselves.

Participants were asked, at different stages of data-generation methods, about the ease and flexibility of using other options of Blackboard such as blogs, as indicated by Figure 7.11 below. Academics indicated that they were not very familiar with blogs.

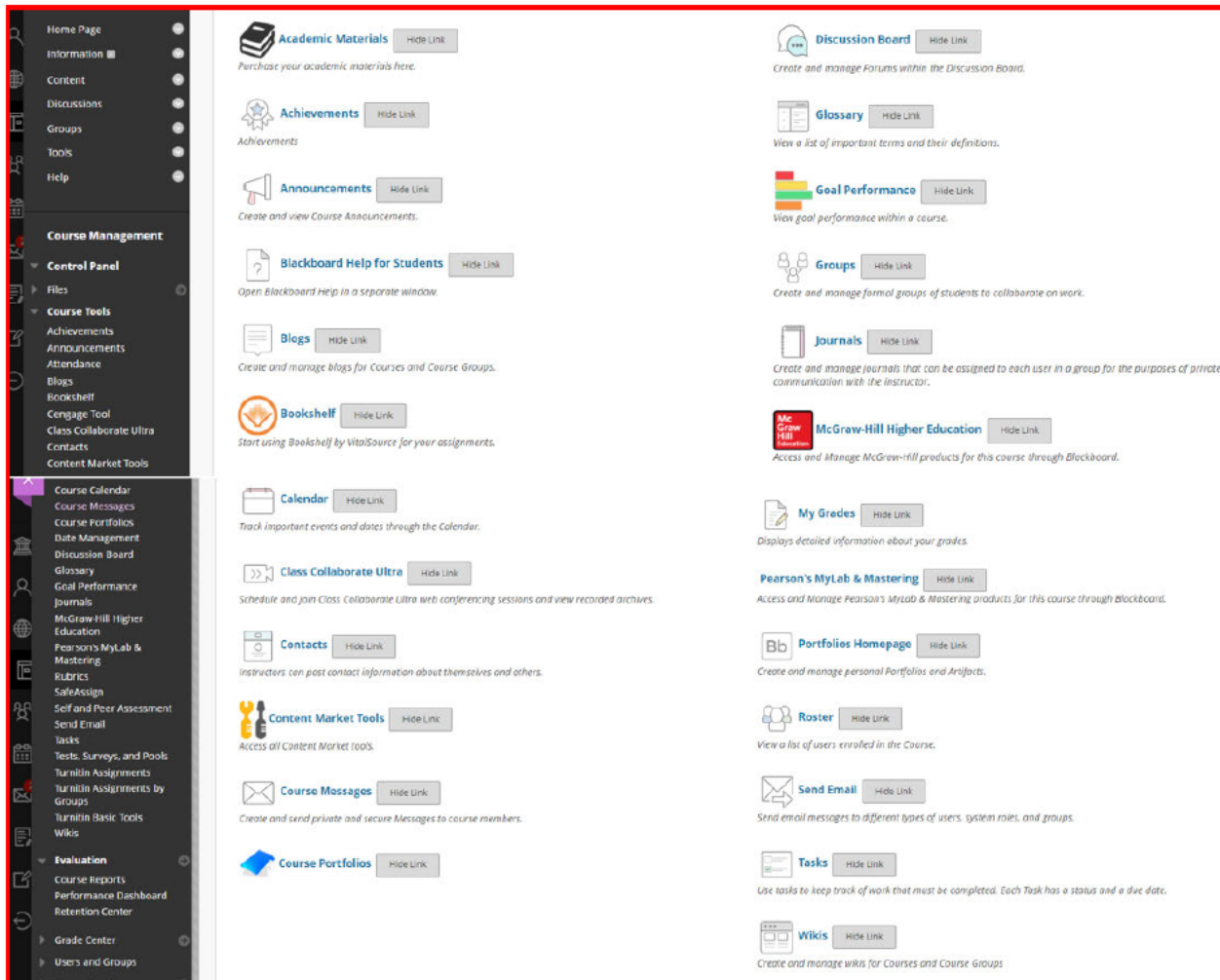


Figure 7.11: Blackboard tools and features for teaching

From the features presented by Figure 7.11 above, the most commonly used by academics were announcements, class collaborate ultra, to create class sessions to teach, discussion board for engagements and tests, and surveys and pools to set tests and examinations.

AC2: *“I feel like it will take me more time to learn other features, I am ok with the ones I am using. Especially that for teaching, most of the time, I am using Microsoft teams. Technology is not really my thing, but I am using it because we just have to. Yes, the convenience and flexibility are there, but still, being always in front of a computer or always on the phone is not my thing. It’s even worse teaching students you I do not see.”*

From the experiences mentioned above, it is evident that academics have different opinions and experiences regarding convenience, flexibility, and benefits of teaching in a digitalised learning environment. Working from the comfort of one's own space, as reported by Mukhathi et al. (2022) fits well with academics' busy schedules. Even if students don't attend, **LP1** and **LP2** highlighted that recordings can always be sent to students, who can then access the content. However, **AC1**, **LP3** and **EE4** find it more convenient to provide detailed comment and feedback when marking offline. Overall, the academics' deliberations reflected a range of experiences and preferences. The convenience, flexibility, customisation options, and ease of communication are seen as positive aspects. However, there are variations in marking preference, with some favouring real-time marking, and limited familiarity with certain features, such as blogs. This suggests a potential need for further training and support to maximise the use of available tools and the option of using a digital learning environment.

When responding to the questions about the convenience of costs involved, as presented in previous themes, time-on-tasks academics expressed being more susceptible to financial strain because the university did not offer them data bundles when academics are employed on a contract basis. These academics only manage to work efficiently and effectively when they are on university premises. There they took advantage of the university Wi-Fi and become disconnected once they left the university. These participants conveyed that they had to buy their own data should they wish to work from home.

EE6: *"It poses a risk to be on campus at to use campus Wi-Fi, as I would have to walk back to my off-campus residence after work. Therefore, I feel compelled to purchase my own data bundles in order to access the learning platform and mark assignments during the night, and on top of that, I am a female to be walking alone at night. It is not safe."* Conversely, all permanently employed academics were provided anytime and night data bundles. Only one participant (**EE4**) complained about a dysfunctional data dongle/router. As a backup, some have home Wi-Fi subscription with either Telkom, Vodacom, MTN, and Rain.

With regard to timetabling, participants all referred to the university's universal lecture timetable and lecture groups for the Faculty of Science and Agriculture. These are presented in Figure 7.12 below:

Lecture Timetable						
Time	Mon	Tues	Wed	Thurs	Fri	
08:00 – 08:45	B	F	D	A	E	
08:55 – 09:40	A	B	G	D	C	
09:50 – 10:35	A	B	E	D	C	
10:45 – 11:30	C	D	A	G	F	
11:40 – 12:25	E	G	F	C	H	
12:35 – 13:20	E	G	F	B	H	
14:00 – 17:00	PRACTICALS					

Lecture Groups (Below the subjects are listed according to the lecture groups).							
Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
BID 111 CLT 111 GLG 100 MNU 100 ZOO 100	ECO 111 ECO 121 PAC 110 PAC 121 PAC 119 PAC 129	CSC 100 ICC 121	AGF 112 MAT 011 STA 111 STA 121 STA 122	AGC 111 AGC 122 GEG 100 PHY 100 PHY 113 PHY 114 PHY 123 PHY 124 AFA 111 AFA 121	AGE 121 BEC 111 BEC 121 BOT 100	AGE 111 BIO 121	AGE 121 practical
AGP 211 AGP 222 ECO 222 GIS 200 MAT 200 MIC 200	AGS 211 AGS 221 AGV 221 CSC 200 ZOO 223	AGC 222 ECO 211 ECO 221 GEG 200 PAC 200 PHY 200 STM 200 ZOO 212 ZOO 222	AGA 211 AGE 221 BCH 223 EDE 211 EDE 221 GLG 200 MAP 200	AGC 221 PAC 224	AGA 221 AGE 211 AGE 222 BCH 211 BCH 212	AGC 211 AGG 221 AGP 223 BOT 200	AGE 213 AGW 211 AGX 221
AGA 323 AGC 311 AGE 316 AGG 311 AGH 312 AGS 321 AGS 323 ALP 322 CSC300 ZOO 316 ZOO 326	AGB 312 AGC 312 AGC 413 AGE 321 AGR 322 BCH 300 MAT 300	AGA 311 AGC 314 AGC 323 AGE 312 AGC 321 AGC 314 AGP 312 AGP 322 AGX 323 GLG 300 MAP 300 MIC 300	AGA 311 AGA 322 AGB 321 AGH 321 AGS 323 AGV 322 AGX 321 PAC 300 GIS 300	AGC 316 AGE 311 AGH 321 AGS 324 AGP 323 AGV 322 AGX 321 ECO 321 ECO 322	AGP 324 AGQ 311 AGS 322 AGS 324 BOT 300 ECO 311 ECO 312 ECO 321 ECO 322	AGC 315 AGV 323 AGX 322	AGE 312 practical

Lecture venues for Agriculture Modules		
Course/Module	Lecture Group	Lecture Venue
AGA 211	D	New Auditorium
AGA 221	F	B16
AGA 311	D	B7
AGA 322	D	B129
AGA 323	A	B129
AGA 415	D	B129
AGA 416	E	B129
AGA 421	A	B7
AGA 425	E	B129
AGB 312	B	Biology Lecture Theatre
AGB 321 (Phase out)	D	Biology Lecture Theatre
AGC 111 (F)	E	New Auditorium
AGC 121 (F) (Phase out)	E	New Auditorium
AGC 122 & AGC122 F	E	New Auditorium
AGC 211 (Phase out)	G	NE 11/12
AGC 221 (Phase out)	E	B112
AGC 222	F	B129
AGC 311	A	B129
AGC 312 (Phase out)	B	B112
AGC 313 / 316	E	B112
AGC 314	C	B7
AGC 315	G	B16
AGC 321 (Phase out)	D	B7
AGC 323	C	B16
AGC 411	F	B112
AGC 412	F	B112 (same time slot as AGC411)
AGC 413	E	B7
AGC414	A	B16

Figure 7.12: Lecture timetable, lecture groups and venues of agriculture module

The participants indicated that, even though their modules were allocated to real-life venues, virtual teaching took place during the allocated times and slots. However, announcements on both LMSs and SMSs are sent at any given time of the day, although speedier via WhatsApp than emails and Blackboard. Likewise, EE4 outlined (see Figure 7.13 below):

9. <u>Where do you use digital learning environment when teaching agricultural sciences modules?</u>		
Answer: In the office and at home (created working space)		
Msimelelo Buyisile Nkohla	216074125	PhD Education- Curriculum Studies
10. <u>When do you use digital learning environment to teach agricultural sciences modules?</u>		
Answer:		
Lecture slots as per the departmental time table is;		
Tuesday – 9 am- 11:00 am (Honours course AGX 502 Communication, leadership and management)		
Tuesday 11:40 am- 13:20 pm (3rd yr AGX 322 Applied agricultural extension and rural development)		
Thursday 10:45 am- 11:30 AGX 322)		
Friday students consultations for AGX 504 (RESEARCH PROJECTS) AND AGX 323 and 506 (SEMINARS)		
Any time of the day when students consult they are attended to not unless I am occupied with other University activities. When I am home, we mostly communicate via WhatsApp,		
The digital learning platforms are used also for administrative duties, research, meetings		
Ph.D. research work		
Community engagement		
(I am not sure of these Msido, if you want me to dwell also on them, if so pls let me know)		

Figure 7.13: EE4 responding to where and when they use digital learning environment to teach agriculture modules

Academics expressed satisfaction with the flexibility of their timetable in allowing them to teach different classes; none complained about not being able to complete content delivery. Lecturers sometimes use the practical slots from 14h00 to 17h00 for online demonstrations should students not be visiting the real-world farms. The convenience and flexibility of online was also outlined on the use of WhatsApp as an instant communication platform, as presented in the previous theme. The group chats for specific modules allow academics to reach a larger audience, also sharing multimedia content and reference material.

EE5: “I sometimes ask students to record voice notes to explain concepts and articulate their understanding in their own words,” **EE5** asserted. Matarirano et al. (2021) emphasise that the act of

recording voice notes solidifies students' understanding by compelling them to engage in critical thinking and organisation of their thoughts, leading to a deeper understanding of the subject matter. Furthermore, voice notes enable students to reflect on their existing knowledge. The use of differentiated digital learning platforms and functions can accommodate diverse learning preferences. Mpungose (2020a) and Mukhathi et al. (2022) support this viewpoint by arguing that such an approach fosters an inclusive and flexible learning environment in that this provides a more inclusive learning environment.

7.2.5 Theme Five: *Social influence*

This theme probes into the concept of social influence, which refers to how social and cultural factors shape the acceptance and use of digital learning in teaching agricultural science modules. It highlights the significance of considering cultural norms, social connection, and other contextual realities that influence academics' involvement and interaction with a digitalised learning environment. According to Xakaza-Kumalo (2017), it is crucial to understand how social and cultural aspects impact individuals' attitudes, behaviours, and decisions regarding the adoption and usage of digital learning platforms. The shared beliefs, values, institutional cultures, location, and social class of the institution influence how its academics view and approach the willingness to engage in various digital platforms, and the importance of considering cultural norms, social relationships, and other contextual factors that may affect students' engagement with digital learning. The construction of this theme was developed using inputs from various sources, including responses gathered from follow-up questions during one-on-one semi-structured interviews and focus-group discussion. Additionally, some questions were derived from lessons observed and documents analysed, including the reflective activity. The questions included:

- *How does age and the era in which one grew up impact academics' utilisation of digital learning environments in teaching agriculture modules?*
- *What institutional cultural factors can either promote or impede the adoption and utilisation of digitalised learning environments?*

- *How has the assistance from colleagues and engagement with students influenced your utilisation of digital technology?*

Before proceeding with the participants' accounts, in order to probe deeper into the experience of social influence, I had to provide a thorough explanation. Critically, I had to help academics understand the classification of operational aspects of higher education institutions (HEIs) within their social and contextual spaces; also, how some institutions are ranked as research intensive, others as comprehensive universities, and still others as universities of technology. Most participants knew only that there are mainstream universities and universities of technology. Only **EE2**, **EE3** and **AC1** had an idea, even though somewhat limited, of the Centre for World University Rankings ([World University Rankings 2023 | Global 2000 List | CWUR](#)) and Times Higher Education World University Rankings (<https://www.timeshighereducation.com/world-university-rankings/2023/world-ranking>).

However, there were other ranking bodies we enlightened each other about that included Quacquarelli Symonds (QS), Academic Ranking of World Universities (ARWU) [also known as Shanghai Ranking], Leiden University ranking, and Webometrics ranking (Fauzi et al., 2020; Vidal & Ferreira, 2020); nevertheless the focus was on the former ranking bodies. This was to enlighten academics on the mandate that their institution had in serving the community, and responding to societal or contextual realities more than focusing primarily on the global rankings. Even after the data generation, I keep on updating academics on any development, the links provided being the latest 2023 rankings.

EE3: *“I know that universities are ranked but haven't given myself time dig the criteria and all the nitty gritty of it. I will perhaps look into it.”*

EE4: *“Zibalulekile na Msido ezinto zezi rankings na for thina kule yethu I university...yho hay hay, zibaluleke ngantoni? Ininzi into esijongene nayo.”* (isiXhosa to English translation: *are these ranking things, Msido, also important for us in our university?... No no, how are they important? We have too*

much to worry about already). Thus, I had to reinforce the literature presented in Chapters Two and Three, which shed light on the outlook of universities and experiences thereof, so that academics could grasp the type of students predominantly enrolled in their historically disadvantaged university, together with the institutional culture. It was crucial to consider that the university is located in an under-resourced community, surrounded by villages, where a majority of students come from working class and impoverished backgrounds. During my visit to neighbouring schools (which was not necessarily part of this study) close to the university campus, I discovered that some students may have had their first exposure to computers upon enrolling in university. This context influenced the experience and use of digital learning environments in teaching agriculture, and possibly other fields of study as well. In such an HEI, digital usage and curriculum, according to Khoza (2021b) are dominated by competency, and social cohesion. The focus is on students over academics, as opposed to a performance-based curriculum that favours academics, prescribed outlook, and professional ranking over students and their background. This shows that casual experiences prevailed; students and society were made the first priority, and their needs catered for. As a result, contextual realities informed the adoption and use of a digital learning environment.

Be that as it may, participants' accounts were:

LP1: *“I think cultural norms and values influenced, and still does, students’ acceptance, and that ultimately affected us as lecturers. Besides teaching using digital platforms as you ask, when we teach about the use of digital tools and techniques, for an example in pig and poultry production that I teach, my students are sometimes resistant to the idea of adopting these tools because their societies are still deeply rooted on traditional farming practices. Even in teaching, the type of students we have are also not very competent in using computers.”*

LP2: *“The preference of physical and oral transmission of knowledge even by colleagues have made it difficult to fully accept the adoption of digital learning in agriculture. For other departments and faculties*

also. The institution is trying, but only if, as it has been said, we had all the facilities and training way before COVID, we would be at a better place now.”

EE1: *“...change can never be something smooth especially if it takes you out of your comfort zone. There is a conservative culture that values traditional teaching, and it still impedes the adoption of digital use. The notion that, this is how we have been doing things successfully, has impeded many developments in our working spaces, and outside. Academics should take lead in order for students to follow. Its bears no fruits if I enforce something that other colleagues pours water on, when talking to their students. we do not have a single voice.”*

EE2: *“Our deputy vice chancellor for teaching and learning have been trying to strengthen and enforce the use of learning management systems, amongst other operation issues, but the resistance from staff has been hindering that. Understandably so, we are a traditional black university with more than 80% of its student and staff component may be coming from disadvantaged schools. It will not be instant.”* Pertaining to the age factor, **EE4** asserted: *“I do not think age is a factor. I am not old myself, and I am crying together with old colleagues, and I am not the only one...as mentioned before, I was assisted by a colleague who took me through blackboard, even though I continued with MS Teams that we have always been using.”*

EE3: *“I am a BBC generation, as you can see. Born before computers, but have been trying to catch up with digital systems used in the field of agriculture particularly in research and/or data analysis, even though I am slow. I do not think my younger are at a better place when it comes to teaching and learning. Yes, when it comes to social media and or other social spaces. So, I don’t think I am disadvantaged because of my age in this regard.”*

The accounts above on age and socialisation factors suggest that, for digital natives, as alluded to by Prensky (2001), the culture and socialisation of their generation in using digital spaces is primarily for

enjoyment and satisfaction. These students grew up being socialised digitally, and hence EE2 mentioned that if students actively participate and show interest in a particular digital learning environment, academics may be motivated to continue using such a tool. Conversely, Sokhulu (2020) deliberated that if students show disinterest or lack of engagement, academics may be less inclined to rely on that particular digital learning environment. Furthermore, the era in which one grew up can influence one's familiarity with general technology use. However, for the purpose of teaching, older and experienced academics saw the significance of LMSs more than young academics, even though all academics shared the same similar challenges for teaching, learning, and assessment. A study by Owan et al. (2021) explored the impact of age and gender on the preparedness of academics to adopt the internet for research in universities. It was reported and concluded that older and more experienced academics showed a higher rate of preparedness to adopt digital tools for educational research purposes.

Both **AC1** and **AC2** shared the same sentiment that, inasmuch as their experiences and preferences as academics differ, some cultures need to be enforced and others unlearned; however, still taking cognisance of the context and of our particular students. The use of a digital learning environment was perceived by **LP4**, **LP6** and **EE5** to have had less to do with cultural and social factors because *“everything happened instantly, and we were not really given a choice. In fact, we did not have a choice. This question will be relevant from 2023 moving forward as it will be someone's choice to teach online or face-to-face, just like WhatsApp, as I mentioned I was not comfortable chatting with students, but I felt like I had no choice.”*

The above accounts of academics not understanding the outlook of their own institution in the global society emerged as of great concern. However, Hou and Jacob (2017) assert that it is not uncommon for academics to have differing views and misunderstandings about world university rankings. Even amongst participants in this study, some had an understanding while others lacked detailed knowledge about how the rankings are formulated. Understandably, this could be aligned with the competence nature of the

curricula in that the institution has academics with knowledge of certain digital learning environment when training their colleagues (Khoza, 2021b). Secondary to that, even training workshops organised on Blackboard LMS which is driven by a performance-based curriculum (prescribed experience), were attended by academics. These personnel needed to know the basics just to upload material and set tests for compliance, before returning to Microsoft Teams, a platform they are familiar with. Pragmatically, that was an experience (customised experience) common amongst academics. I also had a sense that the university's political background and its significance in serving communities may have been the reason that EE4 even doubted the importance of understanding the rankings. These rankings focus primarily on research output in terms of number of publications, citations, industry income, and research funding (Vidal & Ferreira, 2020). Therefore, the historical reputation, locality and zeal for social cohesion may have influenced the institutional culture of resistance in resources that cater for students who come from the deepest, most impoverished communities. In the process, performance could be compromised.

The significance of institutional culture in operational transformation in HEIs, as highlighted mainly by **EE1** and **EE2**, is also reported by Hlatshwayo and Shawa (2020) to influence the manner in which teaching and learning is executed. Hlatshwayo and Shawa (2020) further stress that the social outlook of historically Black universities in curriculum reforms should not be overlooked, especially when compared with historically White institutions. It is understandable why the norm at the historically disadvantaged comprehensive university in question and its academics have socially just, democratic and inclusive experiences that also consider what is pragmatically feasible for both themselves as academics and the students they teach. Similarly, Wilcox (2020) writes about customised and casual experience. This researcher posits that, when examining education policies within the context of a growing reliance on digital technology in teaching, learning, and communication, it is crucial that these policies truly comprehend the impact on social and educational systems. It is also necessary to consider how policies are influenced by personal, local, national, and global factors. Some academics are pragmatic in

customising their experiences to address societal needs (casual experience). Thus cultural factors shape one's attitude and behaviour toward technology adoption. Societal beliefs about traditional farming practices may hinder acceptance of digital tools and techniques in agricultural education (Mtega et al., 2014; Voss et al., 2021).

7.3 Conclusion

In this chapter, the thematic analysis of qualitative data generated from the experiences of academics teaching agriculture modules in a historically disadvantaged university has been presented. The analysis aimed to gain insights into the adoption and use of digital learning environments in an academic context. Five key themes emerged from the data, and key questions, including unplanned follow-up questions that brought codes creating the themes have also been presented. Following the guidelines proposed by Brawn and Clarke, this chapter presents important passages and verbatim utterances or exclamations shared by the participants. The next chapter extends the data presentation and presents findings from statistical analysis of quantitative data collected.

CHAPTER EIGHT

STATISTICAL PRESENTATION AND CONCEPTUALISATION OF QUANTITATIVE DATA

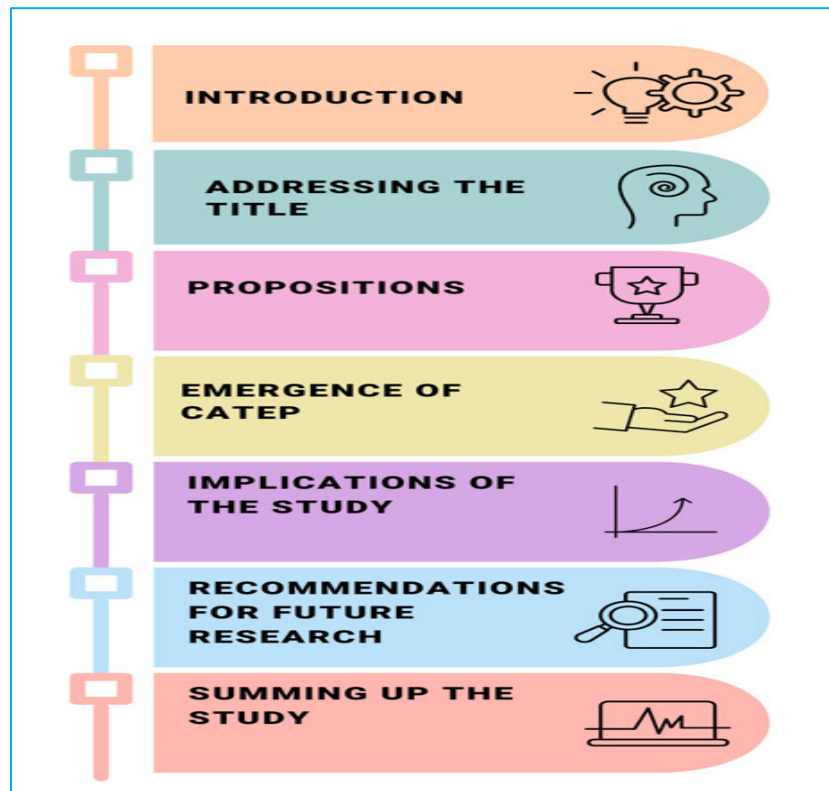


Figure 8.1- The outlook of Chapter 8

8.1 Introduction

In the previous chapter, this study probed into the conceptualisation of the qualitative data that was analysed using thematic analysis to explore the experiences of academics teaching agriculture modules in a historically disadvantaged university. This chapter (Chapter Eight) continues the exploration by conceptualising quantitative data collected through lesson observation. These observations allowed a deeper and broader understanding of the effectiveness and impact of a digital learning environment. Findings are obtained from frequencies of descriptive statistics analysed with SPSS that also provide a triangulated overview of the observed trends, patterns, and relationships within the dataset. Thus, through this chapter, clear and concise summaries of the statistical findings, accompanied by relevant tables, charts, and graphs are provided. After data was collected it was recorded and coded on Microsoft Excel,

after which the data were imported from Excel to IBM SPSS version 28. The process typically involved organising and cleaning the data, using descriptive statistics frequencies to analyse and interpret the output. The following section of the analysis presents the biographical outlook of the participants.

8.2 Biographical Statistics of the Academics

This section aims to provide a comprehensive overview of the data analysis conducted in this study. I found it essential to present the biographical details of participants in order to establish a contextual understanding of academics in this study. This introductory segment sheds light on characteristics and backgrounds of participants such as their gender, age, ethnic group, education level, position at work, department employed, years of university teaching and actual years of using a digital learning environment. By presenting these biographical details, unique experiences and potential influences that academics bring to the data are comprehended. Subsequently, this enhances the interpretation of the statistical results.

8.2.1 Gender of academics

Table 8.1: Gender Distribution of Academics

	<i>Frequency</i>	<i>Percent</i>
<i>Male</i>	9	64.3
<i>Female</i>	5	35.7
<i>Total</i>	14	100.0

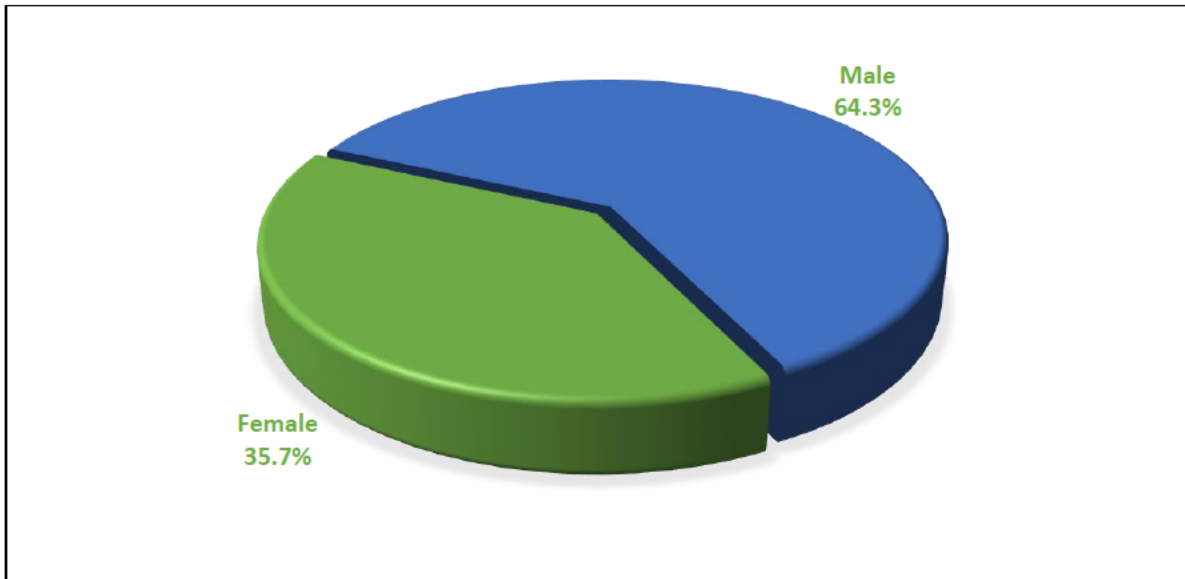


Figure 8.2: Gender distribution of academics

The results of the gender distribution within a sample size of 14 participants indicate a higher representation of male academics, constituting 64.3 % (n = 9) of the total. In contrast, females accounted for 35.7% (n=5) of the sample. Pragmatically, the total size consisted of 9 males and 5 females.

8.2.2 Age of academics

Table 8.2 Age Distribution of Academics

	<i>Frequency</i>	<i>Percent</i>
31-35	9	64.3
36-40	1	7.1
41-45	3	21.4
45-50	1	7.1
<i>Total</i>	14	100

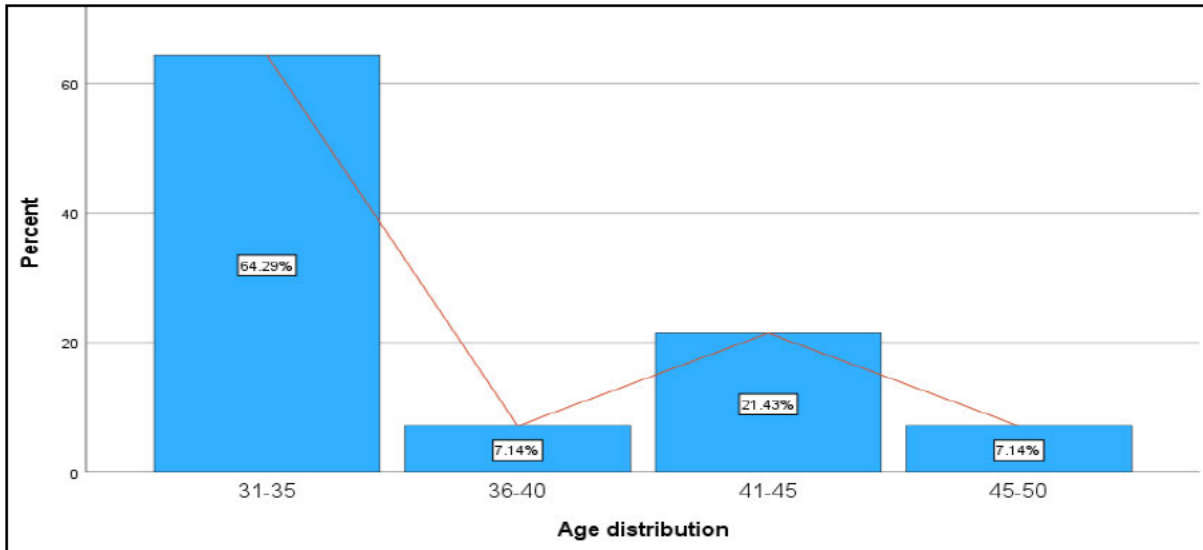


Figure 8.3: Age distribution of academics

Table 8.2 and Figure 8.3 above represent the frequency and percentage distribution of age groups within a sample size of 14 participants. The data provided is divided into four age ranges: 31-35, 36-40, 41-45, and 46-50. The majority of the sample fell into the age range of 31-35, comprising 64.3% (n =9) of the total. The remaining age groups had relatively smaller representations, with 41-45 accounting for 21.4% (n = 3); with both 36-40 and 45-50 each representing 7.1% (n=1) of the sample. These results suggest that participating academics were predominantly in their early to mid-thirties, with smaller proportions in other age groups.

8.2.3 Ethnicity and nationality of academics

Table 8.3: Ethnicity

	<i>Frequency</i>	<i>Percent</i>
<i>Black</i>	13	92.9
<i>White</i>	1	7.1
<i>Total</i>	14	100.0

Table 8.4: Nationality

	<i>Frequency</i>	<i>Percent</i>
<i>South African</i>	9	64.3
<i>Zimbabwean</i>	3	21.4
<i>Nigerian</i>	2	14.3
<i>Total</i>	14	100

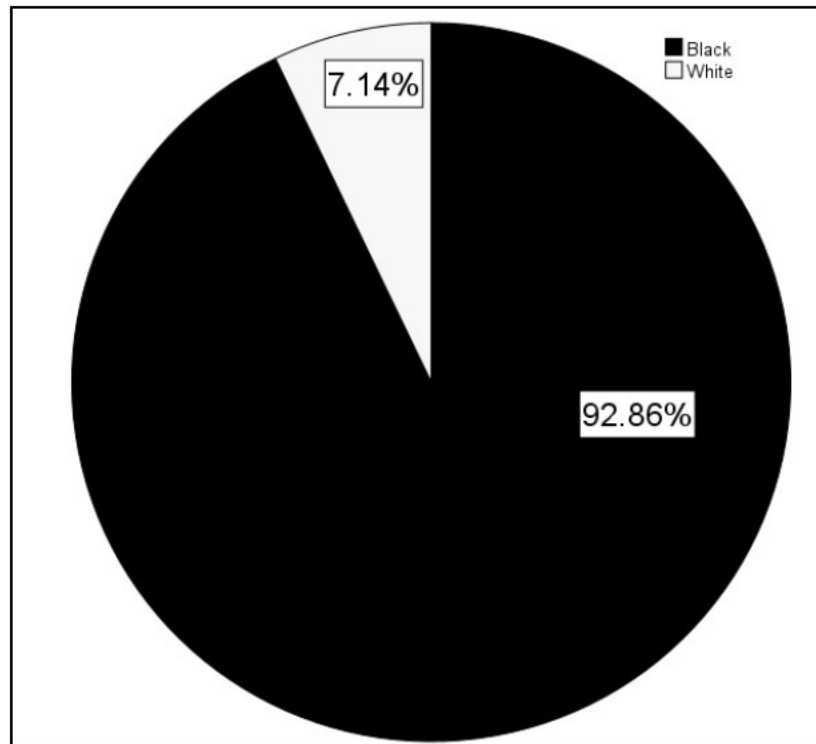


Figure 8.4: Ethnicity of participants

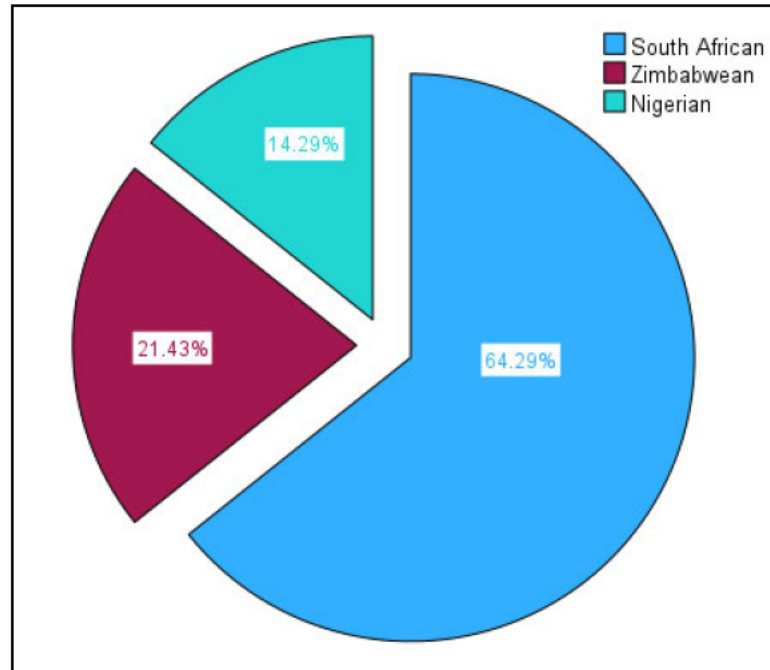


Figure 8.5: Nationality of participants

The above results of a sample population that consisted of 14 participants show racial distribution of the majority, 92.9% ($n=13$) of academics being Black, while the minority 7.1% ($n=1$), were White. Regarding nationality, there were more South Africans, accounting for 64.3 % ($n=9$), followed by Zimbabweans that comprised 21.4 % ($n = 3$); and the smallest group were Nigerians that made up 14.3% ($n = 2$). These findings suggest a significant representation of Black academics in the historically disadvantaged comprehensive university across the three departments. It is crucial to acknowledge that since this sample accurately represented the broad population of academics, these findings reflected the ethnic and national distribution of the entire academics who teach agricultural science modules at the university.

8.2.4 Education levels of academics

Table 8.5: Highest Qualifications of Academics

	<i>Frequency</i>	<i>Percent</i>
<i>Master</i>	6	42.9
<i>Doctoral</i>	8	57.1
<i>Total</i>	14	100.0

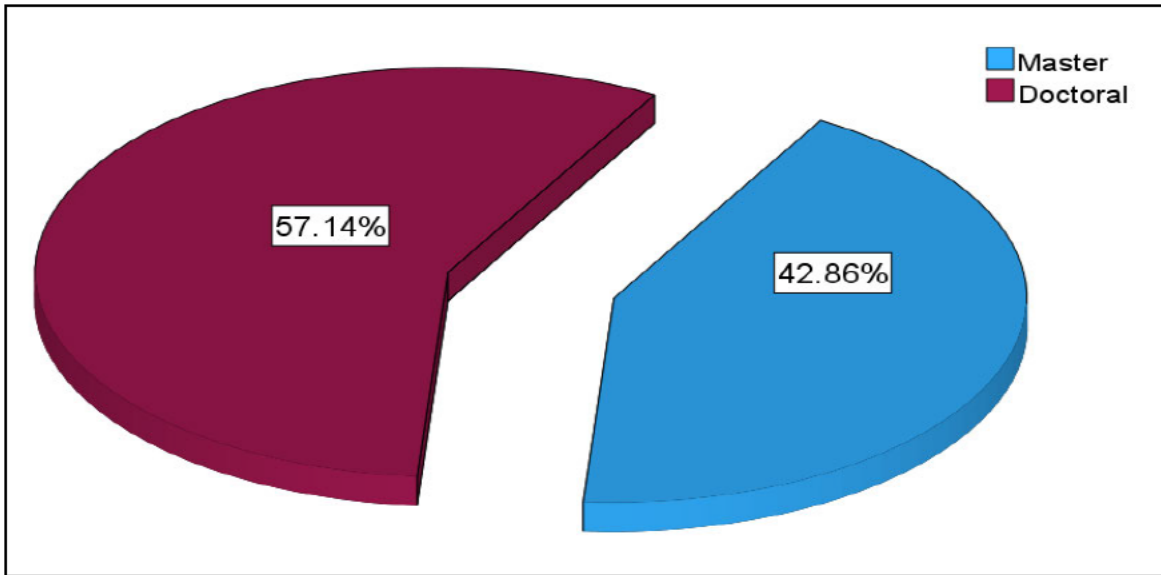


Figure 8.6: Highest qualification of academics

From the total number of 15 academics who participated in this study 8, which accounted for 57.1 %, already had doctoral qualifications; while the remaining 6, 42.9% only had master’s degrees but were all registered for doctoral qualifications.

8.2.5 Job position

Table 8.6: Job Descriptions of Academics

	<i>Frequency</i>	<i>Percent</i>
Time-on-task lecturer	3	21.4
Lecturer	5	35.7
Senior lecturer	3	21.4
Associate professor	2	14.3
Professor	1	7.1
<i>Total</i>	14	100.0

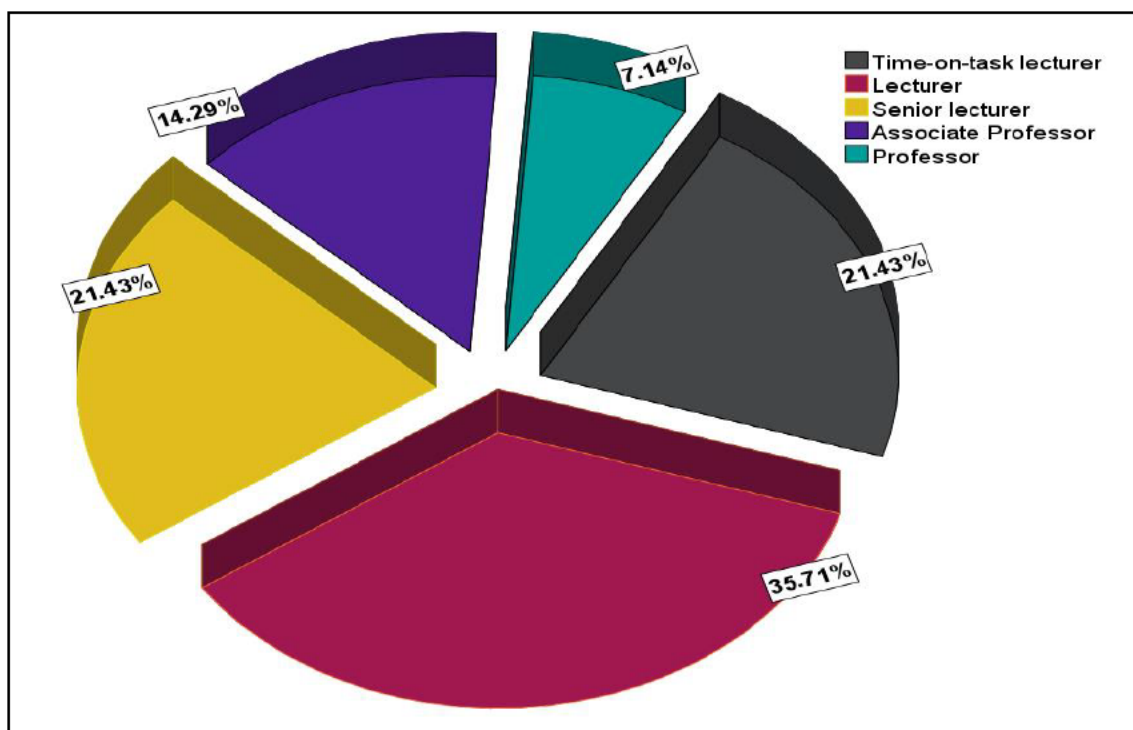


Figure 8.7: Job descriptions of academics

Table 8.6 and Figure 8.7 show frequencies and percentages of job descriptions or levels of the 14 academics who participated in this study. Among the participants, 21.4% (n =3) were time-on-task lecturers, while 37.5% (n=5) held the position of lecturer. Additionally, 21.4% (n=3) were senior lecturers, and 14.3% were associate professors (n= 2). Lastly, 7.1% (n=1) held the highest position of professor. Lecturers held the most common position, and the least common were professorship positions.

8.2.6 Distribution of academics across the three departments

Table 8.6: Academic Departments in which the Academics were Employed

	<i>Frequency</i>	<i>Percent</i>
<i>Livestock and Pasture Science</i>	6	42.9
<i>Agricultural Economics and Extension</i>	6	42.9
<i>Agronomy</i>	2	14.3

<i>Total</i>	14	100
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According to the table, academics who taught in the Department of Livestock and Pasture Science, and those from Agricultural Economics and Extension, constituted 42.3% (n =6) each, and only 14.3 % (n=2) came from the Department of Agronomy.

8.2.7 Years of university teaching

Table 8.7: Years Academics have been Teaching at University Level

	<i>Frequency</i>	<i>Percent</i>
One year and below	1	7.1
2-5	4	28.6
6-10	5	35.7
11-15	1	7.1
16-20	3	21.4
<i>Total</i>	14	100

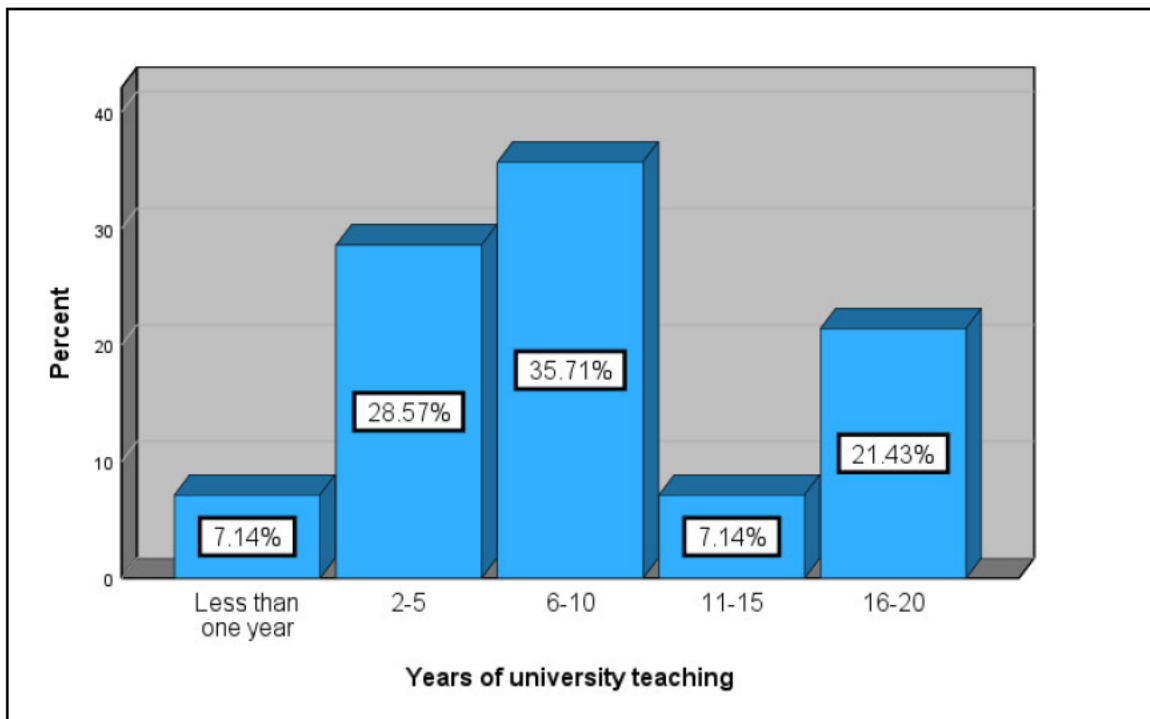


Figure 8.8: Years academics have been teaching at university level

Table 8.2 and Figure 8.8 present frequencies and percentage distributions on the number of years that academics have taught agriculture modules at university level. Some 7.1 % (n=1) had experience of one year or below. Some 28.6% (n=4) of the participants had experience ranging from 2 to 5 years. Furthermore, 35.7 % (n=5) taught from 6 to 10 years. Experience spanning from 11 to 15 years was only acquired by 7.1% (n=1) of the participants, while 21.4% (n=3) had experience ranging from 16 to 20 years. The majority of academics therefore had experience ranging from 6 to 10 years.

8.2.8 Years of teaching using digital learning environment

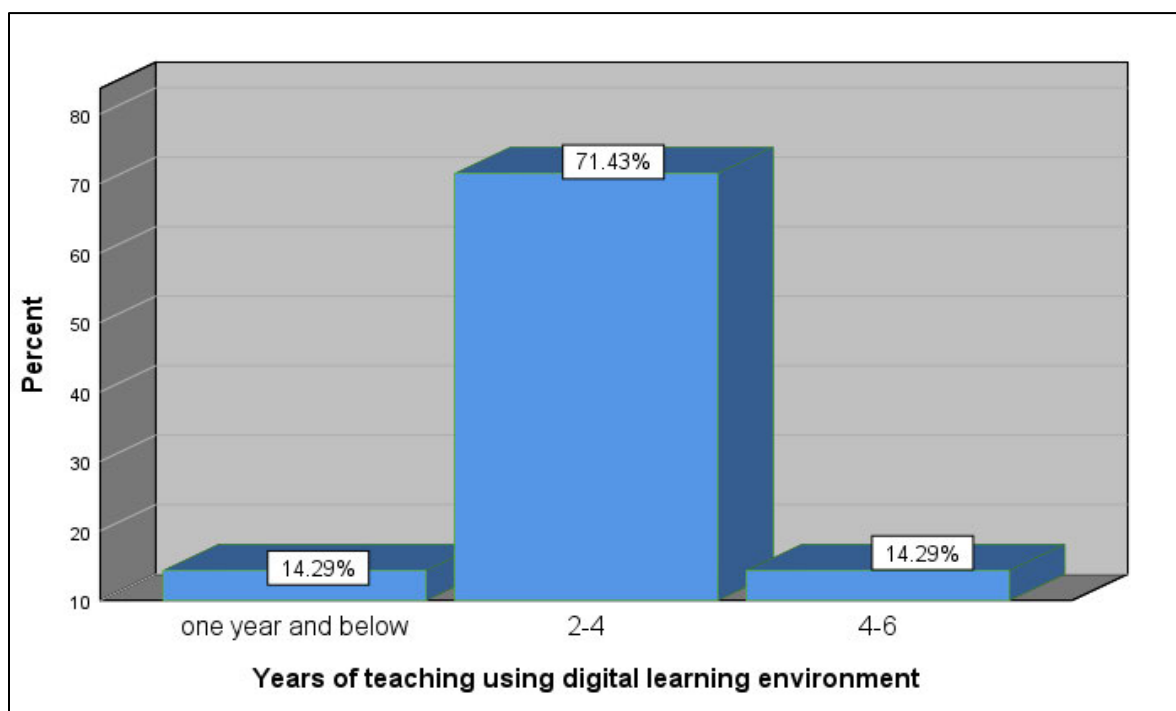


Figure 8.9: Years academics have been using digital learning environment when teaching

Based on Figure 8.8 above, 14.3% of the academics had one year of experience or below. The majority of the participants constituted 71.4% with 2 to 4 years of experience. The remaining 14.3% had experience of using a digital learning environment ranging from 4 to 6 years. None of the participants had experience of over 6 years of using a digital learning environment to facilitate teaching and learning of agriculture modules. This suggests that the majority of academics may only have considered using a digital learning environment during the time of COVID-19.

8.3 Descriptive Statistical Results of Lesson Presentation Observations

Hussey and Hussey (1997) suggest that an initial step in quantitative data analysis entails examining the frequency distribution of each variable. Such analysis will determine the numerical value of the overall number of responses for the variable investigated. Thus, frequency distribution was used throughout the analysis of the lesson evaluation tools. The complete set of lesson evaluation results is presented, accompanied by the corresponding numerical value used in the statistical analysis. The data has been described in alignment with the way in which academics plan and execute their teaching of agriculture modules using digital platforms.

8.3.1 Mastery of subject matter

Table 8.8: Frequencies: Mastery of Subject Matter

	<i>Frequency</i>	<i>Percent</i>
<i>Very good</i>	2	14.3
<i>Outstanding</i>	12	85.7
<i>Total</i>	14	100.0

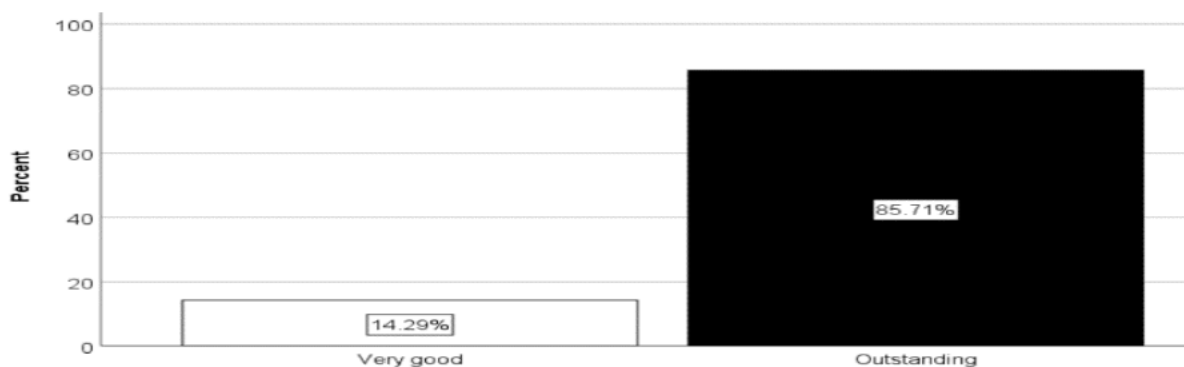


Figure 8.10 Percentages: Mastery of subject matter

The frequency distribution assessing the mastery of subject matter shows that of the 14 observations, 2 academics were rated 'very good', which accounts for 14.3%. However, 12 academics were rated as having an 'outstanding mastery', which accounts for 85.7%. These findings suggest that the majority of

academics observed demonstrated an exceptional mastery of agriculture subject matter, with a significant portion being rated as outstanding.

8.3.2 The academic/instructor/facilitator follows module outcomes and module description

Table 8.9: Frequencies: Adhering to Module Outcomes and Module Description

	<i>Frequency</i>	<i>Percent</i>
<i>Very good</i>	5	35.7
<i>Outstanding</i>	9	64.3
<i>Total</i>	14	100.0

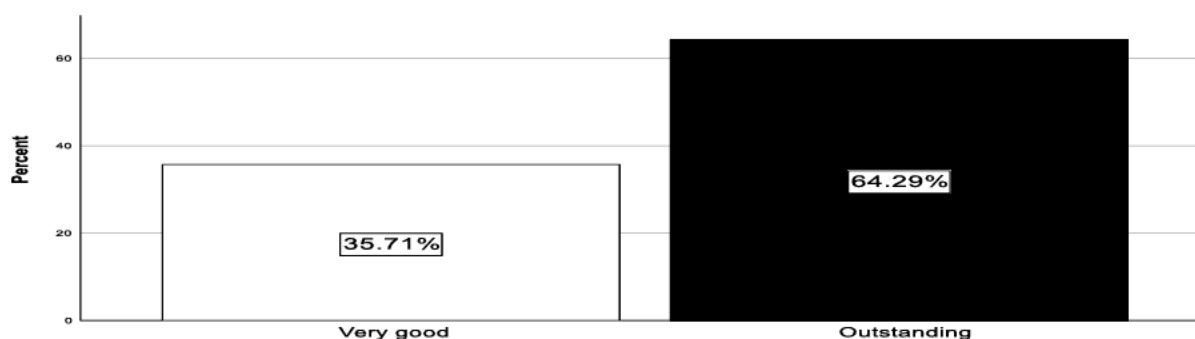


Figure 8.11: Percentages: Adhering to module outcomes and module description

The evaluation results when academics follow module outcomes and description show that 35.7% (n=5) of academics were rated as having an outstanding level of adherence to module outcome and description; while 64.3% (n=9) were rated as very good. These results suggest that there is room for improvement for academics teaching agriculture modules in terms of aligning their teaching and academic activities with the intended outcomes and module description.

8.3.3 Class objectives conveyed clearly

Table 8.10: Frequencies: Conveying of Objectives

	<i>Frequency</i>	<i>Percent</i>
<i>Very good</i>	2	14.3
<i>Outstanding</i>	12	85.7
<i>Total</i>	14	100.0

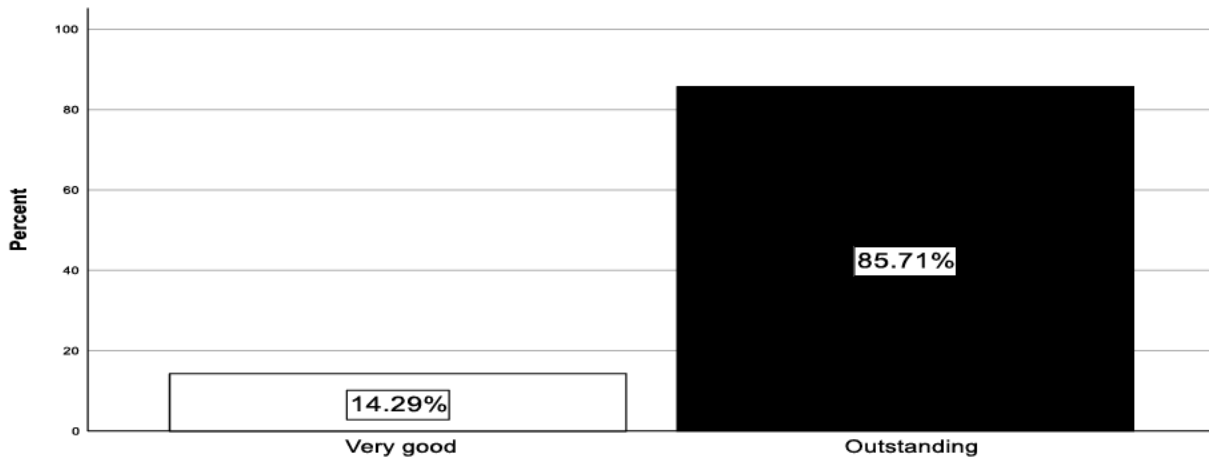


Figure 8.12 Percentages: Conveying of objectives

During lesson delivery, 14.3% (n=2) of academics conveyed class objectives very well. Meanwhile, 85.7% (n=12) were rated as outstanding. The majority of academics were highly effective in communicating the objectives of the class, and were clear and concise, ensuring that the students had a solid understanding of what was expected of them.

8.3.4 Module syllabus including course description, course schedule, contact information, and evaluation procedure is communicated to students

Table 8.11: Frequencies: Conveying of Objectives

	<i>Frequency</i>	<i>Percent</i>
<i>Very good</i>	10	71.4
<i>Outstanding</i>	4	28.6
<i>Total</i>	14	100.0

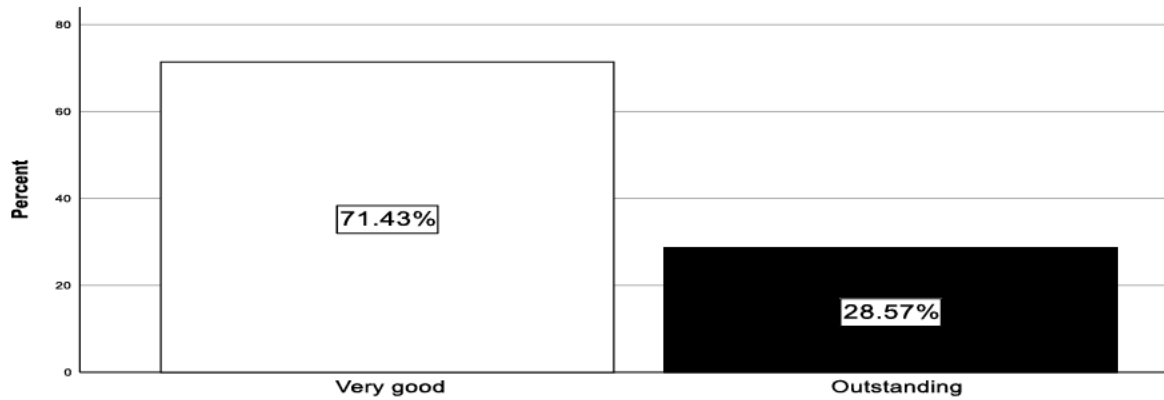


Figure 8.13 Percentages: Communicating module syllabus with students

Findings show that 71.4% (n=10) of academics were rated ‘very good’ in communicating the module syllabi, including course, course outline, contact information, and assessment criteria. Additionally, 28.6% (n=4) were rated as outstanding. This indicates that communicating using digital leaning environment is highly efficient and effective. Module outlines and contact information were well-organised and easily accessible to the students.

8.3.5 Organisation and design of lecture: lecture is easy to navigate

Table 8.12: Frequencies: Organisation and Design of Lecture

	<i>Frequency</i>	<i>Percent</i>
<i>Very good</i>	7	50.0
<i>Outstanding</i>	7	50.0
<i>Total</i>	14	100.0

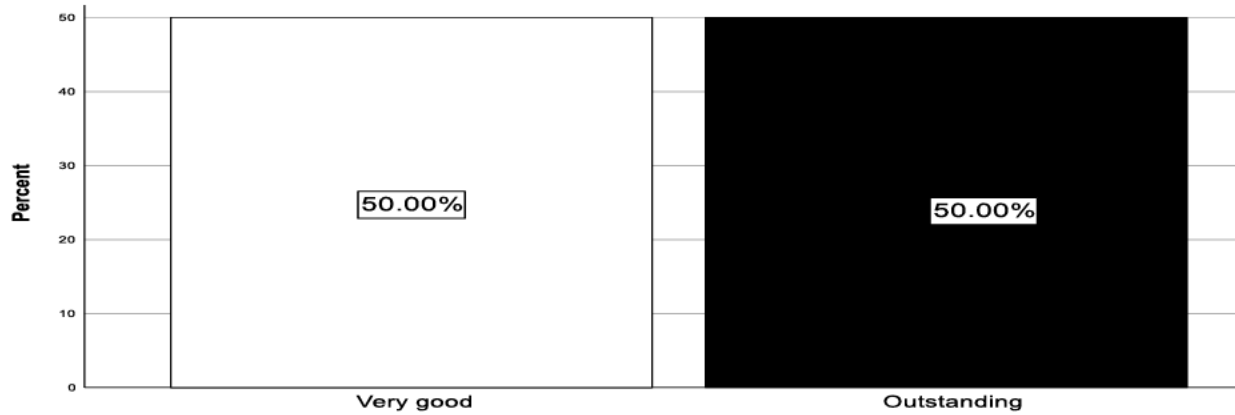


Figure 8.14: Percentages: Organisation and design of lecture

The results shown above indicate that 50% (n=7) of the academics were rated for the organisation and design of lectures very good, while the other 50% were rated outstanding. This suggests that lecture sessions were created and organised well and in a manner that was easy to navigate in terms of joining classes and engaging on the discussion boards. It was evident that other students joined using their portable phones through provided links and apps. The organisation of lectures helped students easily to follow the content and flow of information. The design incorporated visual aids, such as slides, and handouts, that enhanced understanding and engagements. Thus, overall, the sessions were designed and presented logically and coherently.

8.3.6 Curriculum and instruction: the use of a variety of technology tools to foster interaction (i.e., learning modules, discussion board, course mail, announcements, etc.)

Table 8.13: Frequencies: Use of technology for curriculum and instruction

	<i>Frequency</i>	<i>Percent</i>
<i>Satisfactory</i>	2	14.3
<i>Very good</i>	8	57.1
<i>Outstanding</i>	4	28.6
<i>Total</i>	14	100.0

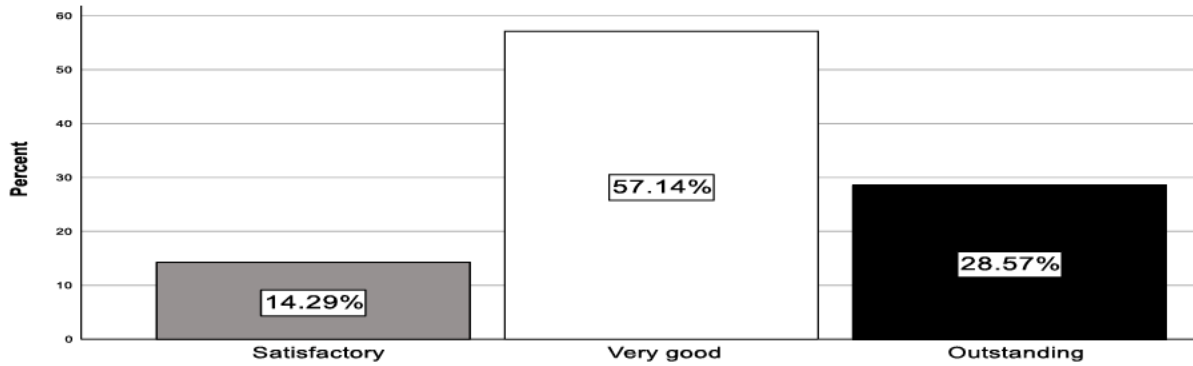


Figure 8.15: Percentages: Use of technology for curriculum and instruction

The results presented above show that 57.1% of academics, on the use of a variety of technology tools in curriculum and instruction, were rated as very good. Additionally, 28.6% (n=4) were outstanding, while 14.3% (n=2) were rated satisfactory. None were marginal and unsatisfactory. This implies that the use of various tools was mostly above average, with more academics performing effectively. The use of tools such as LMSs, SMSs, discussion boards, emails, and announcements facilitated instruction and engagement within the modules observed.

8.3.7 There is communication with an individual student, consistently, effectively, and in a timely manner in the form of emails, chats, or weekly discussions

Table 8.14: Frequencies: Communication with an Individual Student

	<i>Frequency</i>	<i>Percent</i>
<i>Marginal</i>	6	42.9
<i>Satisfactory</i>	7	50.0
<i>Very good</i>	1	7.1
<i>Total</i>	14	100.0

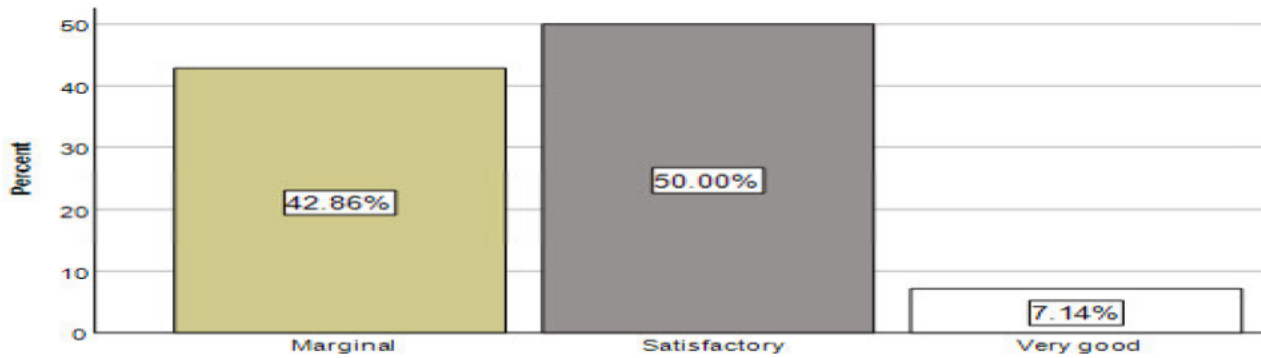


Figure 8.16: Percentages: Communication with an individual student

The frequencies and percentages presented above show data observed from 14 academics regarding the communication with individual students when teaching using digital learning environments. At a marginal level, 42.9% (n=6) were rated, and 50% (n=7) of academics were rated as satisfactory. Meanwhile, only 7.1% of the academic were rated as very good. These results suggest that the individual communication between academics and students is not excellently achieved. The communication was above average; however, it was not very good. This further suggests that academics' experiences ought to be improved in terms of how they engage with individual students when teaching digitally.

8.3.8 Classroom participation and engagement: Students are encouraged to engage in the class, log-in frequently and participate with other students

Table 8.15: Frequencies: Classroom Participation and Engagement

	<i>Frequency</i>	<i>Percent</i>
<i>Marginal</i>	5	35.7
<i>Satisfactory</i>	6	42.9
<i>Very good</i>	3	21.4
<i>Total</i>	14	100.0

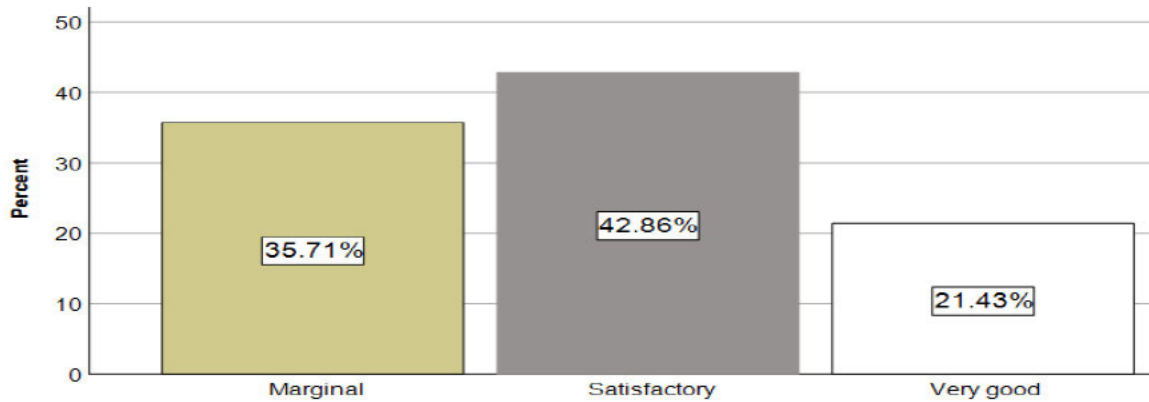


Figure 8.17: Percentages: Classroom participation and engagement

In terms of encouraging student participation and engagement, together with encouraging students frequently to log in during virtual class sessions, 35.7% (n=5) were rated marginal, and only 21.4% (n=3) were rated very good. The majority of the academics (42.9%) were satisfactory in encouraging the students during teaching, and even before teaching. These findings suggest a positive level of encouragement and engagement; however, academics' experiences ought to encourage students even more.

8.3.9 Clarity and quality of assignment and assessment tasks

Table 8.16: Frequencies: Clarity and Quality of Assessment Tasks

	<i>Frequency</i>	<i>Percent</i>
<i>Satisfactory</i>	1	7.1
<i>Very good</i>	4	28.6
<i>Outstanding</i>	9	64.3
<i>Total</i>	14	100.0

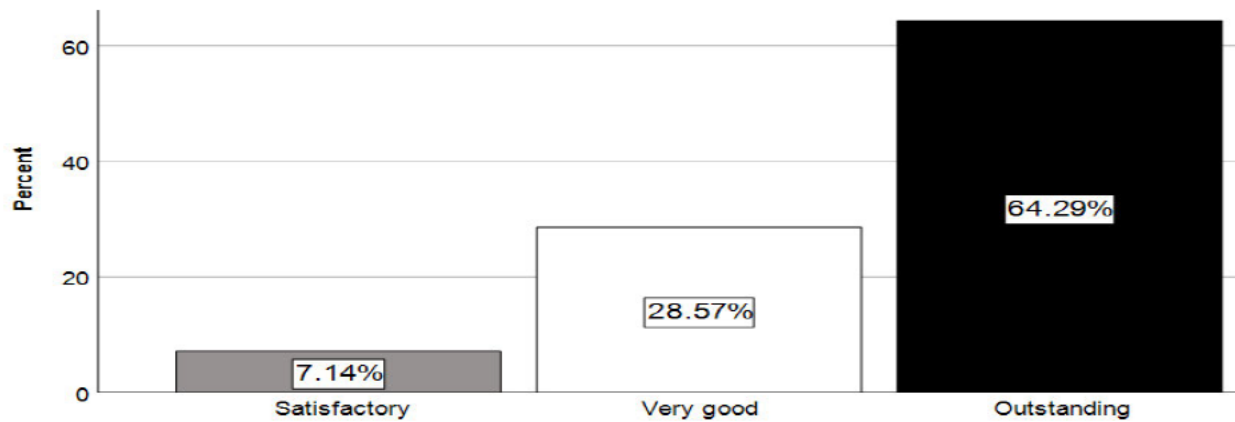


Figure 8.18: Percentages: Clarity and quality of assessment tasks

Regarding clarity and quality of assessment tasks given by academics to students and explaining them, 64.3% (n=9) of academics were outstanding, and 28.6% (n=4) were rated as very good, while only 1 academic (7.1%) was satisfactory. These findings indicate that academics' experiences are satisfying, and the tasks provided were generally well-designed, clear, and meet the expected standards according to the learning outcomes of the modules.

8.3.10 Technical issues – The course links and other technical aspects are in working order, and the instructor makes use of multimedia links (music, video, etc.) when possible

Table 8.17: Frequencies: Technical issues – The course links and other technical aspects are in working order

	<i>Frequency</i>	<i>Percent</i>
<i>Satisfactory</i>	1	7.1
<i>Very good</i>	8	57.1
<i>Outstanding</i>	5	35.7
<i>Total</i>	14	100.0

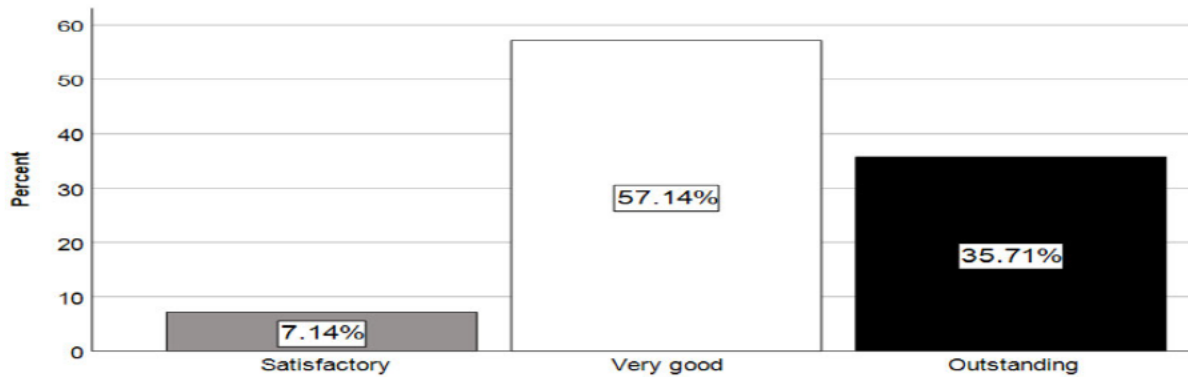


Figure 8.19: Percentages: Technical issues – The course links and other technical aspects are in working order

The frequencies and levels of satisfaction presented by the above frequency table and bar graph, respectively, show that 57.1 % (n=8) of academics' lessons had very good technicalities in terms of active links for classes and online learning. Of the 14 academics, 35.7% (n=5) were outstanding while only 1 (7.1%) was just satisfactory. Therefore, most of the links and technical elements of the courses were in working order – students can access the necessary resources without any major issues.

8.3.11 Formative assessments tied to learning goals to check student understanding and provide appropriate feedback

Table 8.18: Frequencies: Formative Assessments tied to Learning Goals

	<i>Frequency</i>	<i>Percent</i>
<i>Satisfactory</i>	1	7.1
<i>Very good</i>	11	78.6
<i>Outstanding</i>	2	14.3
<i>Total</i>	14	100.0

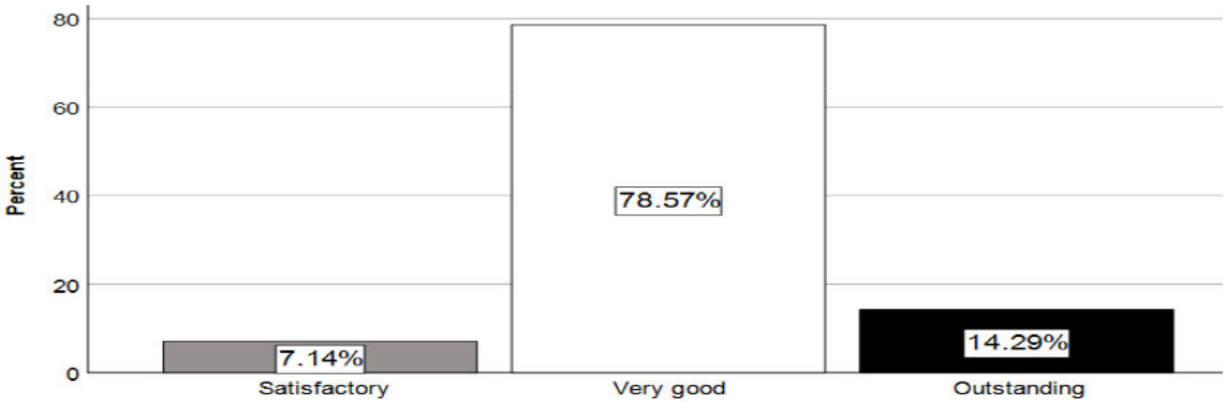


Figure 8.20: Percentages: Formative assessments tied to learning goals

During classes, it is shown by the frequencies and percentages that 78.6% of the academics were very good at formative assessment in checking student understanding; they provided developing feedback to students. The formative assessment, mainly through didactic question-and-answer methods, quizzes, and debates helped academics track students' progress and identify areas of improvement. Furthermore, 14.3% (n=2) outstandingly tied formative assessments with learning goals when teaching digitally. Only a small percentage of academics (7.1%) were just satisfactory, indicating that there may be some areas of refinement needed in the implementation of these assessments.

8.3.12 Pause for students to think and respond

Table 8.19: Frequencies: Pause for Students to Think and Respond

	<i>Frequency</i>	<i>Percent</i>
<i>Unsatisfactory</i>	1	7.1
<i>Marginal</i>	4	28.6
<i>Satisfactory</i>	7	50.0
<i>Very good</i>	2	14.3
<i>Total</i>	14	100.0

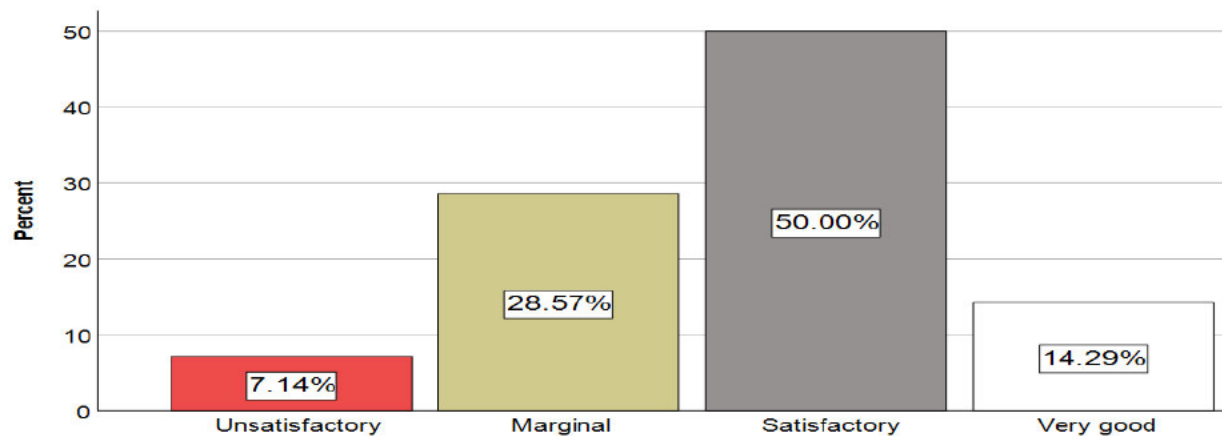


Figure 8.21: Percentages: Pause for students to think and respond

The above frequency results show that 7.1% (n=1) of the participants did not allow adequate time for students to process and think in order to respond to questions or even make meaning of what was taught, asking questions accordingly. Additionally, 28.6% (n=4) were marginal in pausing for students to think and respond, which was not consistently implemented. On the other hand, 50% (n=7) were reasonably comfortable with allowing time and opportunity for thinking and responding in class. A smaller percentage, 14.3% demonstrated above-average professionalism in ensuring critical thinking and engaging in class. Teaching styles and class dynamics such as level of comfort, and complexity of the topics contributed to the significant differences for academics to allow time for students to think, reflect, and respond. Other students joined late; and there might be less time available to cover all the planned lessons.

8.3.13 Lesson is adaptive to ability

Table 8.20: Frequencies: Lesson is Adaptive to Ability

	<i>Freq</i>	
<i>8.20:</i>	<i>Frequency</i>	<i>Percent</i>
<i>Satisfactory</i>	2	14.3
<i>Very good</i>	11	78.6
<i>Outstanding</i>	1	7.1
<i>Total</i>	14	100.0

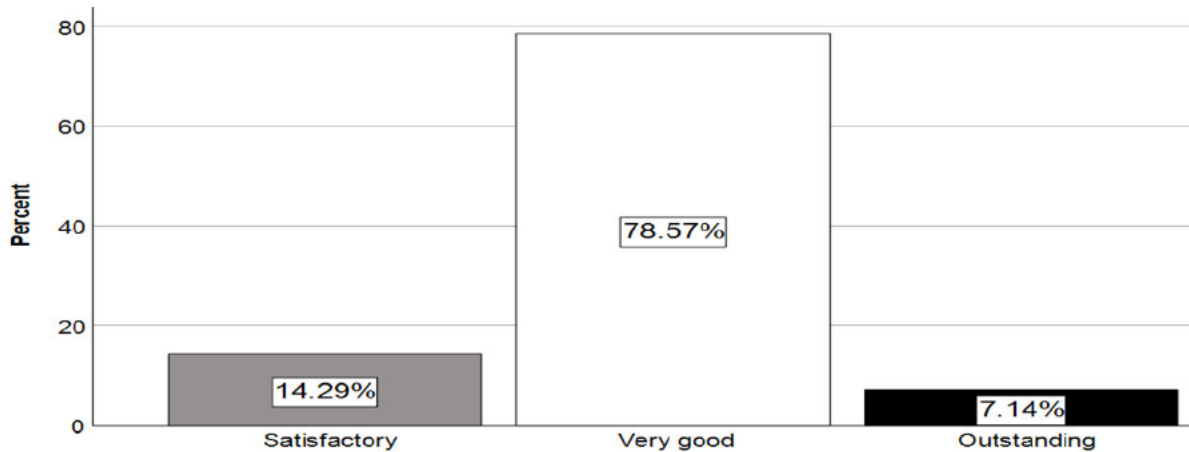


Figure 8.22: Percentages: Lesson is adaptive to ability

The frequencies presented above show that there is a very good frequency (11) of academics amounting to 78.6% whose lessons were adaptive and in which they were comfortable using the digital platforms. Also, lessons were adaptive to students' abilities. This finding suggests that the lessons provided accommodated and catered for the varying abilities and needs of both academics and students. About 7.1% (n=1) of the lessons were outstanding; and 14.3 (n=2) were rated satisfactory or averagely adaptive.

8.3.14 Evidence of use/incorporation of social media sites in the lesson

Table 8.21: Frequencies: Evidence of Use/Incorporation of Social Media Sites in the Lesson

	<i>Frequency</i>	<i>Percent</i>
<i>Satisfactory</i>	2	14.3
<i>Very good</i>	8	57.1
<i>Outstanding</i>	4	28.6
<i>Total</i>	14	100.0

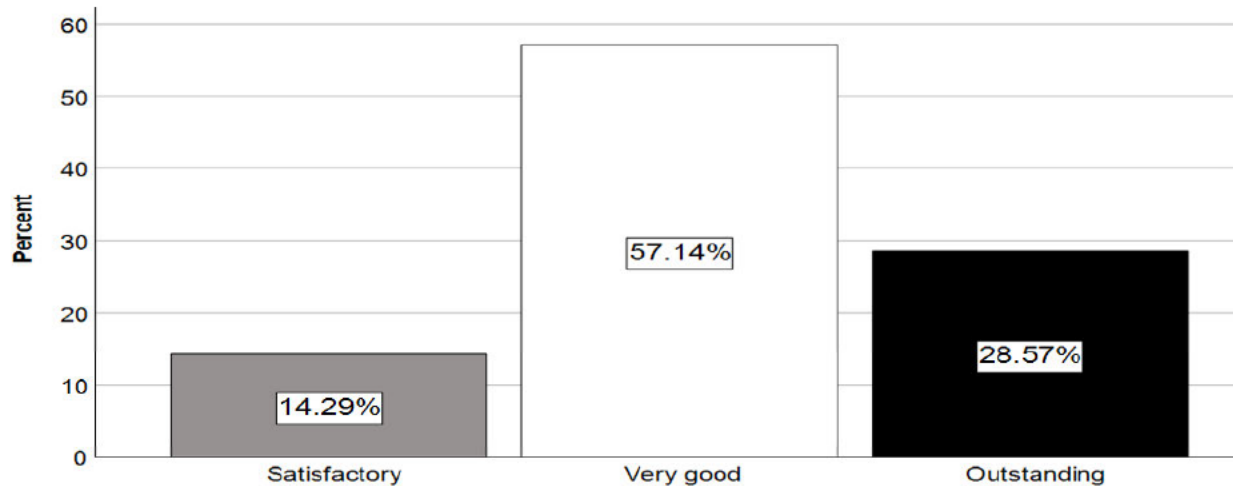


Figure 8.23: Percentages: Evidence of use/incorporation of social media sites in the lesson

Based on the findings presented by the frequency table and bar graph above, the majority (57.1%) of academics demonstrated above average ability in incorporating social media sites to benefit their students' learning experiences in their classes. Moreover, 28.6% (n=4) were exceptional in facilitating communication, collaboration, and engagement through SMSs for their lessons. A small percentage (14.3%) of academics (n=2) demonstrated average evidence of utilising social media sites that was below full potential. The latter was linked to academics' experiences in using SMSs to their fullest ability for teaching purposes. However, all participants were rated positively regarding the use of SMSs.

8.3.15 The instructor provides relevant resources to enhance quality of online course delivery

Table 8.22: Frequencies: Provision of Relevant Resources to Enhance Quality of Online Course delivery

	<i>Frequency</i>	<i>Percent</i>
<i>Marginal</i>	1	7.1
<i>Satisfactory</i>	1	7.1
<i>Very good</i>	2	14.3
<i>Outstanding</i>	10	71.4
<i>Total</i>	14	100.0

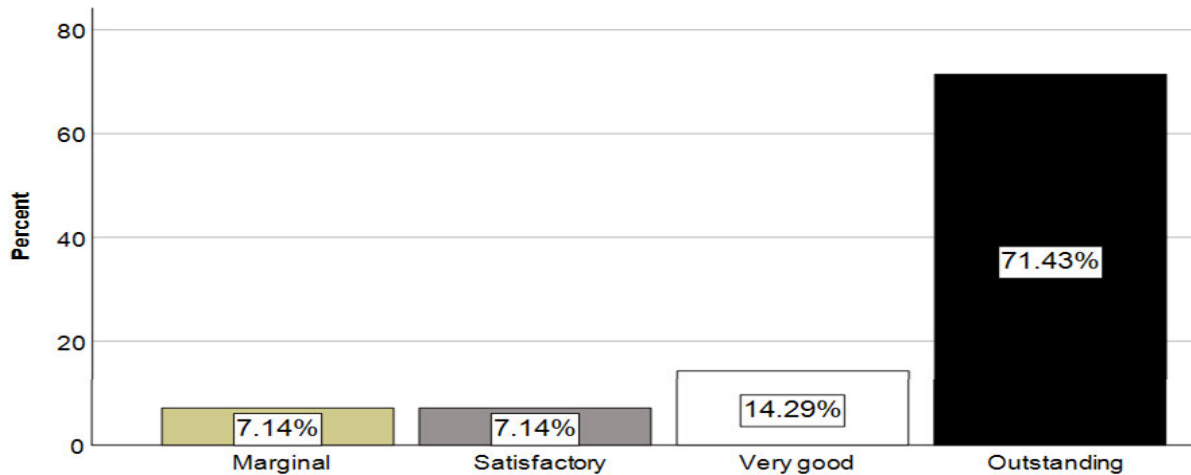


Figure 8.24: Percentages: Provision of relevant resources to enhance quality of online course delivery

From the observed lessons, the above data emanated. The majority (71.4%) of academics' provision of relevant resources was outstanding in providing resources to support teaching and learning of agricultural science modules. Resources provided by the 10 academics were also extensive, current, and updated. A modest percentage of 14.3% (n=2) were good as some of their resources were outdated but contributed comprehensively in enriching the teaching and learning experiences. A small percentage (7.1%) of academics were marginal and did not sufficiently provide the latest resources for the lessons. Similarly, another 7% (n=1) of the academics were rated average/satisfactory and provided average resources for the lesson observed. These results imply that academics' efforts in providing resources to enhance their quality of online delivery are generally well-regarded. However, it is important to note that the less outstanding academics must make necessary improvements better to meet the needs and expectations of the curriculum and students of the digital era.

8.3.16 The instructor creates an atmosphere for students to communicate with him/her at any given moment during the lesson should the need arise.

Table 8.23: Frequencies: Ending the lesson in a Planned Manner Frequencies: The Instructor Creates an Atmosphere for Students to Communicate with him/her at any given Moment during the Lesson

	<i>Frequency</i>	<i>Percent</i>
<i>Marginal</i>	3	21.4
<i>Satisfactory</i>	7	50.0
<i>Very good</i>	3	21.4
<i>Outstanding</i>	1	7.1
<i>Total</i>	14	100.0

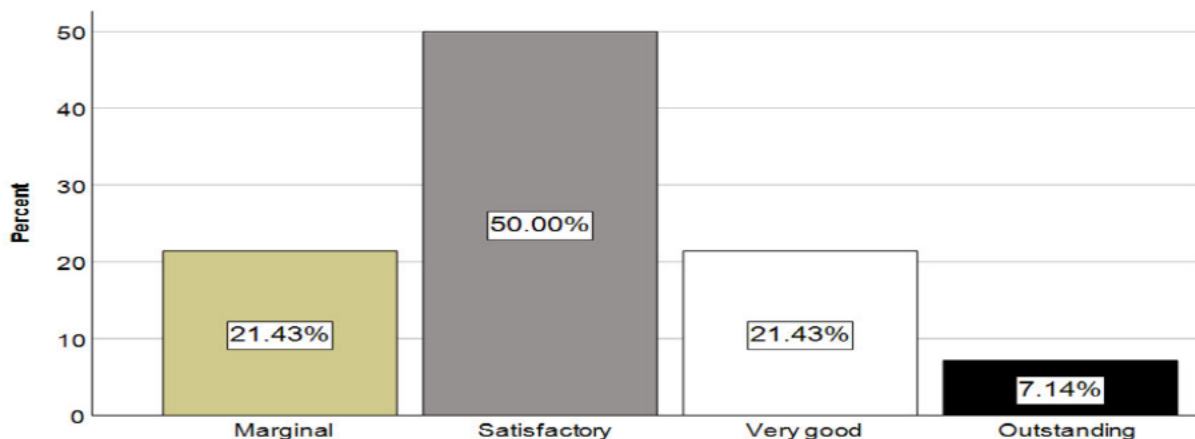


Figure 8.25: Percentages: The instructor creates an atmosphere for students to communicate with him/her at any given moment during the lesson

The data presented above indicate academics' abilities to create a positive atmosphere that allows students to interject at any given moment during the lesson. From the lessons observed, 7.1 % (n=1) showed outstanding abilities as the students continuously positively interjected during the lesson. The academic highly appreciated and consistently encouraged the check-ins during the session. Similarly, another 21% (n=3) of the academics' efforts were very good; academics were effective multidirectional communicators of knowledge. However, 50% of the academics (n=7) demonstrated average ability when students interjected. Primarily, their reaction was linked to the rush against time, and to connectivity challenges. Furthermore, another significant proportion (21.4% (n=3)) of academics' efforts were rated marginal;

students were not as active as they should have been, and did not communicate when they were supposed to.

8.3.17 Lesson ends in a planned manner

Table 8.24: Frequencies: Ending the lesson in a Planned Manner

	<i>Frequency</i>	<i>Percent</i>
<i>Marginal</i>	1	7.1
<i>Satisfactory</i>	4	28.6
<i>Very good</i>	8	57.1
<i>Outstanding</i>	1	7.1
<i>Total</i>	14	100.0

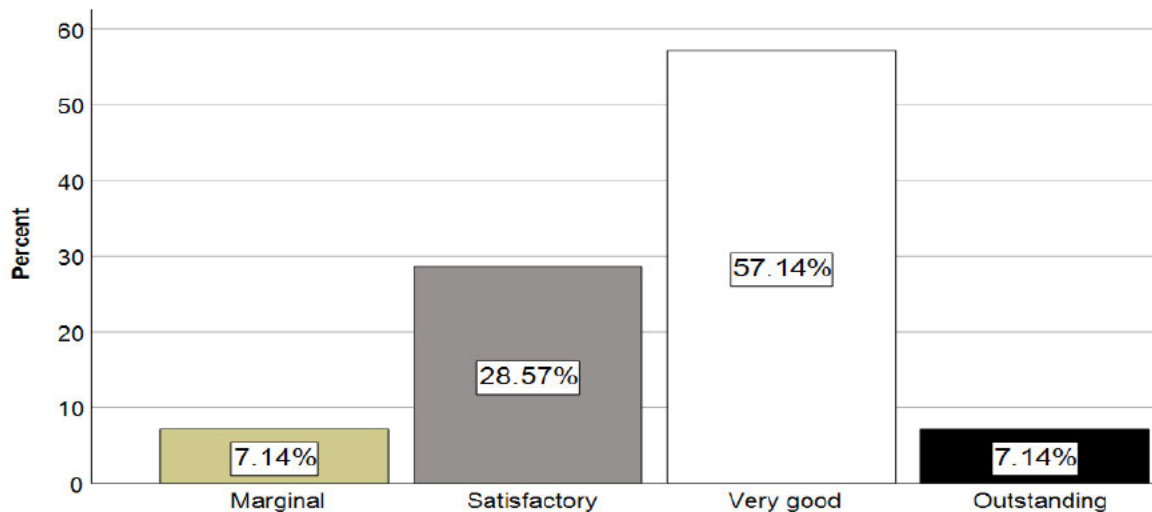


Figure 8.26: Percentages: Ending the lesson in a planned manner

Regarding the way the observed lessons ended, one lesson (7.1%) was marginal for the planned ending of the lesson. The lesson did not entirely end the way that was anticipated. Similarly, 28.6 % (n=4) of the lesson conclusions were satisfactory; however, they could have a more intentional and purposeful conclusion should academics' experiences improve. Electricity power cuts, network Wi-Fi connectivity, and technical challenges such as audio and visual settings or glitches contributed to the unplanned ending of classes. Furthermore, classroom discussions involved complex concepts. Such contributed to more time

having to be spent ensuring that students understood the concepts before moving to next topics. Nevertheless, the majority of lessons (57.1%) had very good endings. Only 7.1% had an outstanding conclusion, in which the academics skilfully wrapped up the lessons, leaving students with a clear understanding of the key concepts and a sense of readiness for subsequent learning. These findings suggest that there are improvements needed by academics in creating a more structured consolidation of lessons, thus ensuring smoother transition to the next topics. However, load shedding power cuts and Wi-Fi connectivity were sometimes at fault, slowing lessons down.

8.3.18 Instructor critically reflecting on their teaching processes and their own learning

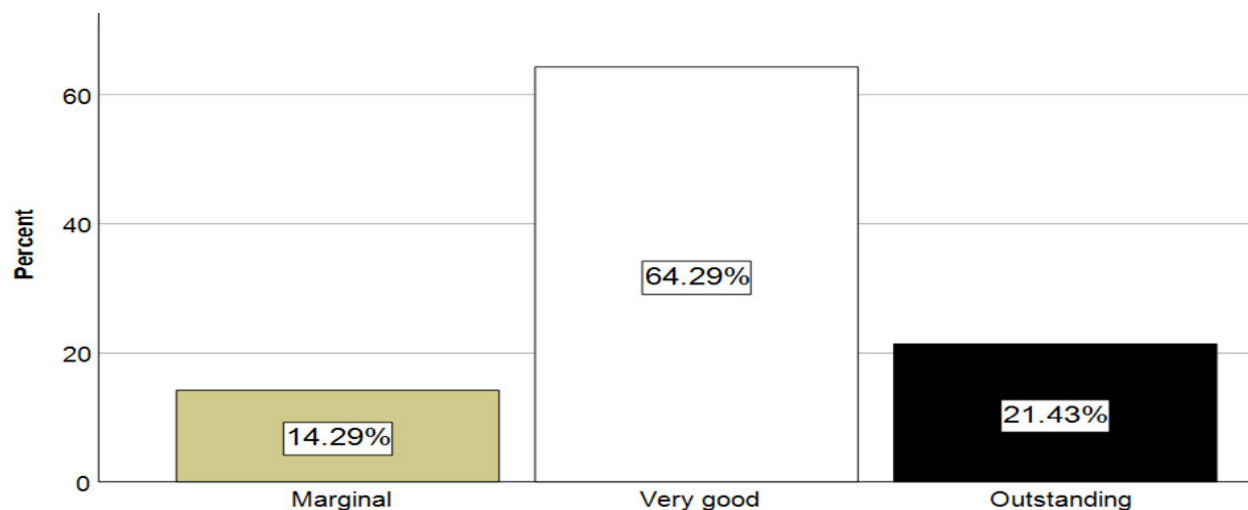


Figure 8.27: Percentages: Instructor critically reflect on their teaching processes and their own learning

The percentages shown above present descriptive frequency percentages of how critical academics were in reflecting on their lessons; and whether they managed to identify their vulnerabilities and areas of improvement. A small number (n=2) of academics (14.3%) demonstrated minimal reflective skills when engaging in self-assessment and critical analysis of their teaching. However, 62.3% (n=9) reflected on their mode of teaching, challenges with not being in front of students, connectivity issues, and the need for more training. These academics were rated very good. Moreover, 21.4% (n=3) were outstanding in

reflecting on their teaching experience. The outstanding academics engaged in deep self-reflection in assessing their work against their earning outcomes. The academics envisioned making significant efforts to continuously improve their digital teaching pedagogies and achievements. In summary, these findings indicate a positive trend towards an active engagement in reflection and evaluation. However, other academics may need additional support to encourage and foster a culture of reflecting on experiences.

8.3.19 Class attendance

Table 8.25: Frequencies of Class Attendance

	<i>Frequency</i>	<i>Percent</i>
<i>Marginal</i>	1	7.1
<i>Satisfactory</i>	8	57.1
<i>Very good</i>	5	35.7
<i>Total</i>	14	100.0

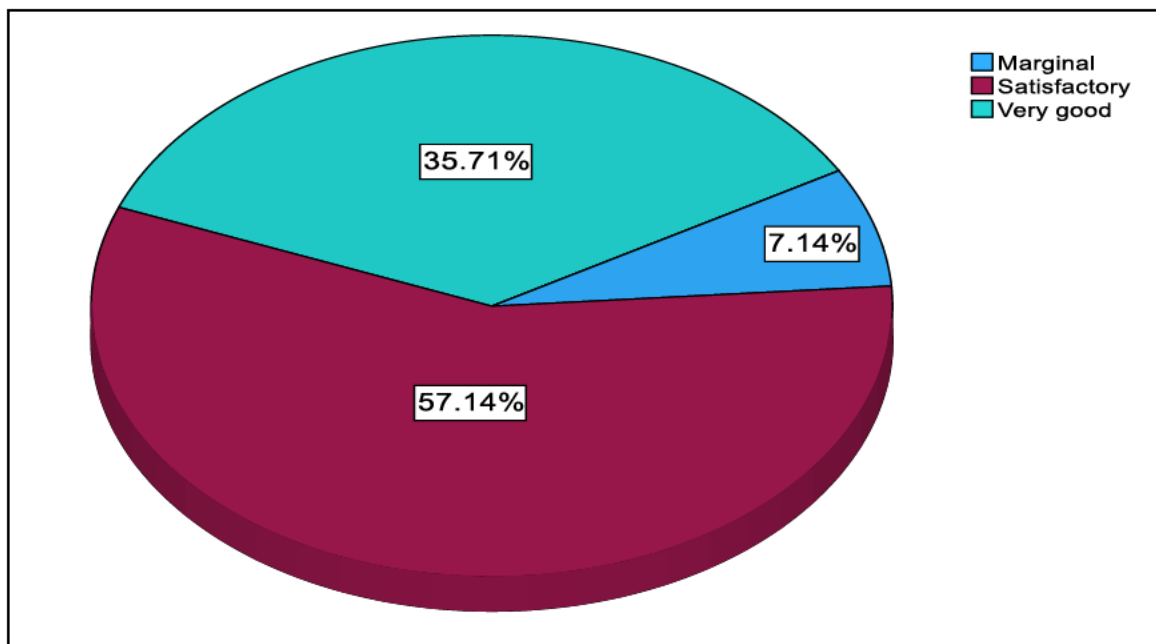


Figure 8.28: Class attendance

The above frequency table and chart present frequencies and percentages that give an indication on how students attend classes. The rating depended on the number of students who joined against the total number of registered students for the module or course evaluated. Some 80 to 100% attendance was scored 5/outstanding; 70-80 scored 4/very good; 60-70 scored 3/satisfactory; 50-60% scored 2/marginal; and below 50 % scored 1/unsatisfactory. The majority of lessons evaluated had satisfactory attendance and accounted for 57.1% (n=8). Additionally, 35.7% of the lessons were rated very good; and only 7.1% of the lessons were marginal. These findings suggest that attendance during digital teaching is not consistent. It is therefore crucial for academics to explore strategies to encourage consistent attendance and active participation of students in their courses/modules. Support should be offered to students who may be facing barriers to attending classes would be pivotal in no student being left behind.

8.4 Conclusion

In this chapter, the biological details of the academics who participated in this study were presented. The statistics provided insights into the participants' gender, age, ethnicity, nationality, education level, job position, department, years of university teaching, and years of using digital learning environments. Descriptive statistical results of lesson presentation observations were also provided. The results showed that the majority of academics demonstrated an outstanding mastery of subject matter and effectively conveyed class objectives. Academics also effectively communicated module syllabi; they designed lectures that were easy to navigate, especially with evidence that there was an integration of prescribed and casual experiences. This chapter further revealed that the use of digital technology tools for instructions and fostered interaction was mostly rated as very good. However, there was a need to improve experiences in terms of allowing students to interact with one another on LMSs, and for enhanced interaction. These statistical results contribute to the understanding of the experiences and practices of academics teaching agriculture modules in a historically disadvantaged university. Also provided are a foundational discussion, re-conceptualisation and consolidation of experience in the next chapter.

CHAPTER NINE

RECONCEPTUALISING THE FINDINGS, CONSOLIDATING AND PROPOSITIONING EXPERIENCES

9.1 Introduction

Chapter Seven of this study conceptualised the qualitative analysis of data obtained from academics teaching agriculture modules in a historically disadvantaged comprehensive university, focusing on the adoption and use of digital learning environments. Through the thematic analysis, five themes emerged, shedding light on the experiences of the fourteen participants. Verbatim utterances and important passages were shared to capture the essence of their voices. Building upon the qualitative findings, Chapter Eight transitioned to a quantitative analysis, presenting the demographic details of the participants. This included statistical insights into observations of their lesson presentations. The statistical results highlighted the effectiveness of the academics in delivering module content and leveraging digital tools for instruction and interaction. The present chapter presents the discussion and propositions through consolidating the findings from both qualitative and quantitative analyses. The propositions that are generated suggest responsive practices that address the tensions between prescribed, casual, and customised experiences. Thus, following propositions, the emergence of a CATEP framework is outlined, and how it can be used in that it adds to the existing body of knowledge in education research.

Furthermore, by synthesising the thematic analysis and statistical results, this final chapter aims to provide a comprehensive understanding of the experiences and practices of academics teaching agriculture. Moreover, it will offer propositions for enhancing the adoption of responsive digital learning environments in this academic context. Thus, therefore, this final chapter also sought to provide a holistic summary of the research, and to answer the descriptive ‘what’, operational ‘how’ and philosophical ‘why’ questions, which address the aim of this study.

9.2 Addressing the Title: Reconceptualising Academics' Experiences of Using Digitalised Learning Environments to Teach Agricultural Sciences at a South African University

To address this title, I formulated three key research questions: 1. The descriptive/content '**what**' question: *“What are academics' experiences on the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?”* 2. The operational '**how**' question - *“How can academics' experiences enhance the use of digital learning environment to teach agricultural sciences modules at a historically disadvantaged comprehensive university?”* and 3. The philosophical/ideological '**why**' question: *“Why do academics experience in particular ways the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?”* Literature was explored in Chapters Two and Three to scrutinise findings of other researchers on experiences of digital technology users in teaching, learning, and assessment. Literature has outlined how the use of digital learning environments are primarily informed by prescriptive and casual experiences, and less by customised experiences for personal identities, which altogether address educational habits as alluded to by Khoza (2020b).

Furthermore, in this educational design research study, I employed five different methods to generate data for answering the research questions. Of these methods, four were qualitative, including reflective activities, document analysis, one-on-one semi-structured interviews, and focus-group discussion. The fifth method, lesson observations, was quantitative in nature. These methods are explained in detail in Chapter Six of the study. Data were generated from a group of fourteen academics who teach various agriculture modules at a historically disadvantaged university. Five themes emerged from the qualitative data, both inductively and deductively; and frequencies emerged from descriptive quantitative data analysis. The following discussion provides a comprehensive explanation of how each research question

was conceptualised and addressed within the framework of this study, which is the Unified Theory of Acceptance and Use of Technology-Two.

9.2.1 The descriptive/content ‘**what**’ question: “*What are academics’ experiences on the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?*”

In order to address the research question, careful planning was undertaken to navigate academics’ teaching experiences, as illustrated in Chapter Five, section 5.7 (Designing the study/Educational Design Research). A reflective activity was incorporated into the planning to allow academics to engage in self-evaluation regarding their experiences. Through this process, a programme of action was designed, outlining the experiences, the digital learning environment used, and a deeper understanding of significance and discrepancies thereof. Furthermore, to ensure a comprehensive analysis in responding to the descriptive question, academics’ teaching portfolios or course outlines were examined through document analysis. This analysis was to determine whether the academics provided clear and concise instruction on how digital platforms would be utilised in specific topics. Additionally, clarity, specificity, and measurability of the learning outcomes and curriculum objectives were assessed; and potential ways of enhancing their teaching experiences were identified. Thus, the planning stage addressed the descriptive or content-focused aspect of the research questions.

Data from the reflective activities and reviewed documents provided a written description of the nature of the experiences in agricultural science modules. It emerged that academics’ use of a digital learning environment to teach was driven by professional demands; academics had to subscribe to standards and formalities of learning outcomes and assessment criteria, content, and the learning management system (Blackboard) prescribed by the university. The learning guides provided were uniform and prescribed by the university’s teaching and learning centre (TLC). These guides were submitted for approval before

dissemination to students, together with well-defined objectives and content. According to Barthakur et al. (2022), HEIs have used different approaches to develop uniform course designs for best practices that enhance online learning experiences and academic achievements. Barthakur et al. (2022) have also reported that HEIs are prescribing course design rubric standards. These rubrics prescribe the format of planning and preparing for each module to be taught. The following figure shows sections in the standard guide articulating that for quality assurance, all modules must be reviewed by TLC:

What procedures are used to assure quality?	<ul style="list-style-type: none"> • Module evaluation in each year by TLC. • Learning guide quality checks by faculty Quality Assurance Coordinator and Programme Coordinator • External moderation of examination papers
How often will the module be reviewed?	The module will be reviewed every three years
How will assessment data be used to ensure continuous improvement?	The assessment practices will include assessment of learning and assessment for learning. The assessment data will be used to inform the lecturers' teaching and to facilitate student learning. The data gathered through an integrated assessment will permit the students to demonstrate applied competence. The focus will be on deep learning which encourages active and long-term engagement with tasks and teaching practice. Students will be provided with constructive criticism. Formative assessments will be used to guide teaching and learning and improvement on teaching practice. Evaluation that will also be done through TLC will assist in identifying areas of improvement.
Projected number of students	30
Resource Implications	1 lecturer, laptops, data projector, smartphones, data bundles
<p>Suggested Readings</p> <p>Compulsory Readings / Handouts:</p>	

Figure 9.1: Quality assurance section for modules

The figure above shows that the institution has a uniform template used for quality assurance. There are procedures that are followed in which each module is reviewed against the module application document. The designing of a course structure is hierarchical; and the teaching staff must comply with this. Ngoatle et al. (2022) who explored the implementation of quality teaching and learning using online platforms in HEIs reported that academics should align the objective with the overall course structure to ensure consistency and quality across different modules. This also helps in standardisation of teaching

experiences, and even when other institutions are benchmarking for academic collaborations. For instance, participants **EE2** and **EE5** were teaching agricultural economics modules. These participants' templates provided a structure of the content, assessment, methods, learning outcome, and learning activities. The content includes supply and demand, and market structures, respectively. Both course structures/learning guides outlined learning objectives that were related to the understanding of supply and demand, analysing equilibrium prices and quantities, and how those principles are applicable to real-life situations. The TLC and line managers of the academics had to oversee the alignment of the instructional material, including the digital learning environment. Instructional material should correspond with the objectives and the overall course structure. By adhering to the hierarchy and evaluations criteria, prescribed experiences are enhanced, the main aim being professionalisation of experiences (Sokhulu, 2021). The enforcement of using structured LMS, complying with and adhering to professional institutional standards and templates, ensures uniformity in terms of implementation of quality teaching and learning practices using online platforms.

In addition, the descriptive question was explored within the scope of the first theme: effectiveness and quality assurance. The primary focus of Theme One was on academic integrity and performance expectancy. Concurrently, it is expected that academics comply with and conform to the policy expectations, assuming that they possess similar and equitable resources to effectively meet the demands of the curriculum. The research findings further indicate that academics who teach agricultural science modules demonstrated adherence to the rigorous key performance areas (KPA) outlined for their profession. As part of their annual evaluation process, academics are required to submit individual performance assessment (IPA) portfolios, as depicted in Figure 7.3, in order to qualify for performance bonuses. Hence the utilisation of Blackboard for professional purposes emerged as crucial in achieving curriculum objectives; academics sought to develop effective strategies to support students at risk. Consequently, alternative platforms such as Microsoft Teams, WhatsApp, YouTube, and Zoom gained

significant prominence among academics. These platforms provided additional means of communication and engagement with students for teaching and learning.

The above suggests that academics use the prescribed digital learning environment as their primary tool for education, while also incorporating supplementary platforms that are pragmatically feasible and convenient in fulfilling specific learning requirements (Dickinson & Gronseth, 2020; Rohloff et al., 2020). Furthermore, prescriptive experience also emphasises the significance of academics ensuring that students acquire adequate competencies in agricultural knowledge and practices. It is crucial for students not only to master the content and meet syllabus requirements, but also to be well-prepared for competitive summative assessments, such as examinations (Akala, 2021). The literature further affirms that subject matter is the main concept. Regardless of the platforms used, academics must communicate and upload all study material onto the prescribed LMSs (Alokluk, 2018; Bervell & Arkorful, 2020; Makumane, 2021; Moonsamy & Govender, 2018).

Through the application of educational design research (EDR) methods, I gained insights into academics' experiences – their teaching planning process, the modules they taught, and the content covered within those modules. The experiences shared by academics demonstrated a profound professional understanding of the subject matter, which was strongly influenced by guiding policies. While policies may not provide specific instructions on which content to teach in which digital learning environments or the approach to use, academics are required to develop their own unique identity that aligns with educational demands, practices, and habits (Khoza, 2020b). Sokhulu (2021) positions this as professionalised experiences, in which content is at the heart of teaching and learning. The use of technology must be in accordance with the prescribed information or manual, and academics' cognitive knowledge draws from formal training.

In a nutshell, the planning stage involved the analysis of the context and an exploration of the existing knowledge based on agricultural sciences, professional growth, curriculum design, and the integration of digital tools for effective teaching and learning. The findings created a professional development plan that aimed to enhance significance, coherence, relevance, feasibility, and efficiency through deeper understanding of contextual realities of the academics. The document analysis provided valuable insights into how general competence and institutional culture impact pedagogy and learning in a historically disadvantaged university.

9.2.2 The operational ‘**how**’ question was: “***How can academics’ experiences enhance the use of digital learning environment to teach agricultural sciences modules at a historically disadvantaged comprehensive university?***”

This operational or pragmatic question addresses the operationalising of academics’ experiences; and was informed by the execution of the teaching of agriculture using various digital learning environments. This question was addressed using data from lesson observations in which academics used their pedagogical strategies to address educational needs through the integration of both prescriptive (professional/formal) and casual (social/informal) digital learning environments. The integration of the experiences is referred to by Mpungose (2019b) as semi-formal experience; and by Sokhulu (2020) as personalisation experience. While academics may initially base their teaching approaches and experiences on similar policy prescriptions and recommendations, the way they actually implement and/or enact a curriculum is significantly influenced by the specific contextual realities they encounter (Alvunger, 2018). There are thus tensions between prescribed policies and implementation. Thus, the enactment of digital teaching that provided pragmatic experiences giving answers to the operational questions were also addressed in themes: ease of implementation, access and support (Theme Two), and fostering student engagement (Theme Three) that emanated from the qualitative data.

In observing the academics in action, teaching different topics in different ways, it became evident that they have various roles and responsibilities when teaching. Academics juggle between being traditional instructors and facilitators of teaching and learning, often simultaneously. Additionally, managing communication and various assessment activities further adds to the complexity of their tasks. Academics who adopted a more traditional instructional approach predominantly delivered lectures and imparted knowledge/content to the students using the prescribed Blackboard and emails. Content is central to this approach, some 85.71% of academics demonstrated mastery of subject matter, with 14.3% very good; and none rated below that, as shown in Section 8.3.1. Nine of the academics demonstrated outstanding skills in following module outcomes and descriptions using Blackboard and Microsoft Teams. This indicates that, on LMSs, academics are instructors. Academics set questions, to be answered, gave out how and when learning was to take place, give out compulsory reading that was also uploaded, and assessment tasks decided autocratically with fixed duration. However, academics were more flexible, and students were more engaging on WhatsApp.

According to Likisa (2018), in academics' role as instructors when teaching, academics take on the responsibility of conveying complex subject matter in a coherent and understandable manner. Planning is carefully accomplished, with time allocations to ensure effective delivery of the curriculum. However, Mpungose (2020c) reminds that academics have the challenging task of designing and implementing diverse online assessment activities to evaluate student progress and learning outcomes; when academics only confine themselves to using the prescribed LMSs. Academics in this study have to use various tools for Blackboard to create assignments, exams, and formal tests. The majority of academics incorporated Microsoft Teams for teaching, Microsoft Outlook emails for announcements, and WhatsApp for informal formative quizzes and online discussions, urgent announcements, and even explaining interactively areas in which students needed clarity. Furthermore, WhatsApp assisted in creating different class groups, enabling the exchange of learning material and links. WhatsApp also allows academics and students to

share and receive audio files, voice notes, and watch pre-downloaded videos. This has also been highlighted in several studies by various authors, including Chirinda et al. (2021), Dube (2020), Khoza (2020b), and Maphosa et al. (2020). However, the transition from face-to-face to digital learning in South Africa poses a challenge to academics (Mpungose, 2020c).

Simultaneously, some academics embraced the facilitative teaching style, creating an interactive learning environment that encouraged student engagement and participation. As such, a commendable rating on communication, ranging from good to outstanding, between the academics and students was observed during lesson observations. Frequencies presented in Chapter Eight confirm this. The facilitative role was also presented in the previous chapter by frequencies and graphs highlighting the adaptive ability of lecturers and academics, incorporation of SMSs, and creating of a flexible atmosphere in the statistical presentation of quantitative data. Such fostered discussions, encouraging active learning and critical thinking amongst their students. The use of casual experiences to identify personal identities (customised experience) in attaining the curriculum and/or educational habits enhanced problem-solving; and promoted a deeper understanding of the subject matter. On that note, Berkvens (2009) asserts that facilitative teaching experience also empowers students to take ownership of their learning journey. Khoza (2012), who explored a question about who helps an online facilitator to learn with students in a day, further claims that managing communication is a crucial aspect for academics when facilitating teaching and learning. Academics had to be approachable and responsive to students' questions and concerns, even if they were raised outside the allocated lecture times. Thus, various channels of communication were used.

Further to the above, it is worth mentioning that academics often faced time constraints due to the demands of juggling their instructional and facilitative roles, as well as the additional administrative duties that come with their positions. Academics also mentioned that balancing research commitments and having to

understand digital platforms and professional development further added to their workload and complexities. Despite various challenges, observing academics in action demonstrated their unwavering dedication and passion for fostering meaningful teaching and learning experiences for themselves and their students. Their adaptability was noted in shifting between their roles, regardless of their age, years of experience in traditional teaching, and within a digital learning environment, no matter the module discipline they teach, and biographical differences. No significant difference in the adoption and use of a digital learning environment was obvious. Rather, academics showcased their commitment to meeting only their personal digital needs, that of students, and the modern educational landscape.

Academics' experience plays a crucial role in shaping their teaching methodologies and approaches. According to Dewey (1938); Khoza (2014), educators' experiences and expertise significantly influence their ability to adapt to new teaching technologies, integrating them effectively into the classroom. Therefore, understanding how academics' experience was leveraged to enhancing digital learning environment in agricultural sciences was essential. Observing their sessions provided me with an insight into how they addressed educational needs through differentiated platforms that engage students. A study by du Plessis (2020) affirms that, with experience, academics tend to adopt a more learner-centred approach. Maphosa et al. (2020) argue that academics must incorporate prescriptive and casual experiences and tools to yield significant benefits of online learning. Thus, I had to observe how structured and organised learning experience complemented casual experiences and fostered a sense of community among academics and their students. However, historically disadvantaged institutions often face unique challenges such as limited resources and inadequate infrastructure (Khlaif et al., 2021). With an institutional culture that is socially influenced, this study offers potential solutions to bridge the gaps and enhance educational outcomes, where there is also resistance amongst both academics and students. The resistance was evident as the institution in question announced a 70:30 contact to online teaching and learning ratio; and there are academics who could not wait to return to face-to-face classes. The primary

mandate is fostering holistic academic success and supporting the mission and visions of the institution and the broader identity of academics in the teaching of agriculture across institutions.

9.2.3 The philosophical/ideological ‘**why**’ question: “*Why do academics experience in particular ways the use of digital learning environments to teach agricultural sciences modules at a historically disadvantaged comprehensive university?*”

Based on the data analysis presented in Chapter Seven, the philosophical and ideological question was addressed through the emergence of two main themes: Theme Four, which focused on convenience and flexibility, and Theme Three, which focused on social influence and its impact on the adoption and use of digital learning environments. The emergence of Theme Four highlighted the significance of convenience, flexibility, effort expectancy, or ease of use, and cost-effectiveness in explaining why specific digital environments were chosen. Similarly, Theme Three shed light on how social expectation and institutional culture influence these decisions. It is essential to note that these themes are interconnected, and they collectively contributed to addressing the broader philosophical questions. Additionally, Theme One, which centred on effectiveness, also played a role in providing insights and experiences in response to the philosophical question that was answered through semi-structured interviews and focus-group discussions. Understanding the reasons for use of particular technologies in particular ways had to follow after the execution so as to evaluate their experiences as explained in Chapter Five, Section 5.1 (Designing the Study).

The data revealed that the digitalised learning environment facilitated a more flexible approach to teaching and learning. Academics expressed that they could adjust their time frames and teach at times suitable for their personal needs. On that note, Chirinda et al. (2021) postulate that academics appreciate the ability to rearrange time outside the scheduled timetable. Furthermore, students can be reached even if not all attend

the live sessions. In this study, this flexibility was more advantageous for academics teaching large classes and those with busy schedules. Academics, with the use of digital learning environments, were able to teach during working hours; during their free time they addressed informal issues raised, and cases that could be addressed during working hours were also further addressed after working hours. However, academics' experiences of using a digital learning environment in particular ways were found to be primarily influenced by institutional culture. The use of Blackboard was mandatory and enforced for examinations. This was evident from most academics who decided to continue with Microsoft Teams because as the faculty, they were using the platform and most academics and students were comfortable with the prescribed platform. The skills and knowledge gained from colleagues made the platform accessible. Such was also evident from participant **EE4** who attested that whenever she needs assistance with the prescribed platform, she calls a colleague, who is also a friend, to assist. Even so, EE4 continued using the prescribed platforms just to be able to set exams, as mandated. Thus, I argue that the manner in which people around one experience things, and value certain platforms informs one's own acceptance and use of the platform.

Furthermore, the findings indicated that academics now do understand that their identity is equally important to the institution or agricultural curriculum. However, before being informed of the levels of experiences and identities, academics had no clue that that they experienced a digital learning environment at different levels the way they did. Regarding the assessment and feedback, some academics preferred real-time marking, while others found online marking more convenient. On that note, Khoza (2021b) and Matarirano et al. (2021) argue that flexibility to choose the assessment options that suit personal needs is considered beneficial for attaining educational aims. According to Alokuk (2018), the economic benefits of using digital platforms that include reduced travel expense and textbook costs were also highlighted by the academics in this study. For this reason, academics also use case studies, YouTube, and voice notes for teaching and learning. As van den Akker (2013) argues, students should achieve and demonstrate

learning outcomes at the end of a teaching course. Academics indicated that through customised experience prescribed and casualised experiences are integrated, and practical aspects of agricultural sciences are addressed. However, soil science and animal sciences were indicated as having crucial topics. A student needs hands-on experience to be able to feel and have a sense of how a particular practice is accomplished. This includes uprooting, injecting, feeling the temperature, touching and feeling the cervix during artificial insemination, and budding, to name a few.

Moreover, on social influence, the data revealed that cultural norms and values, as well as institutional culture, played a significant role in the adoption and use of a digital learning environment. Some academics expressed resistance to the adoption of LMSs due to a conservative culture that valued traditional teaching methods. Archer (2017) and Hlatshwayo and Shawa (2020) argue that cultural norms can heavily influence practices and experiences in education. According to Mpungose (2020b), with regard to the reservation of established traditional teaching methods, the integration of digital technology is also met with scepticism or resistance. Such may lead to slower acceptance and implementation of digital tools in educational settings. Thus, in gunpoint experiences, academics do not feel ownership of their experiences.

9.3 Propositions and Areas of Improvement

The discussion above provided a comprehensive understanding of academics' experiences and practices in teaching agricultural sciences using digital learning environments. The study used both qualitative and quantitative data to answer the research questions and provide the following proposition to address the tensions between prescribed, casual, and customised experiences. Reconceptualising experiences in order to improve teaching is argued always central to the teaching and learning process of any curriculum (Berkvens, 2009; Bzowyckj et al., 2017; Hlatshwayo & Zondi, 2020; Shulman, 2019). Thus, this study

recommends that programmes that assist academics, students, and university management in using casual digital learning platforms must be put in place for institutions to survive the rapid digital transformations.

9.3.1 Proposition One: Enhancing academic standards and integrity in a digital learning environment at a historically disadvantaged university

This proposition aims to ensure that digital learning environments are effective and high quality, and that they meet academic standards and expectations for agricultural sciences modules in a historically disadvantaged university. The proposition also aims to address the challenges faced by academics in preventing cheating during assessment. Findings from this study suggest that academics are unable to prevent cheating when students are writing formal assessments on Blackboard. Turnitin is mostly used for assignments; however, copying and pasting on the Blackboard platform cannot be prevented. Lecturers are aware of their adherence to professional standards and policies, and of aligning instructional material with learning outcomes. The implementation was possible through the use of informal digital platforms to teach various content of agriculture. Academics should seek continuous professional development to improve content-specific teaching experiences. Further to this, academics must also embrace more tools such as Turnitin in ensuring that academics' credibility is not compromised during assessment. The university must put in place mechanisms such as online invigilation or cheating-detecting software so that students do not cheat even if they write examinations while at home. The study further proposes that assessment policies should also respond to the contextual nature of the university and subject field involved.

Findings further indicate that academics mainly adopted a digital learning environment as informed by other colleagues in the department. Academics had to move to a platform, WhatsApp that students were most comfortable with and easily accessible to them in order to make sure that teaching and learning was effective. However, for standardisation of experiences, assessment and activities, protocols had to be

followed, and policy documents had to be applicable to all. Thus, all formal assessments were on a prescribed digital learning environment as there are moderations and audits on these. As such, professional needs were at the forefront in ensuring academic integrity. However, this was made possible by the integration of links that directed students to external sources and websites for asynchronous online learning.

9.3.2 Proposition Two: Enhanced support

This proposition emphasises the need to provide necessary resources and training to support academics and students in using digital tools effectively and efficiently. The significance of differentiated digital learning environments was on individual discretion; the main focus of training and support being on Blackboard (prescribed platform). Such hinders the full potential of digital education. Mukhathi et al. (2022) posit that institutions must recognise the significance of differentiated digital learning environments and the need to provide necessary resources and training to support academics and students effectively. Academics expressed that support was found primarily on prescribed digital platforms, however, not on the pedagogy on those platforms. This became a struggle; only 21.43% academics showed very good frequency in classroom participation and engagement, and there was an unsatisfactory percentage of academics flexible enough to allow students to think and respond. Therefore, in prescribed platforms, teacher-centred methods emerged due to not being capicitated on the pedagogy aspect. This also includes recognition of social medial platforms as equal contributors to the achievement of educational goals; and that academics' teaching must be driven by all the levels of experiences (prescribed, casual, and customised).

Further to the above, academics revealed that they need more than the support offered by the institution. This implies that, at times, academics see what is pragmatically possible from studying the institutional culture, their own preferences, and what students need. Academics follow a bottom-up decision where

they customised their experiences to suit their personal needs. There are therefore gaps in terms of support between what is prescribed and platforms that can be easily adopted and used to teach agricultural sciences at a historically disadvantaged comprehensive university. Thus, there is increasing tension between platforms that academics are compelled to use and the tools that they can use confidently. Support and confidence can never be overemphasised when adopting a particular digital learning environment; this enhances acceptance and ease of implementation of any digital teaching, as Ndebele and Mbodila (2022) affirm.

In also promoting a successful hybrid teaching environment, academics not being fully aware of what hybrid teaching entails, this study proposes that the university should also actively capacitate academics on what it does entail; and provide livestreaming facilities in lecture venues. Thus, the provision for synchronous and asynchronous learning resources was important in order to accommodate the various schedules and preferences.

9.3.3 Proposition Three: Adaptation to enhance active learning

This proposition underscores the significance of creating engaging and motivating digital learning experiences that cater to the needs and preferences of academics and students. There should be strong emphasis on adoption of student-centred approaches and pedagogical strategies in fostering student engagement and motivation (Buraimoh et al., 2021). Findings of the study suggest that academics are able to customise their experiences and are able to identify platforms enjoyable to students. This suggests that personal identities (customised experiences) have been key in transforming identities for the attainment of curriculum goals. Some academics create interactive and engaging learning experiences tailored to students' preferences and needs, while also addressing their personal identities. According to Kajiita et al. (2020), improvising is a quick solution to digital shortages that allow students to be more engaged. Sokhulu (2021) argues that improvisation enables self-actualisation and active learning. Furthermore,

Mpungose (2020a) avers that a combination of digital platforms and tools that cater to diverse teaching and learning needs and maximise convenience makes teaching and learning more interesting. This is evident in that academics are not able to effectively foster active learning in prescribed LMSs, compared with SMSs. As such, their artistry and flexibility as innate abilities enhanced their achievement of learning outcomes.

9.3.4 Proposition Four: Recognising contextual realities

This proposition takes cognisance of cultural norms, social relationships, and other contextual factors that influence academics' engagement with digitalised learning environments. Institutional policies do not fully recognise contextual realities – they use a blanket approach in promoting the use of digital teaching and learning. The gunpoint experience of prescribing the hierarchy of teaching ignores the contextual nature of agriculture and the type of academics and students that the university attracts. The university has not yet created an environment that supports and encourages digital adoption while respecting cultural values and understanding subject-specific needs and the type of academics and students they have. There should be continuous stakeholder involvement in which academics, university management, students, the private sector, farmers and government engage in order that all the stakeholders understand their needs and perspectives better, and provide responsive digital tools. This will allow open communication and awareness of the benefits of a digital learning environment, while also addressing concerns and misconceptions.

9.4 The Emergence of a Reconceptualised and Customised Framework: Contextually Adaptive Tech-Enhanced Pedagogy (CATEP) Framework

The way in which the research questions of this study have been addressed, and the propositions outlined relate to the contextually adaptive tech-enhanced pedagogy (CATEP) framework that was introduced in Chapter Five. CATEP is presented in Figure 9.2 below:

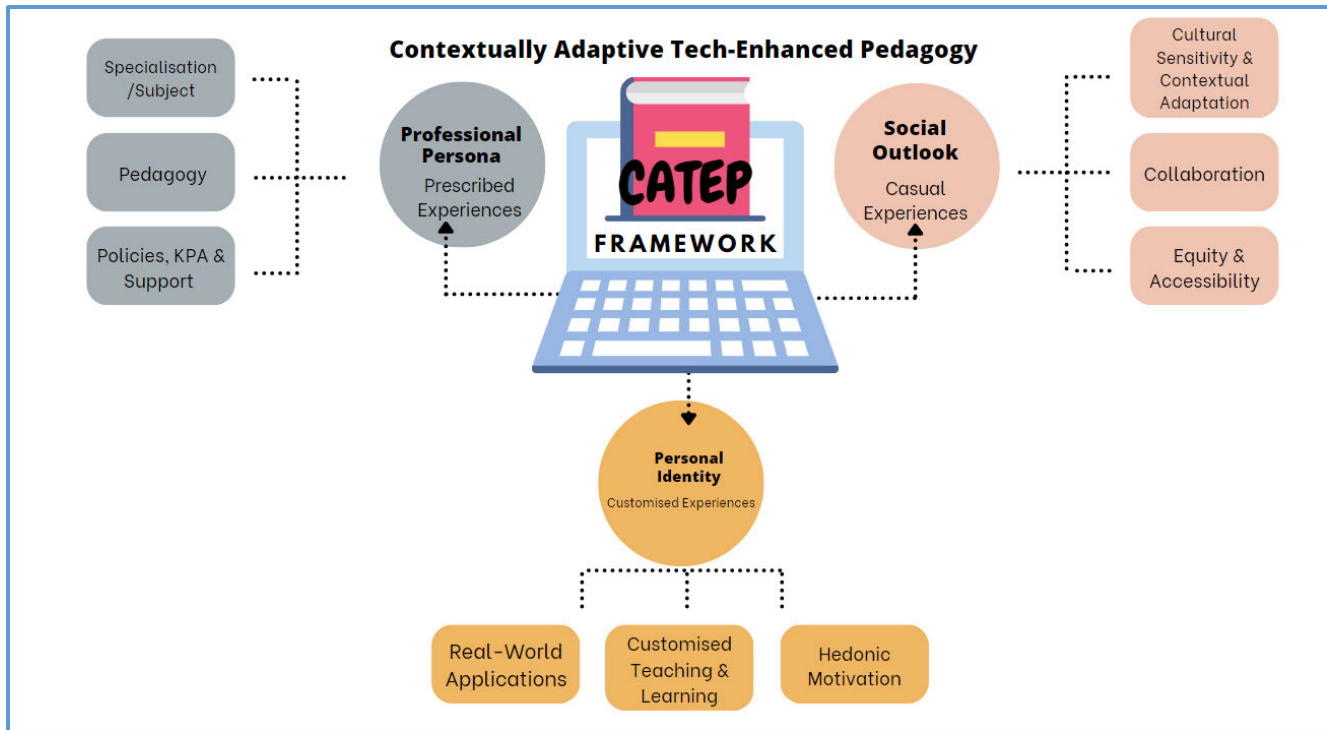


Figure 9.2: CATEP framework

Findings from this study shed light on how academics customised their teaching of agricultural sciences to fit their context and personal identities; and literature posits that experiences are informed by the profession, society, and the person (Bernstein, 1961; Mawere et al., 2021; Mpungose & Khoza, 2020; Ndlovu, 2022; Shulman, 2019). Consequently, academics' experiences yielded a CATEP framework that is intended to improve the adoption and use of digital learning tools in a flexible manner. Such would suit the specific context and needs of academics, students, and university, while connecting the classroom experiences to real-world applications. While UTAUT-2 provides a comprehensive framework for understanding technology acceptance and user behaviour in various contexts (Venkatesh et al., 2012), it does not focus solely on education. CATEP incorporates educational and contextual elements that are critical to improving learning outcomes.

The components of CATEP are categorised into three archetypes: professional persona, social outlook, and personal identity, which inform prescribed, casual, and customised experiences, respectively, as outlined in Figure 9.2. The CATEP framework outlines the following archetypes:

- **Professional persona**

Professional personal (PP) is informed by prescribed experiences; and focuses on the professional identity and role of academics in the digital learning environment. PP addresses subject specialization, the pedagogy, policies, key performance areas, and support provided to attain learning outcomes. Professional forces are directed by policymakers with whose policies academics must comply. As Makumane and Khoza (2020) suggest, professional persona refer to the standardised and institutionalised aspects of teaching and learning that academics are expected to follow. Sokhulu (2020) adds that this includes adhering to specific digital learning platforms, and certain policies. Khoza and Fomunyan (2021) simply put it as following established guidelines. Academics faced the expectation of using a specific LMS, Blackboard, for all assessment and administrative purposes. The archetypes of PP are as follows:

Specialisation/subject matter: This aspect pertains to the expertise and knowledge that academics possess in their various subject areas in agriculture. In this study, the module taught influenced how academics design and deliver digital learning experiences informed by the context they teach. For instance, interactive simulations are used to demonstrate farming techniques.

Pedagogy: this refers to the instructional digital methods and approaches that academics employ to facilitate teaching and learning. In the digital learning context, pedagogy involves selecting appropriate digital tools, resources and activities that align with their teaching philosophy, and learning guides. UTAUT-2 focuses more on general technology acceptance and does not explicitly address how technology aligns with various pedagogical approaches. In contrast, CATEP recognises the pedagogical alignment, ensuring that technology enhances and complements various teaching and learning strategies.

Policies, KPA and support: The acceptance and use of digital learning was also informed by institutional policies. According to Owen (2014), policies are guidelines and rules set by educational institutions to regulate experiences of teaching and learning. Findings of this study suggest that policies should support and encourage the contextually adaptive integration of technology in education. Furthermore, it came to light from academics' experiences that institutions identify essential key performance indicators to monitor their progress in attaining their education objectives. The reviewed teaching portfolios that outline KPSs, as shown in Figure 7.3, are used by institutions to assess performance, and should include metrics related to technology adoption and integration. Such KPIs also involve academic and student performance and teacher professional development. Support, as with facilitating conditions in UTAUT-2, should be multifaceted and responsive to diverse needs of disciplines and academics in a historically disadvantaged university. Support refers to technical support, pedagogical support, policy support, student support and collaborative support. Academics asserted that policies should be sufficiently flexible to allow customisation and personalisation by academics: CATEP emphasises the importance of individual agency, causal and customised experiences.

- **Social outlook**

Social outlook (SO), in this study is informed by casual experiences, and includes collaboration, cultural sensitivity and equitable accessibility. Academics relied on informal digital platforms, such as WhatsApp, to ensure effective teaching and learning processes, considering students' comfort and accessibility.

Cultural sensitivity and contextual adaptation: Academics and the fourth proposition emphasise the significance of considering cultural norms and context in academics' teaching approaches to create an inclusive learning environment in a historically disadvantaged university. Academics design learning experiences that are relevant and engaging. Furthermore, the background of academics and students,

specific application of knowledge and skills, and the legacy of that involves resistance within a historically disadvantaged university.

Collaboration: Academics are encouraged to collaborate with colleagues and students through group capacity programmes, and project and online discussion forums. Collaboration promotes sharing best practices and resources with colleagues. Therefore, the way in which academics collaborated within the same departments and beyond, informed how they adopted and used a specific digital learning environment.

Equity and accessibility: Findings of this study acknowledged the need to ensure equal access to digital learning opportunities and to address the diverse needs of students. This archetype considered also the needs of those with disabilities or divergent learning styles in order for more students and academics to access and benefit from educational resources.

- **Personal identity**

Personal identity (PI) is entrenched in customised experiences and emphasises individuality and agency of academics in shaping their digital teaching practices. PI refers to academics customising to suit their personal teaching styles, preferences, and strengths.

Real-world experiences: this archetype involves integrating real-world examples, scenarios, and application. For instance, academics use videos of successful agricultural practices in different regions, and case studies to provide insights gleaned from various contexts. These insights are infused into digital platforms used for digital learning to make the content relevant and meaningful to students. This action fosters problem-solving and critical thinking abilities in authentic scenarios.

Hedonic motivation: This archetype focuses on recognising interactive digital activities that contribute to academics' and students' enjoyment and motivation to use digital learning environment for teaching and learning. Hedonic motivation explored the emotional aspect of users' behaviour and decisions. For example, there was the satisfaction of using mobile applications, and the flexibility of tapping into both formal and informal engagement on a single gadget or device.

The above explanation of the archetypes of the CATEP framework provides an insight into how the theory offers opportunities for academics teaching agricultural sciences, and possibly any other practical or vocational subject/module, at a historically disadvantaged university. CATEP's contextually adaptive approach encourages continuous reflection and improvement of teaching experiences. Academics can gather feedback from students, monitor their progress, and adjust the pedagogy to optimise learning experience in their different modules.

9.5 Implications of this Study

- **Enhanced teaching and learning**

The study's findings on effectiveness, student engagement, convenience and casual influence have implications for improving teaching practices in the context of digital learning environments. Academics can use this information to design more engaging, flexible, and culturally sensitive digital teaching approaches that also respond to the context and nature of agricultural science. Academics are well informed of the resource constraints that hinder their adoption of a digital learning environment, presenting strategies for overcoming these challenges.

- **Promoting institutional policy and support**

The study highlights the importance of providing academic support and training to academics using digital tools effectively. Institutions, particularly historically disadvantaged comprehensive universities, can

invest in professional development programmes such as training programmes and workshops to empower academics with skills and confidence needed to navigate digital platforms.

- **Creating flexible and inclusive education**

The study underscores the significance of supportive institutional policies that encourage the adoption of a digital learning environment informed by casual and customised experiences. Thus, institutions can develop policies that prioritise technology integration and provide resources for academics to implement digital tools. This allowed for a more personalised educational customised experience.

- **Cultural sensitivity**

Academics understood the impact of social influence on digital learning adoption. This comprehension led to more culturally sensitive and contextualised relevant approaches to technology integration. Applying this study, the institution can adapt their strategies to better suit the cultural norms and values of their academics and students.

9.6 Recommendations for Further Research

This study explored academics' experiences of using a digital learning environment in teaching agriculture at a historically disadvantaged university. For future research:

- Comparative studies can focus on experiences of academics teaching various subjects or disciplines and various institutions to identify discipline-specific challenges and benefits in adopting digital learning environments. This will help tailor intervention to specific academic contexts.
- Incorporate students' perspectives in order to gain insights into how students experience digital learning environments; and how these tools impact their learning experiences.

- Evaluate the effectiveness of faculty training programmes on technology integration; and identifying best practices to enhance academics' digital skills.
- Investigate how to make digital learning environments more accessible and inclusive for students with disabilities or limited access to technology.
- In terms of cross-cultural comparison, exploring how academics from diverse cultural backgrounds and experience can use a digital learning environment is a recommended future research.

9.7 Summing up the Study: Conclusion

This study provides valuable insights into experiences of academics adopting and using a digital learning environment in the context of agricultural science at a rural university. Thematic analysis revealed five key themes: effectiveness and quality assurance, ease of implementation, digital access and support, fostering student engagement, convenience and flexibility, and social influence. The UTAUT-2 was used as an underpinning theory following an educational design research in which both qualitative and quantitative data were gathered. The study's findings have several positive implications for the enhancement of teaching experiences and the improvement of student learning processes. By addressing the above-mentioned themes, academics can design more engaging and effective digital learning environments that meet academic standards, and the needs of academics and society. The CATEP framework emerged as a more responsive and contextually sensitive theory for academics who teach agriculture at a historically disadvantaged university.

In conclusion, this study provides a comprehensive understanding of the experiences and practices of academics teaching agricultural sciences at a South African university. The study offers valuable propositions and recommendations to enhance the adoption of responsive digital learning environments, ultimately contributing to the continuous improvement of teaching and learning in the academic context.

By embracing these findings and future research directions, institutions can better equip academics to navigate the challenges and opportunities of the digital age, ensuring transformative and inclusive educational experiences for all stakeholders involved.

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Appendices

Appendix A: Ethical Clearance approval



27 July 2021

Mr Msimelelo Buyisile Nkohla (216074125)
School Of Education
Edgewood campus

Dear Mr Nkohla,

Protocol reference number: HSSREC/00003093/2021
Project title: Reconceptualising Academics' Experiences of Using Digitalised Learning Environments to Teach Agricultural Sciences at a South African University
Degree: PhD

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 19 July 2021 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted FULL APPROVAL.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid until 27 July 2022.

To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

All research conducted during the COVID-19 period must adhere to the national and UKZN guidelines.

HSSREC is registered with the South African National Research Ethics Council (REC-040414-040).

Yours sincerely,



Professor Dipane Hlalele (Chair)

/dd

Humanities and Social Sciences Research Ethics Committee

Postal Address: Private Bag X54001, Durban, 4000, South Africa

Telephone: +27 (0)31 260 8350/4557/3587 Email: hssrec@ukzn.ac.za Website: <http://research.ukzn.ac.za/Research-Ethics>

Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

INSPIRING GREATNESS

Appendix B: Turnitin Report

CHAPTER ONE
CONTEXTUAL OVERVIEW AND OBJECTIVE

1.1 Introduction

Chapter One introduces the entire study that aims to explore the experiences of using digitalised learning environments to teach at a South African university. This chapter highlights the processes of the study's contextual background and rationale, literature review, nature of universities and the agriculture fraternity. The location, aims and objectives, together with research questions, and how the study is designed, are also outlined by this chapter. This also

Page: 1 of 284 Word Count: 68607

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Appendix C: Permission letter from the Registrar

University of Fort Hare
OFFICE OF UNIVERSITY REGISTRAR

Alice (main) Campus:
Private Bag X1314, King William's Town Road, Alice, 5700, RSA
Tel: +27 (0) 40 602 - 2501 • Fax: +27 (0) 40 602 - 2577
Email: rmabindiso@ufh.ac.za



University of Fort Hare
Together in Excellence

15 July 2021

Mr. Msimelelo Buyisile Nkohla
[REDACTED]
[REDACTED]
Eastern Cape, 5607
mnkohla@ufh.ac.za

Dear Mr MB Nkohla

Approval from the Registrar's Office to Conduct Research

In accordance with the University of Fort Hare Research Ethics Policy and Practice, I hereby grant permission for Mr Msimelelo Buyisile Nkohla, a lecturer at the University of Fort Hare's Faculty of Education, and a doctoral candidate in the School of Education (Curriculum Studies) at the University of KwaZulu-Natal, to conduct research relating to his thesis '*Reconceptualising Academics' Experiences of Using Digitalised Learning Environments to Teach Agricultural Sciences at a South African University*' that will involve academics who teach agricultural sciences modules in the Faculty of Science and Agriculture.

We look forward to reading the research report.

Kind regards

[REDACTED]

Mr. EN Zuma
University Registrar

Bhisho Campus: P. O Box 1153, KWT 5600, Independence Avenue, Bhisho, 5600, RSA
Tel: +27 (0) 40 606 - 3407 • Fax: +27 (0) 40 606 - 3408

East London Campus: Private Bag X9063, EL 5200, 50 Church Street, East London, 5201, RSA
Tel: +27 (0) 43 704 - 7000 • Fax: +27 (0) 43 704 - 7095
V/C Dial Up: +27 (0) 43 704 - 7143/ 7144

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Appendix D: Proof of paper submission

Reply Reply All Forward IM
Tue 11/7/2023 7:05 PM
CAFI-peerreview@journals.tandf.co.uk
Submission received for African Identities (Submission ID: 233538786)
To Nkohla, Msimelelo
If there are problems with how this message is displayed, click here to view it in a web browser.

Routledge
Taylor & Francis Group

Dear MSIMELELO BUYISILE Nkohla,
Thank you for your submission.

Submission ID **233538786**
Manuscript Title **Chronicing digital teaching at a South African historically disadvantaged comprehensive university: Navigating institutional culture for agricultural sciences academics**
Journal **African Identities**

If you [made the submission](#), you can check its progress and make any requested revisions on the [Author Portal](#)

Thank you for submitting your work to our journal.
If you have any queries, please get in touch with CAFI-peerreview@journals.tandf.co.uk.

Kind Regards,
African Identities Editorial Office

Submit to African Identities Author Dashboard
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Hi, MSIMELELO

My Articles SUBMIT NEW MANUSCRIPT

SUBMISSION	TITLE	JOURNAL	STATUS	CHARGES
233538786	Chronicing digital teaching at a South...	African Identities	Manuscript Submitted	

1 SUBMISSION

- 08 November 2023 Submission Created
- 08 November 2023 Submission Incomplete
- 08 November 2023 Manuscript Submitted CONTACT

With Journal Administrator

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Appendix F: Reflective Activity

The descriptive question addressed: What are academics' experiences on the use of digital learning environments to teach Agricultural Sciences modules at a historically disadvantaged comprehensive university?

<p>1. <u>Which digital learning environment do you use when teaching agricultural sciences modules?</u> Answer:.....</p>
<p>2. <u>What resources do you use to when using digital environment for to teach agricultural sciences?</u> Answer:.....</p>
<p>3. <u>Why do you use the particular digital learning environment in teaching agricultural sciences?</u> Answer:.....</p>
<p>4. <u>How do you access the particular digital learning environment?</u> Answer:.....</p>
<p>5. <u>How do you ensure effectiveness of the digital learning environments in attaining goals of the agricultural sciences modules that you are teaching?</u> Answer:.....</p>
<p>6. <u>What content of agricultural sciences are you teaching using digital learning environment?</u> Answer:.....</p>
<p>7. <u>Which digital learning activities do you use when teaching Agricultural Sciences?</u> Answer:.....</p>
<p>8. <u>What are roles in the use of digital learning environment when teaching agricultural sciences modules?</u> Answer:.....</p>

.....
9. <u>Where do you use digital learning environment when teaching agricultural sciences modules?</u> <i>Answer:</i>
10. <u>When do you use digital learning environment to teach agricultural sciences modules?</u>

<i>Answer:</i>
11. <u>How do you assess agricultural sciences using a digital learning environment?</u> <i>Answer:</i>
12. Any general reflection?

Appendix G: Document analysis evaluation tool

Portfolio/ Learning Guide/ Course
Outline Evaluation Tool

<p>1. <u>Digital learning environment used when teaching agricultural sciences modules.</u> Comments:.....</p>
<p>2. <u>Resources used when using digital environment for to teach agricultural sciences</u> Comments:.....</p>
<p>3. <u>Philosophy statement outlines rationale of using particular digital learning environment in teaching agricultural sciences</u> Comments:.....</p>
<p>4. <u>Evidence of different forms of ease of access in to use particular digital learning environment</u> Comments:.....</p>
<p>5. <u>Evidence of effective teaching and attainment of goals with the use of digital learning environments.</u> Comments:.....</p>
<p>6. <u>Relevant and responsive digital learning environment to teach agricultural sciences content are you teaching using digital learning environment</u> Comment:.....</p>
<p>7. <u>Digital learning activities are relevant and effective for the teaching of Agricultural Sciences</u> Comments:.....</p>

<p>8. <u>Roles of the instructor and student are clearly stipulated and there is evidence of enactment during digital teaching of agricultural sciences modules</u></p> <p>Comments:.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>9. <u>Appropriate and conducive environments used when teaching agricultural sciences modules using digital environments</u></p> <p>Comments:.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>10. <u>Time for digital teaching is clearly stipulated, and is conducive for the instructor.</u></p> <p>Comments:.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>11. <u>Evidence of assessment of agricultural sciences modules using digital learning environment?</u></p> <p>Comments:.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

Appendix H: Lesson observation evaluation form

The operational question addressed: How can academics' experiences enhance the use of digital learning environment to teach agricultural sciences modules at a historically disadvantaged university?

Participant identification:

Module observed:

Topic:

Section A: Biographical Information

Please Tick [] the option that best suits your opinion

1. Gender:

Male	
Female	

2. Age?

25 and less	
26-30	
36-40	
46-50	
51-55	
56-60	
65-70	
71-75	
76 and above	

3. Ethnic group?

Black	
Coloured	
Indian	
White	
Other, specify	

4. Highest level of education?

Diploma	
Bachelor's degree	
Honours	
Master	
Doctoral	

5. Post level

Tutor	
Time-on-task lecturer	
Junior lecturer	

Senior lecturer	
Associate Professor	
Professor	

6. Department

Livestock and Pasture Science	
Agricultural Economic and Extension	
Agronomy	

7. Years of university teaching

Less than one year	
2-5	
6-10	
11-15	
16-20	
21-25	
26-30	
31-35	
36 and above	

8. Years of teaching using digital learning environment(s)

Less than one year	
2-4	
4-6	
6-8	
8-10	
10-12	
12-14	
14-16	
16-18	
18-20	
More than 20	

Section B: Lesson evaluation

Performance scale

5. **OUTSTANDING:** performs very well; a model for other instructors;
4. **VERY GOOD:** performs well; demonstrates above average performance;
3. **SATISFACTORY:** performs in middle range; demonstrates average performance;
2. **MARGINAL:** demonstrates minimally acceptable teaching skills; some changes should be made to improve instruction;
1. **UNSATISFACTORY:**

Category	Competencies				
	1	2	3	4	5
1. Mastery of subject matter - Content is appropriate for module					
2. The lecture follows module outcomes and module description					
3. Instructor conveyed class objectives clearly.					
4. Module syllabus including course description, course schedule, and contact information and evaluation procedure are communicated with students.					
5. Organization and Design of lecture – lecture is easy to navigate.					
6. Curriculum and Instruction- there is use of variety of technology tools to foster interaction (i.e., Learning Modules, Discussion Board, Course Mail, Announcements, etc.)					
7. There is communication with individual students and the class at- large consistently, effectively and in a timely manner in the form of emails, chats or weekly discussions.					
8. Classroom participation and engagement – Students are encouraged to engage in the class, log-in frequently and participate with other students in class discussions, etc.					
9. Quality and clarity of assignments					
10. Technical – Links and other technical aspects to the course are in working order. Instructor makes use of multimedia links (music, video, etc.) when possible					
11. Used formative assessments tied to learning goals to check student understanding and provide appropriate feedback					
12. Paused for students to think and respond					
13. Lessons are adaptive to students' ability.					
14. Students are familiar with Blackboard					
15. Social media sites are also used					
16. Instructor provides resources to enhance the quality of online course delivery. (Links to tutorials, etc.)					

17. A gradebook is available for checking student progress and grades are posted in accordance with stated response times.					
18. Instructor creates an active learning community through forums, individual/group/class email, discussion boards and/or video/audio recordings.					
19. Instructor adheres to posted statement of response time unless otherwise indicated in announcements and/or email					
20. Students communicate with the instructor.					
21. Students communicate with each other.					
22. Students demonstrate their knowledge.					
23. Lesson ends in a planned way					
24. Instructor makes a summary					
25. Instructor makes a connection to the next step or lesson					
26. Instructor talks to the students and lets the students talk to					
27. Reflect / evaluate on their work processes and their own learning					
28. Class attendance					

Appendix I: One-on-one semi-structured interview schedule

Philosophical question addressed: Why do academics experience the use digital learning environments to teach agricultural science modules at a historically disadvantaged comprehensive university in particular ways?

<p>1. <u>Which digital learning environments are you using when teaching agricultural sciences modules?</u></p> <p><i>Sub-questions:</i></p> <p>a) Which structured/formal digital learning environment are you using when teaching agricultural sciences modules?</p> <p>b) Which unstructured/informal digital learning environment are you using when teaching agricultural sciences modules?</p> <p>c) Which digital learning environments can be integrated (semi-structured) in order to accommodate your both formal and informal digital teaching needs in teaching agricultural sciences?</p>
<p>2. <u>What resources do you use when using digital environment for to teach agricultural sciences?</u></p> <p><i>Sub-questions:</i></p> <p>a) What software resources do you use to digitally teach agricultural sciences?</p> <p>b) What hardware resources do you use to digitally teach agricultural sciences?</p> <p>c) Which theories guide your teaching of agricultural sciences using a digital learning environment?</p> <p>d) How are these resources compatible to teach agricultural sciences using a digital environment?</p>
<p>3. <u>Why do you use the particular digital learning environment in teaching agricultural sciences?</u></p> <p><i>Sub-questions:</i></p> <p>a) What structured/formal reason made you use digital learning environment in teaching agricultural sciences modules?</p> <p>b) What unstructured/informal reason that made you use digital learning environment in teaching agricultural sciences modules?</p> <p>c) What reason can make you integrate both structured and unstructured digital learning environments in teaching agricultural sciences modules?</p>
<p>4. <u>How do you access the particular digital learning environment that you use to teach agricultural sciences?</u></p> <p><i>Sub-questions:</i></p> <p>A. How is the ease of accessing structured digital learning environments to teach agricultural sciences?</p> <p>B. How is the ease of accessing an unstructured digital learning environment to teach agricultural sciences modules?</p> <p>C. Which digital learning environment (structured or unstructured) is easily accessible for you? Why?</p> <p>D. How do you manage cost implication to access digital learning environment?</p>
<p>5. <u>How do you ensure effectiveness of the digital learning environments in attaining goals of the agricultural sciences modules that you are teaching?</u></p> <p><i>Sub-questions:</i></p> <p>a) How are your aims of using digital learning environment to teach agricultural sciences attained?</p> <p>b) How has digital teaching affected the integrity of attaining your modules' objectives?</p> <p>c) How are your intentions of using digital learning environment satisfied?</p>
<p>6. <u>What content of agricultural sciences are you teaching using digital learning environment?</u></p> <p><i>Sub-questions:</i></p> <p>a) What agricultural sciences content do you teach using digital learning environment?</p> <p>b) How you teach your practical content in agricultural sciences using digital environment?</p> <ul style="list-style-type: none"> • Please me with your module learning guide

7. What digital learning activities do you use when teaching Agricultural Sciences?

Sub-questions:

- a) *What digital learning activities do you use when engaging students in your agricultural sciences modules?*
- b) *How do you plan digital activities in order to respond to the content to be taught?*

- c) *What digital learning activities do you use in order to ensure maximum attendance of students in your lectures?*

8. How do you assess agricultural sciences using digital learning environment?

Sub-questions:

- a) *How do you informally assess agricultural sciences modules on digital environment?*
- b) *Who do you formally assess agricultural sciences modules on digital environment?*
- c) *What difference in the performance (pass/fail/average marks) of students doing online assessments, as opposed to traditional sit-down tests and examinations?*

9. What are roles in the use of digital learning environment when teaching agricultural sciences modules?

Sub-questions:

- a) *How do you perform your role as an instructor when using structured digital learning environment?*
- b) *How do you perform your role as a facilitator when using unstructured digital learning environment?*
- c) *How do you foresee your role when using semi-structured digital learning environment?*

10. Where do you use digital learning environment when teaching agricultural sciences modules?

Sub-questions:

- a) *Where do you formally conduct your online lectures for agricultural sciences?*
- b) *Where do you informally conduct your online lectures for agricultural sciences?*
- c) *Are the environments that you are using conducive and reliable? Explain.*

11. When do you use digital learning environment to teach agricultural sciences modules?

Sub-questions:

- a) *When is convenient for you to use digital learning environment to teach your agricultural sciences modules? Substantiate.*
 - *Morning*
 - *Afternoon*
 - *Evening (after working hours)*
 - *Weekends*
- b) *Is your departmental timetable flexible to accommodate time that is convenient for you and your students?*
- c) *How frequent do you use digital learning environment with your students?*

Appendix J: Focus-group schedule

Philosophical question addressed: Why do academics experience the use digital learning environments to teach agricultural science modules at a historically disadvantaged comprehensive university in particular ways?

<p>1. <u>Which digital learning environments are you using when teaching agricultural sciences modules?</u></p> <p><u>Sub-questions:</u></p> <ul style="list-style-type: none"> a) How can your experiences of your choice of structured/formal digital learning environment be enhanced? b) How can your experiences of your choice of unstructured/informal digital learning environment be enhanced? c) How can structured and semi-structured Which digital learning environments be integrated (semi-structured) in order to accommodate your both formal and informal digital teaching needs in teaching agricultural sciences?
<p>2. <u>What resources do you use to when using digital environment for to teach agricultural sciences?</u></p> <p><u>Sub-questions:</u></p> <ul style="list-style-type: none"> a) How can structured and unstructured resources be used to enhance the digital teaching of agricultural sciences.
<p>3. <u>Why do you use the particular digital learning environment in teaching agricultural sciences?</u></p> <p><u>Sub-questions:</u></p> <ul style="list-style-type: none"> a) What structured/formal reason that made you use digital learning environment in teaching agricultural sciences modules? b) What unstructured/informal reason that made you use digital learning environment in teaching agricultural sciences modules? c) What reason can make you integrate both structured and understructured digital learning environments in teaching agricultural sciences modules?
<p>4. <u>How do you access the particular digital learning environment that you use to teach agricultural sciences?</u></p> <p><u>Sub-questions:</u></p> <ul style="list-style-type: none"> a) How is the ease of accessing structured digital learning environments to teach agricultural sciences? b) How is the ease of accessing unstructured digital learning environment to teach agricultural sciences modules? c) Which digital learning environment (structured or unstructured) is easily accessible for you? Why? d) How do you manage cost implication to access digital learning environment?
<p>5. <u>How do you ensure effectiveness of the digital learning environments in attaining goals of the agricultural sciences modules that you are teaching?</u></p> <p><u>Sub-questions:</u></p> <ul style="list-style-type: none"> a) How are your aims of using digital learning environment to teach agricultural sciences attained? b) How has digital teaching affected the integrity of attaining your modules' objectives? c) How are your intentions of using digital learning environment satisfied?
<p>6. <u>What content of agricultural sciences are you teaching using digital learning environment?</u></p> <p><u>Sub-questions:</u></p> <ul style="list-style-type: none"> a) What agricultural sciences content do you teach using digital learning environment? b) <i>How you teach your practical content in agricultural sciences using digital environment?</i>
<p>7. <u>What digital learning activities do you use when teaching Agricultural Sciences?</u></p> <p><u>Sub-questions:</u></p> <ul style="list-style-type: none"> a) <i>What digital learning activities do you use when engaging students in your agricultural sciences modules?</i> b) <i>How do you plan digital activities in order to respond to the content to be taught?</i> c) <i>What digital learning activities do you use in order to ensure maximum attendance of students in your lectures?</i>
<p>8. <u>How do you assess agricultural sciences sing digital learning environment?</u></p>

<p><u>Sub-questions:</u></p> <ol style="list-style-type: none"> How do you informally assess agricultural sciences modules on digital environment? Who do you formally assess agricultural sciences modules on digital environment? What difference in the performance (pass/fail/average marks) of students doing online assessments, as opposed to traditional sit-down tests and examinations?
<p>9. <u>What are roles in the use of digital learning environment when teaching agricultural sciences modules?</u></p> <p><u>Sub-questions:</u></p> <ol style="list-style-type: none"> How do you perform your role as an instructor when using structured digital learning environment? How do perform your role as a facilitator when using unstructured digital learning environment? How do you foresee your role when using semi-structured digital learning environment?
<p>10. <u>Where do you use digital learning environment when teaching agricultural sciences modules?</u></p> <p><u>Sub-questions:</u></p> <ol style="list-style-type: none"> Where do you formally conduct your online lectures for agricultural sciences? Where do you informally conduct your online lectures for agricultural sciences? <i>Are the environments that you are using conducive and reliable? Explain.</i>
<p>11. <u>When do you use digital learning environment to teach agricultural sciences modules?</u></p> <p><u>Sub-questions:</u></p> <ol style="list-style-type: none"> When is convenient for you to use a digital learning environment to teach your agricultural sciences modules? Substantiate. <ul style="list-style-type: none"> • <i>Morning</i> • <i>Afternoon</i> • <i>Evening (after working hours)</i> • <i>Weekends</i> Is your departmental timetable flexible to accommodate time that is convenient for you and your students? How frequent do you use digital learning environment with your students?

Appendix K: Participant informed consent form

Mr. Msimelelo Buyisile Nkohla

[REDACTED]

[REDACTED]

[REDACTED]

15 November 2021

RE: INFORMED CONSENT FORM

Dear Participant

My name is Msimelelo Buyisile Nkohla. I am a lecturer at the University of Fort Hare's Faculty of Education, and a doctoral candidate in the School of Education (Curriculum Studies) at the University of KwaZulu-Natal. My PhD study is entitled '*Reconceptualising Academics' Experiences of Using Digitalised Learning Environments to Teach Agricultural Sciences at a South African University*', and involves academics who teach agricultural sciences modules in the Faculty of Science and Agriculture. I have observed and experienced that academics' experiences of using digitalised learning environments differ, and some academics are still struggling to attain intended curriculum goals. This could be because of the practical nature of agriculture, and the context of our institution. It becomes more complex when one has to teach a practical subject like agricultural sciences in a historically disadvantaged comprehensive university using digital platforms that require more than the basic experience of using digital technology. Especially, when also a moratorium on face-to-face teaching and learning was announced.

This educational design research of a historically disadvantaged comprehensive university aims to enhance the experiences of teaching agriculture through reconceptualising current experiences in order to come up with responsive pedagogies to the context of the university, and institutions with a similar context. I am also involved in the research as I am an agricultural education lecturer but in a different faculty. Therefore, to gather all the information (data) to successfully complete my studies, I kindly request you to participate and answer some questions based on your experiences as an academic who teaches agricultural sciences modules.

Please note that:

- Your confidentiality is guaranteed as your contribution will not be attributed to you in person, instead a report as a population member option;
- The reflective activity, interviews and focus group may last for about an hour (1 hour);
- Data will be stored in secure storage and destroyed after five years;
- You are at liberty to withdraw your participation from the study at any time you feel uncomfortable continuing;

- Your real identity and university name will not be used, instead, symbols or pseudo-names such as P1 (for participant 1), P2, P3 will be used;
- Your involvement is purely for academic purposes, and there are no financial benefits involved.

If you agree to participate in the research, please tick whether you AGREE (willing) or DISAGREE (Not willing) to the following to be used:

	Willing	Not Willing
Equipment		
Microsoft Teams/ Zoom		
Tape recorder		
Lesson observation (Blackboard)		
Access to teaching portfolio		

I can be contacted at:

Cell: [REDACTED]. Tel: [REDACTED], email: [REDACTED]

My promoter: Prof. S.B. Khoza. Location: School of Education, Edgewood campus, University of KwaZulu-Natal. Phone: 031 260 7595, Email: khozas@ukzn.ac.za

Co-promoter: Dr. C.B. Mpungose: 031 260 3671, Email: mpungosec@ukzn.ac.za

PhD Academic Leader: Professor T.T Bhengu School of Education, Edgewood campus, University of KwaZulu-Natal. , email: bhengutt@ukzn.ac.za

You may also contact the Research Office through:

HSSREC Research Office

Govan Mbeki Building

Private Bag X 54001

Durban, 4000

KwaZulu-Natal, SOUTH AFRICA, 04557

Tel No. 031 260 8350/4557/387. E-mail: HSSREC@ukzn.ac.za

Thank you for your contribution to this research.

Kindest regards:



Msimlelo Buyisile Nkohla

PARTICIPANT DECLARATION

I,..... (Full names of participant) hereby confirm that I understand the consent of this document and nature of the research, and I am willing to participate in this research study.

I understand that I can withdraw at any time I feel uncomfortable.

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Signature of the Participant

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