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The adoption of E-Learning as a remote teaching and learning methodology in tertiary institutions during Covid-19: A case study of the University of Kwa-Zulu Natal

By

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DECLARATION

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ACRONYMS AND ABBREVIATIONS

COVID-19	Coronavirus
E-LEARNING	Electronic Learning
UKZN	University of Kwa-Zulu Natal
ICT	Information and Communications Technology
SEM	Structured Equation Model
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behavior
ICT	Information and Communication Technology
UTOS	UKZN Teach Online Strategy
SPSS	Statistical Package for the Social Sciences

ABSTRACT

This research was a case study that sought to explore if the University of Kwa-Zulu Natal (UKZN) is ready to adopt E-learning as a fully-fledged method of teaching and learning during Covid-19.

The advent of the Coronavirus (Alsoud and Harasis 2021) in South Africa was confirmed by the National Institute for Communicable Diseases (NICD) on the 5th of March 2020. Since then, academic institutions at all levels have been grappling with the ways of delivering education in a safe mode that could prevent the spread of the pandemic. This prompted the need for academic institutions to adopt a fully ledged E-learning methodology in teaching and learning.

Consequently, the aim of the study was to explore the readiness of the academics to adopt the E-learning methodology. Such readiness was explored through the application of the study objectives that were aimed at academic staff's satisfaction level with the change, challenges that were experienced by the academic staff during the adoption process, the impact of E-learning on academics' work and personal lives as well as the improvement of such methodology for the benefit of the institution.

The study adopted a mixed method case study design of qualitative and quantitative research methods. Both quantitative and qualitative data were collected at the same time, analysed separately and the results merged in the summary and discussion of the study findings.

The findings of the study revealed that the academic staff of UKZN were ready for the adoption of E-learning as the teaching and learning methodology. However, the study identified limitations in terms of infrastructural problems such as network service providers, as well as the ongoing blackouts limiting access to electricity.

The findings of the study can have a significant impact on the strategic teams of the institution where there is a need of reinforcing control measures on the remote assessment of the students during the E-learning examinations. Furthermore, Management of the UKZN can use the results of this study as a springboard to motivating the academics and fine-tuning their approach towards the application of the technology based method of teaching and learning.

Keywords: E-learning; Technology Acceptance Model; Teaching and Learning; E-learning challenges; Impact of E-learning; Adoption of E-learning

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CHAPTER 1
THE INTRODUCTION

1.1. Introduction

People in South Africa and around the world were unprepared for the outbreak of the Coronavirus pandemic in 2019 (Mhlanga and Moloi 2020). Government departments, policy-makers, business decision-makers and even religious leaders were caught off guard. Due to the sudden emergence of the pandemic, most institutions implemented interim strategies to deal with the health risks of this virus (Ellis 2021). In the main, institutions of higher learning had already started re-shaping their teaching and learning methods in line with technology-based E-learning, although the new methods were still predominantly classroom-based (Chang Park 2020). With the compliance requirement that institutions must suspend classroom activities, such institutions were left with no other option but to expedite the implementation of a fully-fledged E-learning methodology of teaching and learning.

1.2 Background to the study

In South Africa, like many other countries, risk aversion strategies were designed in a makeshift arrangement influenced by the alert levels (Kollamparambil U and Oyenubi A 2021). Alert levels were used to determine the levels of restrictions to be applied as an intervention during the national state of disaster (Kollamparambil U and Oyenubi A 2021) . These alert levels range from 1-5.

1.2.1 E- learning as a contingency measure

(Cidral *et al.* 2018) define a contigency plan as a course of action, a programme or a strategy crafted by policy-makers to ensure that a particular organisation or an institution responds effectively to a momentous problem that may be confronting them currently or in the future. Like most of the universities throughout the world during the outbreak of Covid-19, UKZN had to take swift action to guarantee the continuity of learning and teaching programmes. E-learning has been found to be the most resilient education system in support of the distance learning as an alternate to the conventional methods of teaching. Covid-19 necessitated this as most institutions went under lockdown ever since its outbreak (Alsoud and Harasis 2021).

E-learning has proved to be a successful replacement for conventional teaching methods in other countries, especially developing countries such as Indonesia, Lesotho and Jordan (Abdullah, Toycan and Anwar 2017). These facts prompted the idea of conducting this study, specifically as the UKZN has already embarked on the processes of adopting E-learning as an alternative to conventional methods. The question was whether UKZN academics were ready to engage positively in this initiative.

(Cidral *et al.* 2018) state that computer technology skills and the users' attitudes become the most significant factors influencing the readiness of any institution to adopt E-learning. Additionally, effective training becomes a key to unlocking the evidence of risk that may accompany such interventions. In that case, the institution is enabled to design relevant risk aversion strategies.

1.3 Impact of Covid-19 on conventional teaching and learning

The challenges faced during the pandemic became a grave concern in higher education. Consequently, psychological resilience in the field of education could only be gained through effective teaching and learning strategies as demanded by the current level at which the country would be operating (Ana *et al.* 2020).The teaching and learning strategies guaranteed less contact between the academics and students. Effectively, face-to-face interactions between the students and academics became non-existent.(Chang Park 2020) states that the teaching and learning strategies that would not compromise both intrinsic and extrinsic educational values would be ones that:

- Easily comprehend lecturers' or academics' approach in delivering the subject matter;
- Pose minimal challenges to the academics;
- Have a positive impact on career advancement and to an extent, the economic status of the academics; and
- encompass teaching and learning strategies that have clear plans to tackle and deal with hiccups during the introductory phase (Ana *et al.* 2020).

Most authors make reference to an E-learning strategy as the recommended methodology for distant or remote learning during the Covid-19 pandemic (Al-Fraihat, Joy and Sinclair 2020; Alhumaid *et al.* 2020; Karkar, Fatlawi and Al-Jobouri 2020). The University of KwaZulu-Natal

also regarded E-learning as the best teaching and learning methodology for remote classes during the Covid-19 lockdown.

1.4 The focus of the study

The study focus is on the acceptance of a fully-fledged E-learning methodology during Covid 19 as an alternative teaching and learning method at UKZN during the Covid-19 period. UKZN comprises four colleges, namely Law and Management, Humanities, Health Sciences, and Science and Agriculture. These colleges are spread across five campuses, namely Edgewood, Nelson Mandela, Pietermaritzburg and Westville. The total number of academic staff responsible for teaching and learning on these campuses is 1296. The study will use a convergent mixed method design with an embedded case study approach. The sample will be drawn from this total number of academics and the questionnaire consisting of both closed and open-ended questions will be sent thereafter. Both quantitative and qualitative data will be collected simultaneously, analysed separately and the results will be converged during the discussion.

The results of the study will assist lecturers at UKZN in their consideration of the improvement of their teaching and learning. Subsequently, the results will be published in both national and international platforms for wider distribution to any other parties that may be interested in making use thereof.

1.5 The rationale and the aim of the study

The researcher is employed as an ICT specialist by the University of KwaZulu-Natal. One of his responsibilities is to deal with both academics' and students' technological challenges associated with the teaching and learning processes. After the UKZN's formation of a strategic team responsible for the development of Covid-19 preventative measures, a list of extraneous factors were implemented as controls to prevent the spread of the virus within the institution. Soon after the inception of E-learning, the ICT department was inundated with various queries from the academics, specifically those complaints that were logged in relation to E-learning. These included infrastructural weaknesses; poor internet speed; E-learning training aspects which included audio and video recording; photo editing; the use of applications for live conferencing, as well as the application of assessment processes. Although student queries were also on the rise, most previous studies have explored a great deal of student-related technological problems with the implementation of E-learning (Al-Fraihat, Joy and Sinclair

2020; Alhumaid *et al.* 2020; Karkar, Fatlawi and Al-Jobouri 2020). Consequently, this study focuses on the problems experienced by academics with E-learning and what can be done to assist them.

The study aims to provide insight into the challenges experienced by academic staff during the sudden adoption of a fully-fledged E-learning process. The study will recommend how challenges can be mitigated to speed up the adoption of the new process.

Consequently, the aim of the study is also to ensure that both lecturers and students are better prepared to embrace E-learning if there is another outbreak of the pandemic, or any other such disruption to teaching and learning.

The recommendations of the study can inform strategic teams about the teaching and learning solutions to these challenges. The study will also recommend how the assessment results of the students can improve through an increased accessibility of students to the process. The focus of the study is as follows:

- Firstly, to gauge academics' level of readiness to accept the E-learning methods whilst analysing their perceptions of the methodology; and
- Secondly, the study seeks to recommend a middle range solution that will enhance the adoption of blended and remote learning.

The solution to the problem is of crucial importance not only to the academic institution, but also to the country as the number of graduates could be affected. This will have a negative impact on the economy of the country as well as other social development initiatives (Ellis 2021).

1.6 The Problem Statement

The implementation of E-learning at UKZN exposed many issues in the institution and the country as a whole. The issues that stood out were the challenges relating to insufficient technological skills; the culture of conventional learning, and the critical lack of technological infrastructure in most parts of the country. South Africa is a developing country, thus the resources and infrastructure required to support E-learning have not yet reached many parts. (Ly *et al.* 2021) cite the slow adoption of E-learning in South African Universities as the major cause for being unprepared when the pandemic broke out in 2020. When the country reached alert level 4, UKZN's implementation of E-learning involved a minimum use of technology.

Teaching involved the use of conventional methods that require much classroom interaction between academic staff and students, and some technology (Ly *et al.* 2021).

With known technological challenges, some academics were reluctant to fully implement the online E-learning methodology. The lack of enthusiasm in the implementation of this initiative came at a high cost to the University, which had an impact on student success. This study therefore seeks to address the reasons behind the academics' low level of acceptance of E-learning at UKZN.

1.7 Objectives

The objectives of the study are to:

- Determine the levels of Academic staff satisfaction with blended and E-learning adoption during Covid-19;
- Determine the challenges experienced by academics during the adoption of E-learning during Covid-19;
- Establish the impact of E-learning on academics during the implementation of remote teaching and learning; and
- Recommend what could/can be done to improve the E-learning transition for academic staff.

1.8 The research questions

The research questions are as follows:

- What are the levels of satisfaction of Academic staff regarding E-learning during Covid-19?
- What were the main challenges in E-learning experienced by academic staff during Covid-19?
- What was the impact of the E-learning transition on academics during the implementation of remote teaching and learning?
- What could/can be done to improve the E-learning transition and experience for academic staff?

1.9 Structure of the study

The structure and the flow of the study are outlined below:

1.9.1 **Chapter 1**: The introductory chapter describes the background to the study; the impact of Covid-19 on conventional teaching and learning; the rationale and the aim of the study; the problem statement; the research objectives; research questions; the focus of the study; and the structure of the study.

1.9.2 **Chapter 2**: Presents the literature review by searching and reviewing current evidence related to the study and expounds on the theoretical framework on which the study is based.

1.9.3 **Chapter 3**: Describes the methods, research design, approach, methodology choice and the design of the questionnaire and the research instrument, data collection, calculation of the sample size and ethical issues. Data preparations encompass Data coding and capturing into computer software.

1.9.4 **Chapter 4**: Presents the analysis and discussion of the findings. It provides a presentation of data outputs in tables and graphical format.

1.1 Chapter 5: Key findings, Discussions, recommendations and conclusions are provided in the final chapter.

1.10 Conclusion

This chapter has laid the background and the focus of the study, highlighting the problem statement, the research objectives as well as the research questions. The following chapter will focus on the collection of evidence through a literature review, choosing the relevant theoretical framework as well as highlighting the gap between what has been reported on the topic and what this study will investigate.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

The previous chapter discussed the aim of the study, the problem statement, objectives and questions of the study, in addition to mapping the structure of the study.

This chapter outlines the review of main evidence collected from previous work by other authors on accepting technology as the buttress of fully-fledged E-learning during the Covid-19 pandemic and beyond. The evidence reviewed includes a screening of seminal literature sources such as scholarly journals, media articles, textbooks, internet browsing and any other legitimately published source that could be of use in achieving the aim of the study. The research topic, problem statement and the research objectives are key to providing guidance in sieving through the readily available evidence so that only relevant conclusions can be made on the presentation of the arguments. Therefore, the review of the literature in line with the research topic and objectives is important in the organisation, examination and synthesizing of the facts before the presentation of the results from the data analysis of this research.

The current chapter will discuss the execution of teaching and learning during Covid-19; academic staff readiness to adopt E-learning during Covid-19; E-learning challenges facing the academic staff; network and internet challenges, as well as the choice of theoretical framework that guided the study.

2.2 Execution of the teaching and learning process during Covid-19

(Chang Park 2020) defines Electronic-Learning (E-learning as a model of education that predominantly employs information and communications technology to feed and retrieve information online during the teaching and learning process (Alqudah Noor M 2020). This definition will be applied throughout this study when referring to the E-learning mode of teaching and learning.

Due to the severity of the Covid-19 pandemic, the adoption of fully-fledged E-learning as a remote teaching and learning methodology in tertiary institutions became inevitable.(Kaur, Kaur and Sharma 2022) insist that the introduction of E-learning has embellished the education by enticing the youth with technology which has become their way of life in the 21st century. With that in mind, E-learning was deemed to be the best teaching and learning methodology to

deliver best-quality results. The learning process could not be suspended indefinitely as there was no certainty about how long it would take to either find the cure for the virus or the natural self-riddance of the virus. Currently, scientists claim that the virus causing Covid-19 will become endemic and will continue to circulate the global population for years until the researchers on infectious diseases find a way to eradicate it (Phillips 2021). In light of these speculations, it is clear that online teaching and learning will continue to be a necessary tool in the field of education. (Phillips 2021) insists that E-learning has embellished the image of education in the 21st century. It has turned education into an important commodity in the knowledge economy. Students going through teaching and learning methodologies like E-learning will make a significant contribution to their nations' ability to compete in the global marketplace. identified four main contributions of E-learning to 21st century education, namely:

- **21st century skills**: where students can research and equip themselves in entrepreneurial skills and environmental literacy;
- **Learning and innovation skills**: with improved ICT skills through E-learning, students become creative, become critical thinkers, learn collaborative problem-solving skills and their communication skills improve;
- **Information technology skills**: students become expert in ICT applications as they get used to the modern technology; and
- **Life and career skills**: E-learning students become more flexible and adaptive to new methods; they take initiatives in process improvement; and they seem to be more productive and take control of things

E-learning was readily in use by most of the tertiary institutions before the outbreak of Covid-19. However, such a learning mode was blended with conventional classroom methods and pure E-learning was mostly popular for people who were mentally and economically capable to work with it (Favale *et al.* 2020). The Coronavirus forced institutions to accept working remotely as opposed to the traditional face-to-face interactions between the students and their instructors. In essence, this would enforce the migration of the teaching and learning process from the comfort of a blended mode to fully fledged E-learning which demands online collaboration platforms (Favale *et al.* 2020).

(Jaffer, Ng'ambi and Czerniewicz 2007) identified several priorities to be strategized before the adoption of E-learning as a mode of remote teaching and learning (Ibrahim R 2017). Some of these priorities include:

- Preparation of students for the new online academic processes, such as the use of interactive web portals;
- Working individually and self-discipline issues;
- Looking into language barriers and contextualising the subjects accordingly. Alignment of curriculum designs with online methods;
- Efforts to eliminate negative perceptions about E-learning; and
- Alignment of the ICT management support systems as well, but not limited to the availability of resources such as internet data and network infrastructure (Agbenyegah Albert Tchey and Dlamini Bongani Innocent 2019).

Most tertiary institutions, for example UKZN, started looking into developing their interventions for fully fledged E-learning to engage students in remote areas off the campuses, which was known as the "UKZN Teach Online Strategy" (UTOS) (http://utlo.ukzn.ac.za/utop). The UKZN Teach Online Strategy (UTOS) is designed to assist academics in adopting a technology-enhanced teaching and learning culture, now and for the future. The strategy affirms and aligns with conventional pedagogic practices, while advancing more innovative and creative modes, which includes effective digital pedagogies, online lecture distribution, online assessments, online lecturer and student engagement, as well as online training and teaching resources.

In the introductory phase of UTOS, the first opportunity was to give it to all the academic staff so that they could identify challenges that had made it hard to implement E-leaning in a blended mode. This was an icebreaking exercise to ensure that proper Computer Technology tools were identified for the curation of online materials as well as the design of relevant training programmes for both academics and other support groups from the ICT department. The exercise also probed the perceptions of the academic staff on the modes of delivery in certain modules and programmes that had not been included initially due to the thinking that such modules do not lend themselves easily to online delivery. In addition, most lecturers are used to practical teaching and learning via face-to-face contact in laboratories. Secondly, insufficient training for staff members unfamiliar with the computer programmes designed for E-learning often leads to errors, unacceptable quality results and time lost due to repeating activities.

Those programmes included uploading and editing the videos created to deliver the modules online.

Progress in information technology has enabled new educational delivery methods such as distance learning and E-learning ((Garad, Al-Ansi and Qamari 2021). As a result, many universities and colleges have joined this innovative E-learning world. Needless to say, Covid-19 brought about this need to accelerate the slow process of transformation from pedagogical and technical knowledge to teach using the Internet, modern technological presentation and conferencing applications. On the positive side, this knowledge is gradually becoming a core competency for many teachers as well as students, especially in tertiary institutions (Garad, Al-Ansi and Qamari 2021).

2.3 Academic staff readiness to adopt E-learning during Covid-19

(Chang Park 2020) states that as an educational delivery system, teaching and learning in tertiary institutions has traditionally been an interactive process whereby lecturers facilitate in a classroom with the students listening, taking notes and asking questions. In this instance, communication between the lecturer and the student has been of vital importance. However, change is always inevitable, and Covid-19 influenced the necessity to review the conventional methods of delivering education. UKZN could not be excluded from that process as Covid-19 pandemic was a global threat and was spreading like a wildfire.

Change management often faces many obstacles with its path being littered by different resistance and concerns from those failing to understand the need (Mohammed and Kassem 2020). Furthermore, (Chang Park 2020) states that adaptability to change is a skill that plays an important role in the work environment. Academics possessing such qualities would be able to react positively and quickly to the ideas and strategies of migrating from blended teaching and learning modes to fully-fledged E-learning methods. A lack of adaptability skills was cited as one of the major obstacles responsible for the reluctance of academics to adopt E-learning during Covid-19 (Mohammed and Kassem 2020). It was for this reason that moving from the comfort of personal interaction with the students to online video-based interactions created some anxiety and discontent amongst some of the academics (Karkar, Fatlawi and Al-Jobouri 2020).

Even though the champions of change in institutions eagerly offered training on basic ICT skills such as audio/video, photo editing and how to use the E-learning applications for live remote

conferencing, ungraspable persistent problems of uncertainty kept cropping up (Alqudah Noor M 2020).

Another perception that thwarted E-learning as a remote teaching and learning method was that academics found it subject to students lacking ICT skills (Mohammed and Kassem 2020). Although not scientifically proved, students from rural areas do not have an adequate level of exposure to modern technology due to infrastructural deficiencies. Such students' confidence can be compromised when exposed to video conferencing applications as their questions may be regarded as irrelevant by other students (Maphalala and Adigun 2021).

Some of the responses by the academics alluded to this by highlighting that students participate more freely when working individually from the comfort of their residences.

On the question of the academics' experience in using E-learning, 56% of the respondents agreed and 15% highly agreed that they have sufficient experience to go live with E-learning (See Fig 4.13)

2.3.1 E-learning challenges facing academics during Covid-19

From the onset the education institutes' effort in fighting against the spread of Covid-19 was deemed worthless unless the classes were suspended. Therefore, the temporary replacement of a conventional or blended teaching and learning system with E-learning was inevitable to maintain the continuity of the classes. This form of teaching and learning method would enable lecturers to access the students in the comfort of their homes in compliance with the regulatory requirements for avoiding the spread of the virus (Aboagye, Yawson and Appiah 2021). Despite all the benefits that can be potentially garnered by both institutions and students, there were also pessimists that contemplated the opposite, with the view that neither academics nor students would benefit from E-learning (Lizcano and Arroyave 2020).

Some of these negative feelings about the adoption of E-learning were evident in the analysed qualitative data for Theme 2 in 4.3.2 in Section D of Chapter 4. Data indicate that academics perceive that the challenges are more prevalent than the benefits. They feel that students will not have sufficient data to go live with E-learning. Coupled with that are the infrastructural problems in relation to power supply.

Although most educational institutions had already established remarkable progress in E-learning, sudden implementation on a full scale during Covid-19 was perceived not to be smooth and adaptable for both the students and academics. One of the shortcomings exhibited

in the analysis of data for this study was the perception that students in the Engineering and Mathematics faculties would experience a slow response to their input commands. The focus for that reason was the small-size type of computers supplied by UKZN.

(Chang Park 2020) listed some of the challenges that were disconcerting as:

- Difficulty tuning into the change by both academics and students;
- Network and internet issues, especially in deep rural areas: The results of this study point out that power failures are a major cause for unreliable internet connections, as well as network service providers. This is highlighted strongly in Q1 of **Theme 2,** as the phrase "connectivity problems" was most frequently used.
- A lack of enablers for students to remotely reach the academics;
- Unconducive residential environments (e.g., restricted workspace);
- A lack of online teaching and learning resources; and
- Insufficient ICT skills associated with video conferencing, editing and online assessments. This is also highlighted in the results of this study in Section D, Theme 2 (Technology challenges). In response to the question on the support by the IT helpdesk, academics demonstrated a strong lack of confidence in the technicians being skilled enough in that function.

2.3.2 Academics' difficulties to adjust

Academics play an important role in making E-learning a success. (Gentile *et al.* 2020) highlights three important combination factors to be considered by academics in understanding E-learning, namely work technology, expressive content and efficacious E-learning design (Gentile *et al.* 2020). Specifically, these three components connect and academics must be able to combine them comprehensively. For instance,

- In order for E-learning to be effective, technology serves as fundamental infrastructure, tasked with enabling the implementation of E-learning through the interactive transfer of information during the teaching and learning process. This process must bear the objective of knowledge acquisition by the students (Urh, Vukovic and Jereb 2015);
- Academics must be able to select relevant activities and material associated with specific subjects for the content to be relatively meaningful in line with the objective of knowledge transfer during E-learning (Al-Yahya, George and Alfaries 2015); and

- Understanding E-learning design helps academics in identifying the scale of decisions in planning activities and interventions before the teaching and learning process, as well as the selection of relevant resources and technology (Gentile *et al.* 2020).

The results of this study indicate that the fear of the change plays an important role in the behaviour of the academics at UKZN. On SQ001, where the objective of the study was to explore the impact of E-learning on the academic staff, there was a statement probing whether E-learning will improve the quality of teaching and learning at UKZN. Only 35% of the respondents agreed with the statement (See Fig 4.21)

In SQ002, which was an objective exploring academics' technological challenges, there was a statement probing whether E-learning is user-friendly, and only 45% responded highly positively to the statement (See Fig. 4.18).

For the same objective, there was another question probing into whether the academics see the resources at UKZN as one of the hurdles for E-learning, and 43 % of the responses were highly positive (See Fig. 4.20).

2.3.3 Connectivity, network and internet issues

E-learning is entirely dependent on an internet connection that is reliable and of fast speed, otherwise such teaching and learning methodology experiences connectivity glitches which impact negatively on time management (Safdar and Khan 2020). With so much internet demand during lockdown, some E-learning undermining factors have been identified in some areas, especially the deep rural areas of South Africa (Dawadi *et al.* 2020) and (Jena 2020). This drawback does not only affect the on-time delivery of subjects to students, but also results in discouragement and the loss of interest by students. Needless to say, there are negative repercussions thereof on the quality of E-learning as an effective methodology to deliver a high degree of excellence in the end-results (Aboagye *et al*. 2020); (Bao 2020);(Berezhna 2020); (Dawadi *et al.* 2020) (Jena 2020). In some areas, it was reported that the internet cannot be consistently available and this lack of reliability to access online lectures on time sometimes forced the academics to repeat one lecture more than once (Crawford *et al.* 2020).

The results of this study demonstrated that connectivity and other internet support infrastructure are still a problem to students as well as those academics residing in semi-rural areas.

2.3.4 Individual challenges

In some areas, academics have reported a serious unavailability of the resources that facilitate online teaching and learning (Kerres 2020). This puts an unnecessary strain on the university ICT support system, especially when E-learning communication tools are needed. This happens mostly when academics experience limited access to other online tools due to licensing inefficiencies (Azorín 2020).

(ATABHOTOR, KOFOWOROLA and BOLATITO 2020) Point out academics' individual challenges as the most difficult hurdle in the delivery of subject matter through E-learning. These challenges may include but are not limited to:

- Academics' technological confidence;
- Understanding organisational and other social supports when faced with technological shortcomings;
- Personal motivation and the level of commitment by the academics; and
- Individual competence and the ability to manage time is of crucial importance in the adoption of an E-learning methodology (Aboagye, Yawson and Appiah 2021).

Additionally, it has also been identified that culture may be one of the determinants of academics' attitudes towards the adoption of E-learning (Zhao *et al.* 2021). It is so profound that even though E-learning and other online base ICT tools were developed in an attempt to achieve the same educational benefits, some developing countries have struggled to adopt technologies that were originally designed and developed for more advanced countries, specifically the first-world economies (Kuliya and Usman 2021). First-world economies have different cultural settings comparative to developing countries. Therefore, their teaching and learning settings are generally not contextualised to the individual needs of academics in developing countries (Kuliya and Usman 2021). (Pinho, Franco and Mendes 2021) state that such gaps between academics from first-world and developing countries can be minimised through skills development programmes. However, the cultural gap still exists and instructors are still resistant to accepting new online-based teaching and learning styles (Pinho, Franco and Mendes 2021).

Although this identified as one of hurdles in the literature, on analysing the data for this study, it emerged as not so much of a concern at UKZN.

2.4 The impact of E-learning on tertiary institutions' teaching and learning processes

The Covid-19 pandemic has definitely prompted a wave of change from the conventional methods of teaching to less-risk technology-based methods, which are perceived to be less risky as far as the spread of Covid-19 is concerned. However, E-learning must not be viewed as an alternative to the face-to-face teaching method, but as a complement to it (Mohammed and Kassem 2020). Furthermore, E-learning allows students flexibility in choosing the learning pace, which means a higher level of responsibility for their own learning process. E-learning can change the methods of learning and has the promise to overcome the barriers of time, distance and economics (Bryson and Andres 2020). Moreover, E-learning is perceived as the learning and teaching method with considerable worth in terms of usefulness in the education sector (Baber 2021). It has completely removed the distance barrier and made learning a convenient and pleasant affair. Studies indicate that E-learning can help increase student engagement, motivation and attendance, which are significant prerequisites for learning (Al-Fraihat, Joy and Sinclair 2020). Effective E-learning can also lead to an enhancement in the performance of major subjects and promote the growth of the required skills to meet the challenges of the 21st century (Chang Park 2020). (Burac *et al.* 2019) also state that the use of E-learning can be economically effective due to its ability to minimise the costs associated with materials for student activities, hand-outs and, to an extent, laboratory manuals (Saxena, Baber and Kumar 2021).

Despite the propagation of electronically-supported teaching and learning processes, there is still a remarkable level of discontentment with how and to what extent E-learning will influence the quality of education as well as intuition in students as the end-products of the system.

Although there are several benefits associated with E-learning, it is evident that such benefits can always be brought about through a fair amount of buy-in from the academics or instructors. One of the doubts commonly cited against E-learning is the lack of the technological skills needed by both academics and students for effective online teaching and learning (Burac *et al.* 2019).

(Chang Park 2020) further confirms that some stakeholders in the educational sector perceive that the lack of resources, institutional structures and financial support are retarding factors in the adoption of E-learning as a fully-fledged remote teaching and learning methodology. This perception stems from the fact that E-learning success is responsive to the economic position

of the country, which means that in the event of an economic downswing, financial support gradually diminishes.

2.5 Academics' level of satisfaction

With all the challenges, perceptions and cultural issues attached to the adoption of E-learning, there is a greater need to look for a model that will help in speeding up the process. Academics' level of satisfaction with the E-learning methodology plays an important role in the adoption of the same, as well as to answer the question of what needs to be done to develop and sustain an E-learning methodology that will improve the educational benefits in the country. In spite of the material reviewed, as well as the consideration of other authors' viewpoints on E-learning topics, this study will focus on answering this question. An answer to the question will make a great contribution towards new knowledge in tertiary institutions' teaching and learning methodologies.

In this study, the academics were tested for their motivation towards speeding up the adoption of E-learning methods. In section 4.25 of the data analysis, it was evident that academics are highly motivated as 63% confirmed that they see E-learning advancing their scope of IT knowledge. Regarding working from home, 72% of the academics confirmed that it would benefit them on travel cost savings.

2.6 Theoretical Framework

(Grant and Osanloo 2016) state that the Theoretical Framework plays an important role in the research process as it is the foundation from which all aspects of research are constructed. It serves as the fabric that systematically weaves and connects the rationale of the study, the problem statement, the significance and the objectives or questions of the study. With a relevant Theoretical Framework, the grounding base is provided for the review of relevant materials and most importantly, the choice of research methods and analysis (Heding, Knudtzen and Bjerre 2020).

According to (Heding, Knudtzen and Bjerre 2020), studies must be supported by fundamental scientific principles for the findings to be reliably adopted as a strong and deeply thought-out contribution to the body of knowledge in the specific field of a subject. Such a scientific principle is useful as the theory through which the study is guided, and it helps evidence analysis in terms of the relationships between the dependent and independent variables. Due to the cognitive limitations of humans, it sometimes becomes too complex to discern and identify

the important thread serving to keep the fabric intact, which is why such a framework becomes a perfect tool for marrying theory with practice (Ullah *et al.* 2020).

Based on the aim, the objectives and the questions of the study, the four pillars of this study are:

- Firstly, to establish the perceptions of the academic staff at UKZN on the migration from traditional blended methods of teaching and learning to fully fledged E-learning during Covid-19;
- Secondly, to ascertain the challenges associated with the adoption of E-learning as a fully-fledged teaching and learning methodology;
- Thirdly, to determine the impact of E-learning on the academics' delivery of the subject matter to students; and
- Lastly, to recommend what can be done to speed up the adoption of E-learning as the solution to remote learning during the Covid-19 pandemic.

E-learning has resulted in a paradigm shift in the field of education, and E-learning systems have been identified in the material reviewed as a powerful tool for achieving the strategic objectives of tertiary institutions (teaching, research and serving the society). E-learning has been found to be a great contributor to progress at the institutional level as well as the personal level, including both academics and faculty (Trakru and Jha 2019). Progress in information technology has made this educational delivery methodology an enabler in the areas of remote learning and E-learning in general. This has led to the need for pedagogical and technical knowledge to teach using the Internet, and this knowledge is gradually becoming a core competence for many teachers as well as students (Al-Samarraie *et al.* 2018);(Mohammed and Kassem 2020).

However, E-learning does not come free of challenges to academics, whether individual or generally in different colleges of the universities. (Chang Park 2020),summarises these challenges into three groups of obstacles, namely:

(i) Personal challenges, which include factors reflective of an individual's internal personal traits as well as the character and habits of that individual;

(ii) Attitudinal inhibitors, which are mostly driven by internal character variables such as people's attitudes and their perspectives regarding technology and E-learning features. An example is the burning of 5G-towers in South Africa due to certain individuals' standpoint; and

(iii) Contextual inhibitors, which are reflective of external variables such as the lack of ICT support and organisational set-ups that are not easy to challenge, and the lack of infrastructural enablers such as internet availability and its speed (Mohammed and Kassem 2020).

Consequently, the study will need an appropriate and applicable Theoretical Framework that can guide the researcher to find answers to the research questions emanating from such objectives (Ullah *et al.* 2020).

With this in mind, the study can be guided through literature to establish which relevant Theoretical Framework can best fit this study (Ullah *et al.* 2020).

2.6.1 Evaluation of Theoretical Frameworks

(Cai *et al.* 2019) state that for the study to yield scientifically balanced results, both research questions and objectives play an important role in the identification of a rudimentary theoretical framework that helps in contextualizing, carrying out the study and reporting on the results. It is the same theoretical framework that establishes the set of parameters within which the most relevant research methods can be selected (Cai *et al.* 2019).

Consequently, three models were explored and examined, namely the Technology Acceptance Model (Greyling 2018) and the two theories as identified in the Diffusion of Innovation Theory. These are

- The Theory of Reasoned Action (Alryalat, Rana and Dwivedi 2020) and
- The Theory of Planned Behaviour (Ahmad *et al.* 2019).

All three theories were explored and compared in relation to the research question. This enabled the researcher to subject them to the same selection criteria before the choice was made.

2.6.1.1 Technology Acceptance Model

The Technology Acceptance Model as a theory (Greyling 2018) and model is highly recommended when investigating people's attitudes towards the adoption of change, especially in technology-related processes**.** In relation to the research questions or objectives of this study, the following can be observed:

- **Academic staff level of satisfaction**: it is people's attitudes towards the new technology that determine their level of satisfaction. This is predominantly driven by both intrinsic rewards as perceived by the person and extrinsic rewards, also perceived by individuals;

- **Challenges with the E-learning methodology**: Technology-based people's orientation and how they feel about innovation (optimists and pessimists) play an important role in the prevalence of challenges. Depending on whether they are a pessimist or an optimist, the person weighs challenges against possible successes (Yadav, Saini and Yadav 2021);
- **Impact of E-learning on academic staff**: Experiences and the perceived usefulness of the change brought about by the new technology influence both feelings and expected outcomes on the change. In-depth experiences usually drive people to look forward to the change. An example is that the impact of E-learning will be positive if the academic has been using technology-based methods in the planning and preparation of lectures, as well as using online methods for students' assignments (Aldieri, Makkonen and Vinci 2021); and
- **Adoption of E-learning**: Motivation theories help speed up people's willingness to accept modern methods of doing things. This refers to the condition where results indicate that the motivation and satisfaction levels of the academics are low (Ismowati *et al.* 2021).

2.6.1.2 The Theory of Reasoned Action

Academic staff level of satisfaction: levels of satisfaction are determined by peoples' attitudes towards the kind of change that is being introduced into the work environment. This means that institutions undergoing technological improvements or in the process of migrating to technology-based methods must ensure that their Human Resource Management practices have been elevated to enhance people's readiness to accept the change (Aldieri, Makkonen and Vinci 2021);

Challenges with the E-learning methodology: Since these are the reciprocals of people's attitudes, the enhancement of people's capabilities will result in less challenges (Aldieri, Makkonen and Vinci 2021).

Impact of E-learning on academic staff: Antecedents such as previous exposure determines the severity of impact on individuals. Institutions that have a poor record in handling technological changes will experience a negative impact with regard to every change instigated (Alryalat, Rana and Dwivedi 2020); and

Adoption of E-learning: Behavioral controls determine the speed of adoption. This normally takes up a lot of time as every time a change is introduced, institutions must be engaged in restructuring processes (Aldieri, Makkonen and Vinci 2021).

2.6.1.3 Theory of Planned Behavior

Academic staff level of satisfaction: Beliefs about the likely consequences influence satisfaction levels. Leaving people's perceptions to dominate the environment is likely to dampen the good results intended by certain actions. Employees' level of satisfaction will be hampered severely by such unwarranted behavior (Aldieri, Makkonen and Vinci 2021).

Challenges with an E-learning methodology: Normative behavior towards the outcomes as expected by the pioneers of the change (Ahmad *et al.* 2019)

Impact of E-learning on academic staff: Perceptions about the factors that may facilitate or impede performance of the new process or change. Resistance or flexibility to change determines the impact of change on the people's way of doing their jobs (Ahmad *et al.* 2019)

Adoption of E-learning: Can be achieved if people are given sufficient control on the change, which is time-consuming. This suggests that for every process or methodology change, the institution must engage all their staff members in the change management process. However, this not always practical (Ahmad *et al.* 2019).

Below is the summary of the three models.

Furthermore, Confirmatory Factor Analysis was conducted through Structural Equation Modelling (SEM), which was used as the statistical model fit test.

Table 2.1: Model comparisons

Research Question	TRA	TAM	TPB
Academic staff level of satisfaction	This is more determined by people's attitudes	People's attitudes towards the new technology determine their level of satisfaction	Beliefs about the likely consequences influence satisfaction levels
Challenges with the E-learning methodology	These are reciprocals of people's attitudes	Technology-based orientation and how people feel about innovation (optimists and pessimists) play an important role in the prevalence of challenges	Normative behaviour towards the outcomes as expectations of the change instigators
Impact of E-learning on academic staff	Antecedents such as previous exposure determine the	Experiences and perceived usefulness of the change	Perceptions on the factors that may facilitate or impede

	severity of impact on individuals	brought about by the new technology influence both feelings about the change	performance of the new process or change
Adoption of E-learning	Behavioural controls determine the speed of adoption	Motivation theories help speed up people's willingness to accept modern methods of doing things	Can be achieved if people are given sufficient control of the change which is time-consuming

2.6.2 Relevance of these theories to the study

Comparatively profiling the three theories indicates that these theories are applicable and have relevance to this study for the following reasons:

(i) They all address the problem statement of the study;

(ii) They are all underpinned by the same variances as identified in the objectives of the study; and

(iii) Finally, they are all focused in technology which is the bone of contention in this study.

TAM provides a solid blueprint for the study. In line with the rationale, aim and problem statement, the framework can guide the study in a manner such that both concept and purpose will not be botched up (Varpio *et al.* 2020).

2.6.3 Advantages of using TAM

TAM will enable this study in building a better research study when it comes to the design and analysis of data (Varpio *et al.* 2020) .

(Zhong, Oh and Moon 2021) recommend TAM as a useful model when investigating conditions that have effects on people's attitudes towards the adoption of technology. For this study, the model will be used as a basis for the research instrument seeking answers to the research questions. Measuring the academics' level of satisfaction, the identification of challenges and establishing the impact the E-learning and Teaching methodology will have on academics are all very crucial. That will enable the study to produce the results that will yield a better understanding if there were any glitches during the implementation phase. Such understanding will consequently support both theoretical and practical guidance for UKZN in cementing the methodology change (Zhong *et al.* 2021).

(Velicia-Martin *et al.* 2021) reinforce the usefulness of the model in the determination of people's willingness to accept and adopt the technology in modern applications. For validity, confirmation and assurance of the coherence of the model with the variables of the research instrument, a Structural Equation Model will be used (Irfan *et al.* 2021).

Below is a diagram showing the pathways that guide the study to a solid design for better results.

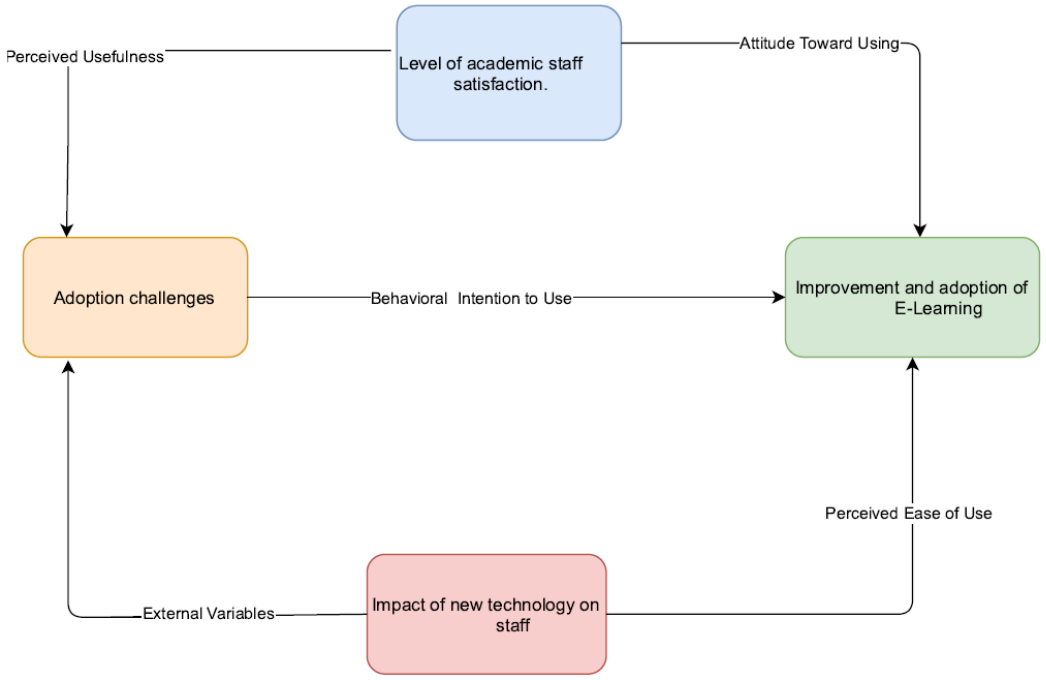


Figure 2.1: Structured Equation Model

2.7 Conclusion

The key highlights of this chapter emanated from the evidence as reviewed from the previous work of the other researchers. Firstly, the chapter highlighted the challenges imposed by the outbreak of Covid-19 on traditional teaching and learning methods. It highlights how Covid-19 has forced the institution to explore a fully-fledged E-learning methodology as an alternative. Consequently, such newly adopted methodology would demand that academics interact with the students online anywhere in the country during the lockdown period. The chapter also elucidated on that E-learning was already part of the teaching and learning methods in most of the institutions before the outbreak of Covid-19. However, such methodology was applied in conjunction with traditional classroom methods, which made the methods blend with a lot of academics'/students' interactions. The chapter identified three models that are closely

related to this study, but only one was used as a framework. That particular model was the Technology Acceptance Model (TAM).

The next chapter will identify the research methods chosen for the study. Elaboration will be made on research philosophy, the research design and data collection instruments. Sampling techniques and the sample size of the study population will be discussed and lastly, data analysis discussions will be provided.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the process followed when conducting the research in this study. Firstly, the research methods adopted are explained. Furthermore, the chapter explains the reasons behind choosing a case study strategy consisting of both quantitative and qualitative data collected through the survey questionnaire with both open- and closed-ended questions. The chapter also elaborates on the data preparation for the separate analyses on SPSS software of the quantitative data and NVivo software for the qualitative data. This research was conducted within the norms and standards of ethical compliance as expected in the University of Kwa-Zulu Natal's Code of Ethics. Together with stringent adherence to the research processes that ensure trustworthiness and reliability of the study, such ethics were maintained throughout this study.

3.2 The research method

(Whiffin 2020) states that there are various decisions to be made during the research phenomenon. For such decisions to keep the research process on track in line with the aim and objectives, the researcher must adopt a relevant methodology for the study. Methodology will then inform the study on how the research problem should be investigated through proper scientific inquiry methods. In summary of the above, the research methodology choice is one of the fundamental decisions to be made for the study in order to address all the underpinning steps to be taken during the research process. Therefore, the research methodology can be taken as an adhesive that sticks everything together during the research process (Whiffin 2020).

The elements of the Theoretical Framework adopted in this study encompass the objectives of this study and the evidence obtained through the literature review material. The methodology germane to this study was an embedded case study research using mixed methods of qualitative and quantitative research. Both data were collected at the same time and analysed separately through different computer software applications, namely SPSS for the quantitative data analysis and NVivo for the qualitative data analysis (Harrison, Reilly and Creswell 2020).

(Donthu and Gustafsson 2020) provide a definition of Mixed Methods (MM) research as a design with philosophical beliefs and methods and techniques of enquiry. As a methodology, a

Mixed Methods research philosophy guides data collection and analysis while combining both qualitative and quantitative data in either a single study or series of studies (Collis and Hussey 2013). Mixed Methods research hinges on the premise that the joint application of qualitative and quantitative approaches simplifies the process of fathoming the research dilemma (Cameron, Sankaran and Scales 2015; Donthu and Gustafsson 2020).

(Creswell and Creswell 2017) state that the core principle of mixed approaches is that both methods must be blended to characterise the complementary strengths for both methods, instead of their overlapping weaknesses. There were very important reasons for doing this, namely:

- To gain convergence and evidence that confirms the findings' statements;
- To annihilate or curtail obvious statements that can probably be regarded as substitutes for the conclusions made from the research data; and
- To clarify the disparate features of a phenomenon (Cameron, Sankaran and Scales 2015).

In this study, the Mixed Methods combined and integrated both qualitative and quantitative methods of collecting and analysing data in a single study. Both forms of data were collected roughly at the same time, analysed separately and the information was integrated in the interpretation of the overall results. This is known as the convergent mixed method and was applied throughout this study (Creswell and Creswell 2017).

3.2.1 Reasons for choosing the Mixed Methods Methodology

Firstly, looking at the research problem, it becomes clear that uncertainty prevails regarding whether tertiary institutions were ready to go fully-fledged on E-learning at the outbreak of the Covid-19 pandemic. The objectives of the study identified and laid the foundation of both the descriptive part as well as the explanatory part of the case study.

Besides the biographical section of the questionnaire, two objectives aim at determining the levels of satisfaction and impact. These two objectives can only be satisfied by obtaining both quantitative and qualitative evidence. The other two objectives firstly probe into the main challenges as perceived by the academics at the University of Kwa-Zulu Natal. Secondly, the objectives seek to derive the solutions, if need be, to eliminate academics' frustrations brought about the transition from conventional to fully-fledged E-learning methodologies. These

objectives can be achieved through the attainment of qualitative data that explains the perceptions and experiences of the academics.

The descriptive part of the study objectives comparatively aims at satisfying the questions of what satisfaction levels the academics are at, as opposed to the level they should be at regarding the implementation of the fully-fledged E-learning methods. Quantitative data will hence be useful in that regard. Objectives underpinning the perceptions and experiences of the academics will be satisfied by the collection and analysis of the qualitative data (Veal 2018). It was therefore recommended that against the backdrop of both the research purpose and the objectives' intent, this chapter describes the pragmatist research philosophy, deductive approach and the methodological choice of concurrent mixed methods.

3.2.2 The important considerations of this research design

(Gokhale, Mishra and Veluchamy 2021) state that the fundamental considerations during research are the identification of the relevant research method and philosophy; the research approach and design; and efficient data collection methods. This can be clearly demonstrated through the application of the Research Onion Framework from Saunders, Lewis and Thornhill (2012, p.128). In this study, the research philosophy, approach, design and the rest will be explained via this Framework.The layers of the onion outline how the information of the research philosophy, approach and design interweave the study throughout the process of research (Gokhale, Mishra and Veluchamy 2021). The research onion was initially designated towards business research, but its usefulness demanded an attraction from other disciplines, and it became the most-used model in the designing of research studies (Gokhale, Mishra and Veluchamy 2021).Even though, initially, it was more designated towards business research, more researchers from other disciplines refer to the research onion model as a framework for designing their research (Mardiana 2020).

3.2.3 The research philosophy for this study

(Alharahsheh and Pius 2020) state that the determination of the appropriate research philosophy revolves around the research question. Furthermore, the type of data necessary in answering the research question should be the propeller behind the choice of philosophy that gives credence to the process used in data collection, the analysis process and the way in which data are used to unravel the research problem (Alharahsheh and Pius 2020).

(Toyon 2021) recommends that serious cognisance must be taken to align the study with the key attributes of the research philosophy. These attributes include ensuring that, based on the

practical implications of the study, the research philosophy formulates beliefs and assumptions on whether data collected are quantitative or qualitative (Toyon 2021). Furthermore, through the research philosophy, such beliefs and assumptions were networked systematically to build new knowledge. Consequently, the philosophy fulfils its purpose to answer the research problem through data collection and analysis. This empowers the findings to subsequently provide a scientific answer to the research question. The research philosophy helps in understanding the assumptions and realities confronted during the journey of the research (Saunders *et al.* 2015). The philosophical position is largely determined by three factors, firstly the available knowledge on the subject, which is known as the epistemological assumptions. These consist of assumptions of variable knowledge possessed by humans (Sultan and Asim 2020). The second factor is the reality on knowledge about the phenomenon under investigation or ontological assumptions. These work hand-in-hand with the epistemological assumptions (Sultan and Asim 2020). This is because some assumptions are drawn from the realities and vice versa, but the onus rests with the researcher to filter good knowledge from bad. Thirdly, personal values have a certain level of influence on research. These are known as axiological assumptions (Saunders *et al.* 2015). It must be noted that the knowledge, assumptions and realities associated with the research philosophy have a big impact on the approach to the research question and how the results of the study get interpreted (Collis and Hussey 2014).

(Kelly and Cordeiro 2020) state that the research philosophy is largely dependent on any of the four aspects of the existing business studies, and that is in relation with the type of research method chosen, namely:

- Positivism: popular for highly structured large samples and recommended for quantitative data, while qualitative data can also be accommodated.
- Interpretivism (interpretivist): popular for small samples with an in-depth investigations and purely qualitative data.
- Realism: The study follows the methods according to the flow of the subject matter and can either be quantitative or qualitative.
- Pragmatism: mixed method design of both quantitative and qualitative data collection, popular for any size samples (Kelly and Cordeiro 2020).

Therefore, the most relevant and suitable philosophy for this study was pragmatism.

3.3 The research strategy

The review of literature indicated that in line with the purpose, aim, objectives and research questions, the study must adopt the strategy that best fit the action plan. There are different research strategies, and they all depend on the action plan needed to carry out the investigations (Clark and Causer 2020). Moreover, data sources play an important role in determining the type of research strategy to be used in the case study. For this study, data were collected from different sources, namely five different colleges of the institution and respondents spreading across all levels of academic staff. It showed that the sources of data were multi-faceted (Yin *et al.* 2020). In a case where data sources are multi-faceted and of both qualitative and quantitative natures and are from a wide variety of sources, an embedded case study should be adopted (Farquhar, Michels and Robson 2020).

(Yin *et al.* 2020) suggest that the case study approach can be of great benefit if the study includes variables that can be deduced from the nuances and other intrinsic behaviour of people. This study explores the reasons why E-learning should or should not be adopted as a suitable teaching and learning methodology of the future at t UKZN.

3.4 The research techniques and procedures

Many factors help in identifying the appropriate techniques to be applied when conducting a case study. Such factors may include the consideration of the research objectives, the research philosophy and strategy, the target population of the study, as well as the desired standard of accuracy. It is therefore important that the sample size and the selection criteria are expounded to enhance the required level of reliability (Yin 2017). The research discussed herein under included the location of the study, its population, the sampling methods and the size of the sample.

3.4.1 The study population

The study was located at the University of Kwa-Zulu Natal and its focus was on all the academics of the institution involved in the teaching and learning of the students at all levels. The University is made up of four colleges, namely Agriculture, Engineering and Science, Health Sciences, Humanities, and Law and Management Studies. The target population of the

study comprised all Lecturers, Senior Lecturers and Professors from all four colleges. The total population of the study was 1221. See Table 3.1 below:

Table 3.1: Number of academic staff by College

College	Prof	Senior Lecturer	Lecturer	Total
Agriculture, Engineering & Science	125,00	101,00	124,00	350,00
Health Sciences	70,00	45,00	167,00	282,00
Humanities	99,00	69,00	220,00	388,00
Law & Management Studies	42,00	56,00	103,00	201,00
Total	**336,00**	**271,00**	**614,00**	**1221,00**

The inclusion of all 1221 academics in the study would yield superfluous data which would be too cumbersome to handle. It was more practical to work with a smaller group of academics that would guarantee the representativeness of the population.

(Duquia *et al.* 2017) state that for the research sample to be representative of the population, it must retain all the characteristics of the target population. Consequently, the retention of such characteristics contributes immensely towards a high level of reliability of the results (Rose and Johnson 2020).

(Zhao and Grafström 2020) state that another important feature to be regarded as important when ensuring the representativeness of the sample is the consideration of all the auxiliary variables' characteristics. An auxiliary variable is defined as an enhancement of the estimation of the sample formation (Grafström and Schelin 2014). This can be attained through the consideration of variables with information, even if they do not constitute the attributes of interest in the sampling plan (Lavrakas 2008). Statistically, ignoring auxiliary variables leads to the increase of the variance estimator in many samples.

3.4.2 The sampling method

(Pace 2021) states that probability sampling is the most practical and convenient method for results that are representative of the population. This technique guarantees that every member of the target population has an equal chance of being selecting into the sample. The probability sampling methods that are applied under different research scenarios are simple, stratified and systematic random sampling (Pace 2021). As the name implies, simple random sampling means that every member of the population stands a good chance of being selected. The process involved the 'drop hat' system where all names are put in the basket and they are selected one by one until the correct sample size has been attained (Ndenje-Sichalwe and Elia 2021) .

(Ndenje-Sichalwe and Elia 2021) also define systematic random sampling as a process in which the population is divided into fixed periodic intervals. An example is where the researcher needs a sample of 100 participants from a population of 1000 people. A decision is made to select every tenth participant from the population. This implies that the population will be divided into a fixed periodic interval scale of 10 (Ndenje-Sichalwe and Elia 2021).

(Asawapoom 2020) defines stratified random sampling as the method that divides an extensive population into smaller groups that do not overlap but represent the entire population. The sample will subsequently be drawn from these groups by applying simple random sampling. An example is the population of this study that consisted of academics from the four different colleges of the university. These colleges readily represent the four strata of the population from which a sample was selected.

The University database was used as the source of the population. Participants were issued with different numbers from 1 to 1221, which were put into a basket. Random selection was conducted, which ended up with a complete sample of 280 participants (sample size to be explained below).

3.5 The size of the sample

An effective sample size calculation is the underlying principle in the planning of the research (Lawrence *et al.* 2020). This reinforces the importance of ensuring that giving insufficient attention to the accuracy in calculating the sample size may yield results that are infested with flaws rather than significant findings (Fellows and Liu 2021).

This study opted for the most popular efficient method of determining the sample size needed as a fair representative of the given population, that is the National Education Association (Neagu) formula was chosen (Yeni, Ambarita and Suwarjo 2021).

Table 3.2: National Education Association (Neagu) formula

The formula is:

$S=X^2NP\ (1-P) \div d^2(N-1)+X^2P(1-P)$, where:

S= Required sample

X^2=Table value of chi-square for 1 degree of freedom at the desired confidence level

N= Population size

P=Population portion (assumed to be 0.50, since this would provide the maximum sample size

D=Degree of accuracy as a proportion (0.05).

When using the NEA formula, cognisance must be taken of the sample size in relation to the size of the population. As the population size grows, the sample size enlarges at a diminishing rate and remains constant at slightly more than 380.

The sample sizes at different levels of defined population size are shown below as determined using the above formula:

Table 3.3: Sample Size calculation

N (Population Size)	S (Required Sample Size	N (Population Size)	S (Required Sample Size
10	10	3500	346
20	19	4000	351
50	44	5000	357
100	80	6000	361
150	108	7000	365
200	132	10000	370

300	169	15000	375
400	196	20000	377
500	217	30000	379
1000	278	40000	380
1500	306	50000	381
2000	322	75000	382
3000	341	100000	384

The population size of this study was 1221, and the required sample size was computed to 280 by both the table and the formula. Following the stratified random sampling:

Table 3.4: Population and sample size by college

STRATA	**POPULATION**	**SAMPLE**
Agriculture, Engineering & Science	350	80
Health Sciences	282	65
Humanities	201	46
Law & Management Studies	388	89
TOTAL	**1221**	**280**

3.6 Data collection

Different research approaches imply different types of data collection methods. In this case study of mixed methods, both qualitative and quantitative data were collected concurrently, analysed separately and the results converged for conclusions and recommendations.

-In this study, a questionnaire consisting of both closed and open-ended questions was used. Before designing the questionnaire, there must be an instrument that manifests questions or statements that are regarded as constructs upon which respondents' points of view can be measured (Nemoto and Beglar 2014; Guetterman, Fetters and Creswell 2015).

(Nemoto T and Beglar D 2014) define the research instrument as the technique of relating something observed in the real world (something obvious to the mind or eyes) to something one is measuring that only exists as part of a theory (something hidden or concealed). The general assumption is that there is a respondent who is the object of measurement. As an instrument, the objectives of the study were used, as the themes will show in the following chapters. The objectives of this study were indicators of what needs to be measured to answer the research questions.

3.6.1 Survey questionnaire design

In this study, a new questionnaire was designed for gathering data from the respondents. The reason for not using an already reviewed template was the scarcity of previous studies that investigated academics' perspectives regarding the adoption of E-learning in tertiary institutions. The questionnaire consisted of three sections, i.e., biographic questions, closed-ended questions and open-ended questions.

3.6.1.1 Biographical questions

This section comprised questions related to the biographies of the respondents. These were important to establish the respondents' ages, gender, level of academic qualifications and the geographical locations where the residents reside, and so forth. Responding to technology related questions is largely influenced by such attributes. An example is the perception that older people seem to be reluctant to apply modern technology as compared to the younger generation.

3.6.1.2 Open-ended questions

This section was made up of statements on which respondents were expected to indicate the level to which they agreed or disagreed with the statements. The Likert-scale was used as a measurement for such levels. The Likert scale questionnaire design is the most common as it allows respondents to indicate their level of agreeing or disagreeing with the statements. This is applied as closed-ended questions for quantitative data collection. Different scales can be applied when developing the Likert-Scale questionnaire. The most commonly used are the 5-point, 6-point, 7-point and 10-point, depending on the construct variables.

This study applied the 5-point Likert-scale as shown below.

Table 3.5: 5-Point Likert scale

1	2	3	4	5	6
Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree

3.6.1.3 Open-ended questions

This study, being a mixed methods research study with a Likert-Scale applied for the collection of the quantitative data, had the last section of the questionnaire consist of open-ended questions (Nemoto and Beglar 2014). These questions probed into the feelings and perceptions of the respondents regarding the adoption of a fully-fledged E-learning methodology.

3.7 Administering of the survey questionnaire

The questionnaire was designed and uploaded on the online survey tool known as the "Lime Survey Tool". Two hundred and eighty questionnaire packs as per the sample size were emailed through to the respondents. All respondents were selected from the database of the University obtainable from the staff portal. Stratified random sampling technique was applied as indicated above. Each college's total participants became the sub-sample of the sample through scientific calculation, e.g., from the total sample size of 280 respondents, each college participants were computed as a percentage of the total sample, thereafter academic positions were calculated as a percentage of the college sample as follows:

Table 3.6: Breakdown of the sample size

COLLEGE	Prof	Snr Lectrure	Lectrer	Totl	Sample	Actual	Prof	Snr Lectrure	Lectrer
COLLEGE OF AGRICULTURE, ENGINEERING & SCIENCE	125,00	101,00	124,00	350,00	80,26	80,00	28,57	23,16	28,44
COLLEGE OF HEALTH SCIENCES	70,00	45,00	167,00	282,00	64,67	65,00	16,13	10,32	38,30
COLLEGE OF HUMANITIES	99,00	69,00	220,00	388,00	88,98	89,00	22,71	15,82	50,45
COLLEGE OF LAW & MANAGEMENT STUDIES	42,00	56,00	103,00	201,00	46,09	46,00	9,61	12,84	23,62
Totl	**336,00**	**271,00**	**614,00**	**1221,00**	**280,00**	**280,00**	**77,03**	**62,15**	**140,80**
SAMPLE SIZE									**280,00**

To select the names of the participants, each college staff member (population) was assigned a code, that is, from 1 to the total number per category (positions) of academic staff per college. These were uploaded into SPSS to automatically generate a random selection of the sample per college and per academic position. The selected codes were assigned to their corresponding

names, and the questionnaire together with the letter of consent were emailed through. Tracking of the responses was automated and reminders were sent off after week 1 and week 2. The survey tool was open for three weeks and thereafter the software application automatically switched off.

3.8 Data Analysis

Both forms of data analysis were analysed separately based on two computer software methods known as NVivo for qualitative and SPSS for the quantitative data analysis. The results were merged later for discussions. Each completed survey from the respondents was stored safely into file structures for easy access. As the data were collected via online means, it was easily captured into the Microsoft SQL database, and information was coded by using the same objectives as the research instrument.

Following is a demonstration of the data analysis process, as will be seen in Chapter 4.

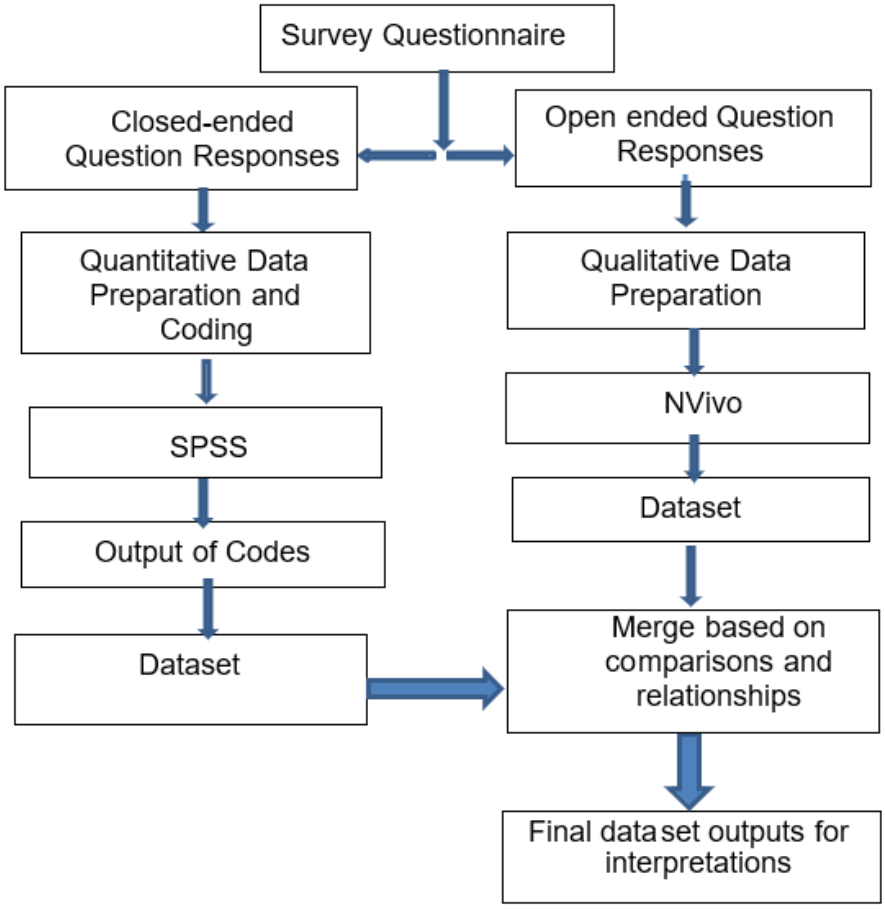


Figure 3.1: Data analysis process

3.8.1 Quantitative Data Analysis

The coded data were captured onto SPSS for analysis. The output results were in the form of tables and graphs. These graphs were ready for discussion as they were representative of the data as collected from the participants. Other outputs for validity will be discussed in the following chapter.

3.8.2 Qualitative Data Analysis

Qualitative data were captured onto the NVivo computer software and analysed through Word-clouds and Clusters. Word-clouds and Clusters resulted from the words commonly used by the respondents when answering the questions. The biggest word is the one regarded as important in the responses and the smallest word is the least important when presenting the results. Clusters follow the same pattern, but words are clustered from the most important to the least important.

3.8.3 Validity and Reliability

(Crang *et al.* 2021) state that validity in research is defined as the extent to which a concept is accurately measured in a quantitative study, and the reliability is the extent to which a research instrument consistently has the same results if it is used in the same situation on repeated occasions. In order to consider these two important aspects of precision, the research instrument for this study was subjected to a specific test of Cronbach's alpha score (Crang *et al.* 2021).

Furthermore, a request for conducting the research from all the campuses of the University of KwaZulu-Natal was sent through to the Registrar of the institution who sanctioned it and granted permission accordingly. The letter of consent was attached to the survey questionnaire for the respondents to take note of their rights when responding to the questionnaire. These were signed by all the respondents.

3.9 Conclusion

This chapter broadly elaborated on the research methodology, dissecting in detail its sections to align with the purpose, objectives and the research questions. The chapter explained the reasons for engaging with Mixed Methods Research as well as its relevance to the rationale of the research. The location and population of the study were discussed, culminating in the determination of the sample size. The questionnaire design was discussed, followed by a description of the data collection instruments. The explanation was given as to where and how the primary researcher went about collecting data. Furthermore, the chapter explained the

importance of data preparation before conducting a full analysis. Validity of the data collection instruments was provided.

Lastly, the study adhered to the scientific requirements of ethics as determined by the guidelines of the institution. The most important part of the ethics adherence requirement was the acquisition of written permits to conduct research from all five campuses of the University of KwaZulu-Natal.

The next chapter will present the results from data analyses, discussions, merging of the quantitative and qualitative outcomes and interpretation of the findings.

CHAPTER 4

RESULTS PRESENTATION AND INTERPRETATION

4.1 Introduction

The main purpose of the study was to establish if the academics of the University of KwaZulu-Natal were ready to adopt E-learning as a fully-fledged teaching and learning methodology during the Covid-19 pandemic. In the previous chapter, the research methodology was presented as per the topic, Theoretical Framework, the research objectives as well as the research questions of this study. The research methods were systematically explored in order to identify the most suitable design, philosophy, theory, strategy, as well as the construction of the research instrument for both quantitative and qualitative data collection. The data collection instrument was pinned on the themes formulated from the research objectives. Each theme consisted of four quantitative statements designed on a 5-point Likert-scale.

This chapter presents the results from the analyses of both the quantitative and qualitative data of the mixed method research applied in this case study. The chapter outlines the findings, interpretation of the results and the discussion that encapsulates both quantitative and qualitative data. Sequentially, the chapter reports on the quantitative data analysis. This consists of sample and reliability statistics, the research instrument and factor analysis.

The four research questions from which themes were constructed were as follows:

For Section B (quantitative research), each theme consisted of four statements coded “SQ001 to SQ004”, which made up a total of 16 statements.

Table 4.1: Research questions versus Themes

RESEARCH QUESTION	THEME
1. What are the levels of satisfaction of Academic staff regarding E-learning during covid 19?	Attitudes of academic staff towards E-learning
2. What were the main challenges in E-learning experienced by academic staff during Covid-19?	E-learning technology challenges faced by academics during the adoption of E-learning
3. What was the impact of E-learning transition on academics during the	The impact of E-learning academic staff

implementation of remote teaching and learning?	
4. What could/can be done to improve E-learning transition and experience for academic staff?	Motivating the academics in speeding up adoption of E-learning methods

4.2 Response rate

(Garritty *et al.* 2021) defines the survey response rate as the number of people who completed the survey divided by the number of people in the sample. Furthermore, the response rate gives an indication and insight into the accuracy of the survey data. A good response rate is needed to demonstrate the validity of the inferences or external validity of the results. A low response rate diminishes external validity and statistical conclusion validity as it leads to an inaccurate effect size of the results (Garritty *et al.* 2021). There has however been several debates about what constitutes a good response rate, which a researcher can use to draw final conclusions and the generalisation of findings (Wong *et al.* 2021).

To maximise the responses in this study, reminders were sent after the first week and the final reminders after the second week. The response frequency was as follows:

After the first week, 50 responses were received, which constituted 18% of the total sample. After sending out the reminders, 178 responses were received, which constituted 64% of the total sample and finally after sending out the second reminders, 38 responses were received, which constituted 14% of the total sample. There were 14 non-responses, which constituted 4% of the total sample, as shown in **Figure 4.1.**

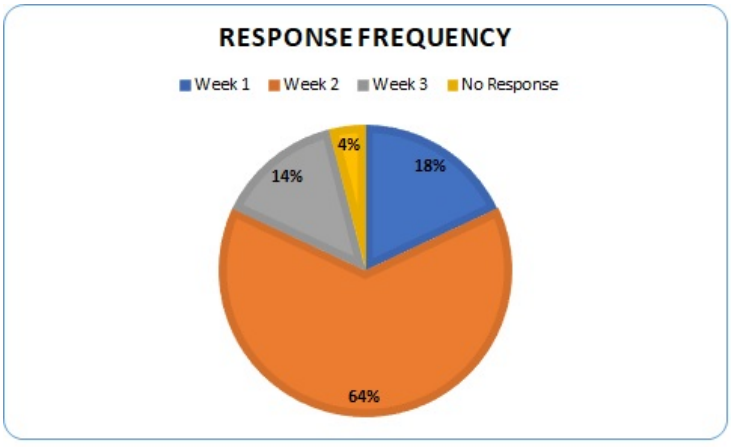


Figure 4.1: Response Rate

Therefore, of the 280 questionnaires that were dispatched, 266 were returned, which gave a 96% response rate.

4.2.1 The research instruments

The research instrument was made up of 3 sections that consisted of 31 items which were separated into four sections as following:

A. Sample characteristics with biographical and employment data. which consisted of 11 items
B. Closed-ended questions which consisted of 4 themes, each with four items, that gives a total of 16 items.
C. Open-ended questions which consisted of 4 items.

4.2.2 Data coding

Each section of the questionnaire was coded for ease of analysis. The first section had seven questions that were biographical and 4 that were employment related. These questions were all independent variables and therefore, they were coded exactly as they were (e.g., gender, age, college, designation, class taught and so forth). Section B was coded according to four themes from question 1 to question 16. Each theme had 4 questions coded as QC1-QC4 for Theme 1; QC5-QC8 for Theme 2; QC9-QC12 for Theme 3; and QC13-QC16 for Theme 4. The open-ended questions were used as they are.

4.2.2 Reliability statistics

The two most important precisions are reliability and validity. Reliability is measured by taking several measurements of the same subjects using a Cronbach's Alpha scale. A Scale reliability coefficient of 0.60 or above is considered as acceptable for a newly developed construct. The table below reflects the Cronbach's Alpha score for all the items that constituted Section C of the questionnaire, which considered the key reliability of the measurement instrument.

Table 4.2:- Cronbach's Alpha score		No of Items	Cronbach's Alpha
QC1-QC4	Attitudes of academic staff towards E-learning	4	0.7264
QC5-QC8	E-learning technology challenges faced by academics during the adoption of E-learning	4	0.6324
QC9-QC12	The impact of E-learning academic staff	4	0.7556
QC13-QC16	Motivating the academics in speeding up adoption of E-learning methods	4	0.6452

The reliability scores for all questions exceed or approximate the recommended Cronbach's alpha value for a newly developed construct. This indicates a degree of acceptable, consistent scoring.

4.2.2.1 The Structured Equation Model

The Structured Equation Model was used to confirm the fitness of the model used as a Theoretical Framework. These confirmatory statistics were very important to benefit the objectives of this study. The last objective seeks to establish how academics can be motivated to adopt the fully-fledged E-learning. Consequentially, this creates the need for the study to contribute to the current situation by identifying the possible weaknesses (if there are any) in the current model used. There are key variables of the model adopted, namely:

Attitudes of the academics towards the adoption of E-learning as a fully-fledged methodology:

- E-learning technology challenges for the academic staff;
- The impact of E-learning technology on academics;
- Motivation of the academics to adopt E-learning; and
- Closed-ended questions were used to confirm the model fit.

4.2.2.2 Model Fit Summary

This Chi-square tests the null hypothesis that the over identified (reduced) model fits the data as well as does a just-identified (full, saturated) model. In a just-identified model there is a direct path (not through an intervening variable) from each variable to each other variable. In such a model, the Chi-square will always have a value of zero, since the fit will always be perfect. The probability should not be significant. In this model, the chi square p-value < 0.001.

It is however worth noting that even though, technically, the Chi-Square should be non-significant in model testing, this is very hard to achieve due to the usually large sample

required for it. However, this model behaved in line with the fitness requirements as seen in the results below:

Table 4.3: Model fitness

Chi-square	764.414
Degrees of freedom	131
Probability level	0.000

4.3 Section by section analysis

The section presents the quantitative data output for the sample characteristics and the closed-ended questions and finally the qualitative data output for open-ended questions.

4.3.1 Sample characteristics

This section summarises the biographical and employment history of the respondents. Below are the results of the overall distribution by gender, age, qualifications, race, residential, campus and home language.

Gender

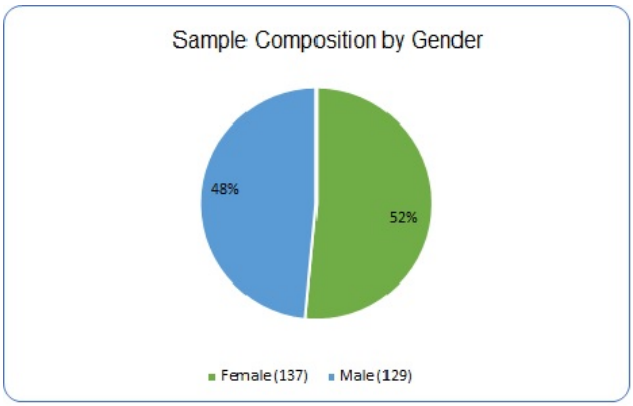


Figure 4.2: Sample characteristics by gender

Figure 4.2 indicates that of the total responses received, 48% were male participants and 52% were female participants. This indicates that there were comparatively more female participants than males.

Age

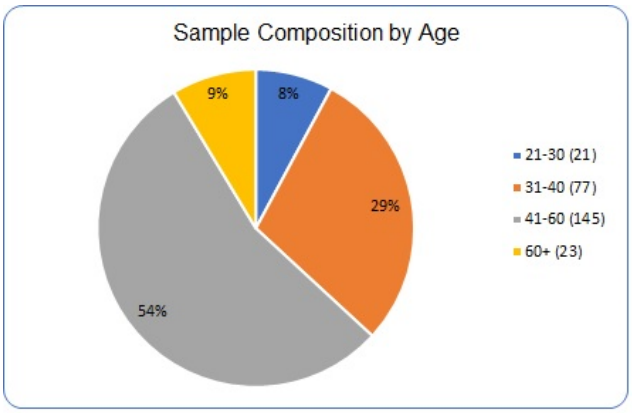


Figure 4.3: Sample characteristics by age

As indicated in Figure 4.3, out of the 266 participants, 7.89% were aged from 21 to 30 years old 28.95% were aged from 31 to 40; 54,51% were aged from 41 to 69; and 8.65% were aged from 41 to 60.

Qualifications

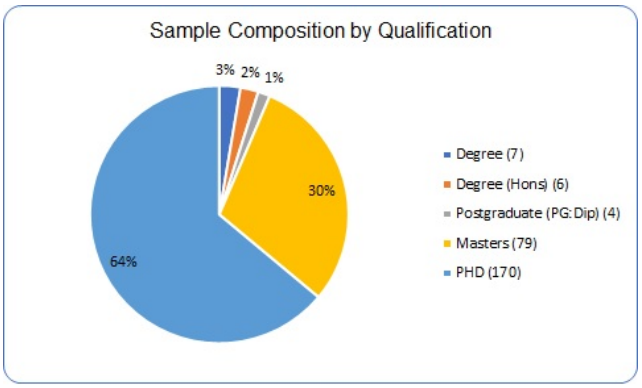


Figure 4.4: Sample characteristics by qualifications

Figure 4.4 indicates that out of 266 participants, 2.63% had junior degrees; 2.26% had honours degrees; 29.70% had Masters' degrees; 63.91% had PhDs and 1.50% had post-graduate diplomas. The results indicate that the institution is inundated with academics qualified in Doctoral degrees.

Geographical location

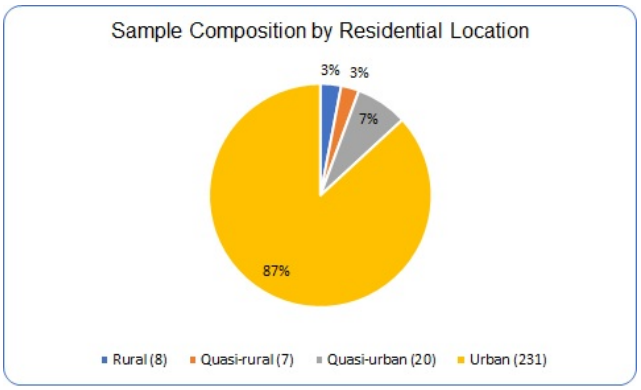


Figure 4.5: Sample characteristics by geographical location

Figure 4.5 indicates that of the 266 participants, 3.01% were from the rural areas; 2.635 from quasi-rural areas; 7.52% from quasi-urban areas; and 87% were from urban areas. The results indicate that most academics reside in urban areas.

Campus

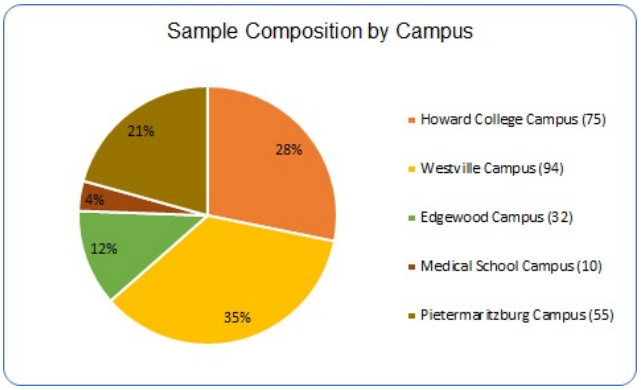


Figure 4.6: Sample composition by campus

UKZN is made up of five campuses, from which the sample was drawn. Figure 4.6 indicates that Howard College campus constituted 28.20% of the respondents; Westville campus constituted 35.34% of the respondents; Edgewood campus constituted 12.03% of the respondents; Medical School campus constituted 3.76%; and the Pietermaritzburg campus constituted 20.68% of the respondents.

Race

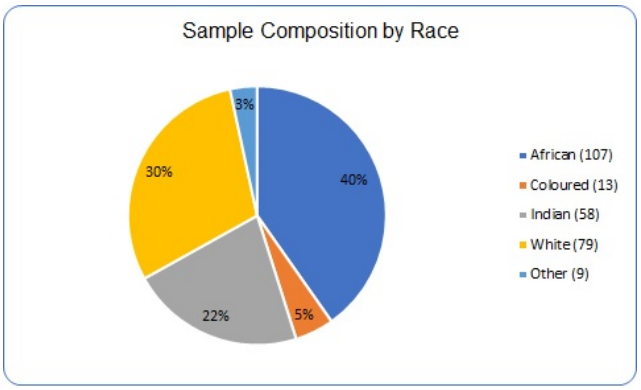


Figure 4.7: Sample characteristics by Race

Figure 4.7 indicates that there were four major race groups identified as the constituency of the sample. The fifth group was included as "other" for foreign academics that could not fit in with the main groups of African, Coloured, Indian or White. Africans constituted 40.23 of the respondents; Coloureds 4.89; Indians 21.80%; and Whites 29.70% while 'other' constituted 3.38%. The results indicate that academics of African origin are by far the majority in this institution.

Home Language

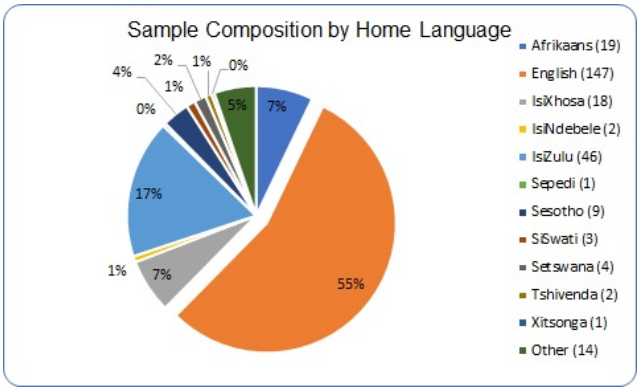


Figure 4.8: Sample characteristics by home language

Figure 4.8 indicates that South Africa has eleven official languages. However, in order not to restrict the respondents to local languages, there was a provision of a space with 'other" home languages. In total, twelve items were provided in the question, with the following results: Afrikaans constituted 7.14%; English 55.26; IsiXhosa 6.77%; IsiNdebele 0.75%, IsiZulu 17.29%, Sepedi 0.38%; Sesotho 3.38%; Siswati 1.13%; Setswana 1.50%; Tshivenda 0.75%;

Xitsonga 0.38%; and other 5.26%. The results show that English is the language used most in this institution.

College

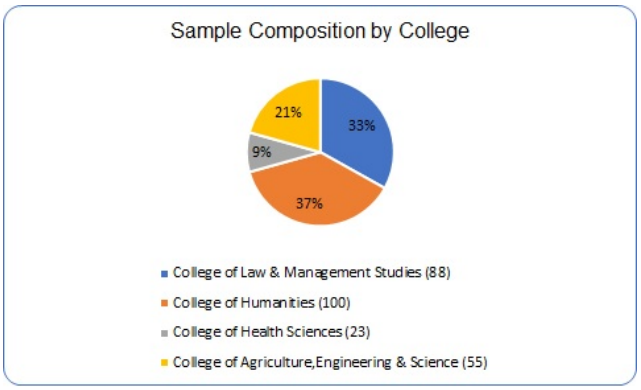


Figure 4.9: Sample characteristics by college

Figure 4.9 shows that UKZN is made up of four colleges, i.e., Law and Management, Humanities, Health Sciences as well as Science and Agriculture. Respondents' split according to their respective colleges was as following: Law and Management constituted 33.08%; Humanities constituted 37.59%; Health Sciences constituted 8.65%; and Science and Agriculture constituted 20.68%. The results indicate that Humanities employs the highest number of academics.

Academics' positions

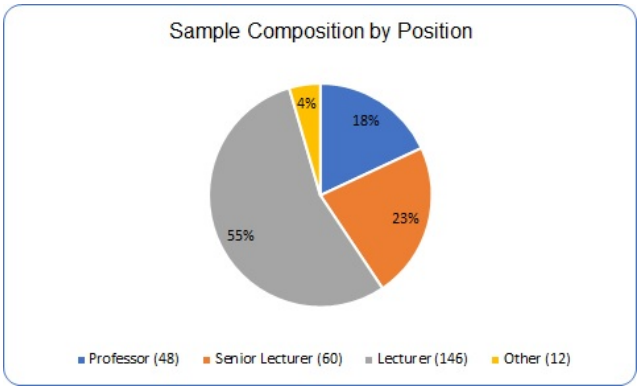


Figure 4.10: Sample characteristics by academics' positions

Figure 4.10 indicates that key academic positions occupied by the respondents were lecturer, senior lecturer, professor and for anything else, the space for "other" was provided. Lecturers

constituted 54.89% of the respondents; Senior lecturers 22.56%, Professors 18.05% and 'other 'constituted 4.51% of the respondents. The results indicate that Lecturers constitute the highest number of academics in this institution.

Class taught

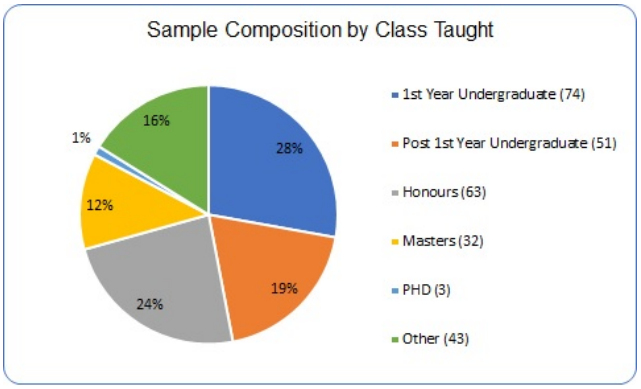


Figure 4.11: Sample characteristics by class taught

This information was used to indicate which class the academic teaches and the results indicated that 27.82% of the respondents were first-year undergraduate lecturers; 19.17% post first-year undergraduates; 23.68% were honours degree lecturers; 12.03% Masters' degree/supervisors' lecturers; 1,13% were PhD supervisors; and 16,17% were 'other'.

E-learning experience

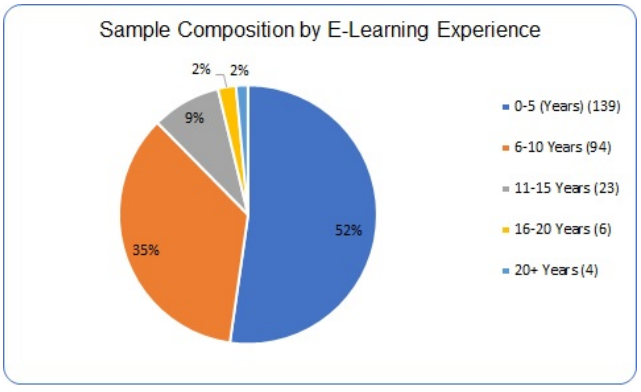


Figure 4.12: Sample characteristics by E-learning experience

Figure 4.12 indicates that 52.26% of the lecturers had 1 to five years' experience; 35.34% had six to ten years' experience; 8.65% had eleven to fifteen years' experience; 2.26% had sixteen

to twenty years' experience; and 1.50% had 20 years and above experience. This question probed into the experiences of the academic lecturers in the application of electronic-based teaching methodologies. The results indicate that most of them have 5 years and less experience.

Section B

This section consisted of four themes with four statements each, with a total of sixteen statements. For data analysis, the themes and their respective statements were coded as follows:

- Attitudes towards E-learning -SQ001 to SQ004;
- E-learning technology challenges -SQ001 to SQ004;
- Impact of E-learning on academic staff -SQ001 to SQ004; and
- Motivating academic staff -SQ001 to SQ004.

The data were analysed in line with the patterns as they appear on the Likert-scale questions. These were presented graphically as indicated below.

4.3.1.1 Attitudes

In response to the theme testing the attitudes of academic staff towards an E-learning teaching and learning methodology, the following was observed:

SQ001: *I have applied E-learning in my teaching methods*

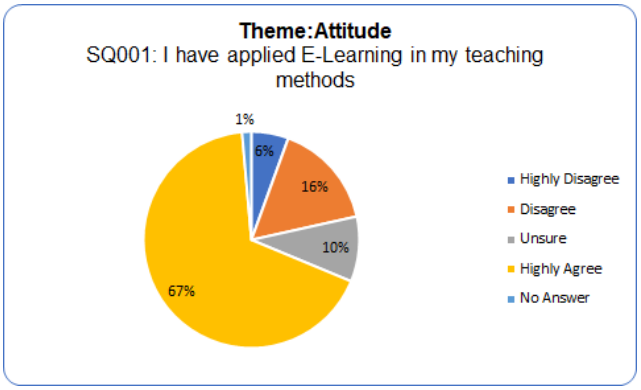


Figure 4.13: Attitudes towards E-learning: Q1

Responses analysis: 46% of the respondents agreed with the statement, while 36% highly agreed; 9% disagreed; 5% were unsure; 3% highly disagreed and 1% had no response. Having seen the E-learning experience of the academics in the sample characteristics in Figure 4.12, one can draw a conclusive comparison that about 48 % have more than five years' experience. Furthermore, 52 % of the academics claim to have at least one to five years' experience of E-

learning technology. According to (Edumadze *et al.* 2014), academics can master E-learning technology within a short space of time in training. There is therefore a good correlation between the sample characteristics "E-learning Experience" and theme "attitude".

SQ002*: I have sufficient skills as required by E-learning technology*

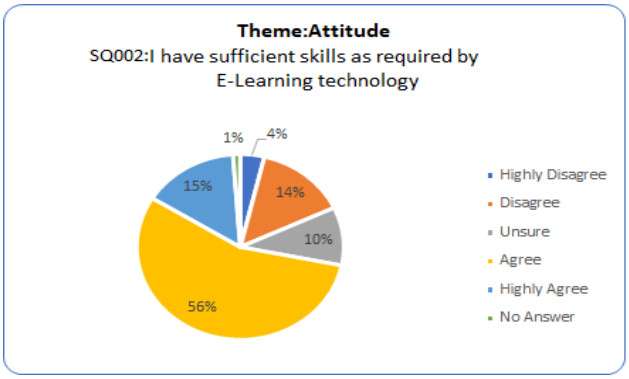


Figure 4.14: Attitudes towards E-learning: Q2

Response analysis: 56% of the respondents agreed with the statement, while 15% highly agreed; 14% disagreed; 10% were unsure; 4% highly disagreed; and 1% had no response to the statement. The response pattern demonstrates the correlation between the sample characteristics "E-learning experience" and the theme "attitude"

SQ003: *I am confident that E-learning will work with minimum glitches*

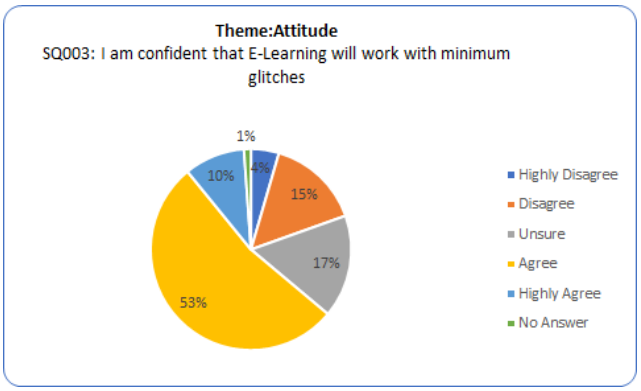


Figure 4.15: Attitudes toward E-learning: Q3

Responses analysis: 53% of the respondents agreed with the statement, while about 17% were unsure; 15% agreed; about 10% highly agreed; about 5% highly disagreed and 1% gave no answer to the statement. The responses to this question indicate that academics have a positive

attitude towards E-learning. The responses demonstrate a good correlation of academics' attitudes with sample characteristics "E-learning experience".

SQ004: *E-learning is a long overdue system of teaching and learning at UKZN*

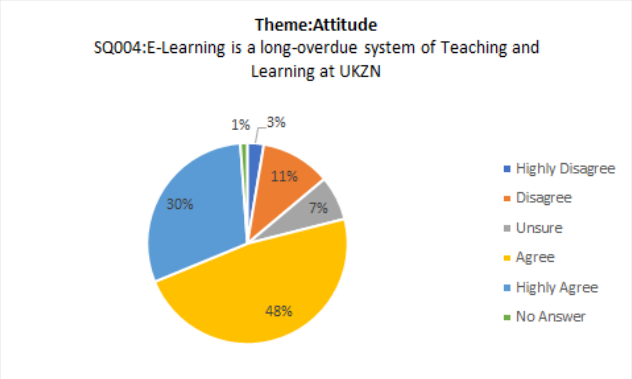


Figure 4.16: Attitudes towards E-learning: Q4

Responses analysis: About 48% of the respondents agreed with the statement, while 30% highly agreed; 11% disagreed; 7% were unsure; about 3% highly disagreed and 1% gave no response to the statement. The responses are a good indication of a correlation between the sample characteristics "E-learning experience" and the theme "attitude".

Consequentially, the results indicate a strong correlation between the academics' experience and their attitude towards an E-learning methodology. Therefore, academics at UKZN have demonstrated a positive attitude resulting from their good experience in E-learning methods.

4.3.1.2 E-learning technology challenges faced by academic staff

There were four statements probing this theme and the following was observed:

SQ001: *UKZN IT system is user friendly*

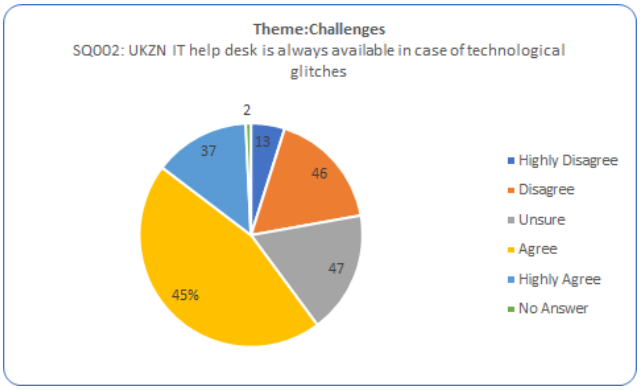


Figure 4.17: E-learning technology challenges: Q1

Responses analysis: 50% of the respondents agreed with the statement, while 20% disagreed; 14% were unsure; 10% highly agreed; 6% highly disagreed; and 1% gave no response to the statement. Characteristics by "college" indicates that 54% of academics are from the colleges of Law and Management Studies, as well as Agriculture, Engineering and Science (Fig. 4.). These two colleges offer courses that are computer-based, hence the extensive use of ICT. Therefore, the responses to this statement are indicative of people that are familiar with computers and thus experience minimum problems using the IT systems at UKZN.

SQ002: *UKZN IT help desk is always available in case of technological glitches*

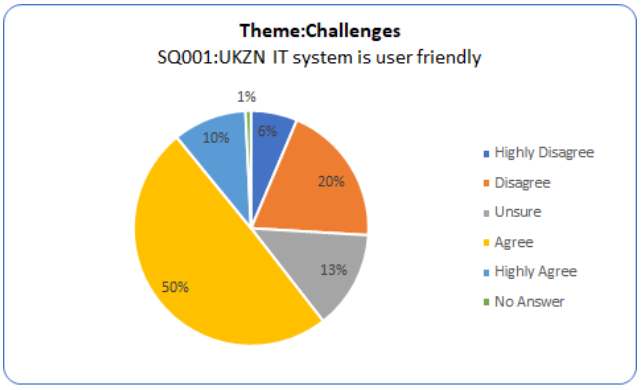


Figure 4.18: E-learning technology challenges: Q2

Responses analysis: 45% agreed with the statement while 18% was unsure, 17% disagree, 14% highly agreed, 5% highly disagreed and about 1% gave no response to the statement. Most of the respondents agreed with the statement. Looking at the sample characteristics (by geographical location), most of the academic staff (87%) reside in the urban area which provides better network coverage than the areas in the rural setting. Consequently, these academics have an easy connection with the helpdesk specialists. Therefore, there is a correlation between the geographical location of the academics and the helpdesk availability in the case of technological challenges. People residing in the urban areas experience less ICT problems than those in the rural areas.

SQ003: *UKZN IT software supports the E-learning technology requirements*

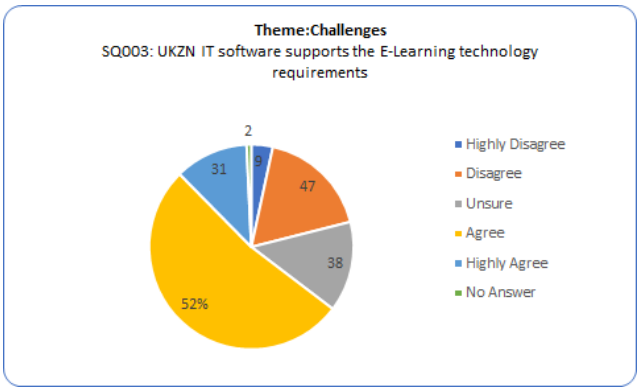


Figure 4.19: E-learning technology challenges: Q3

Responses analysis: 52% of the respondents agreed with the statement while 18% disagreed, 14% was unsure, 12% agreed, 3% highly disagreed and about 1% did not give response to the statement. Again, with easy access to the helpdesk as well as good experience in E-learning, most of the academics have agreed with the statement that UKZN IT software supports the E-learning methodology.

SQ004: *UKZN offers sufficient data bundles for smooth running of the remote classes*

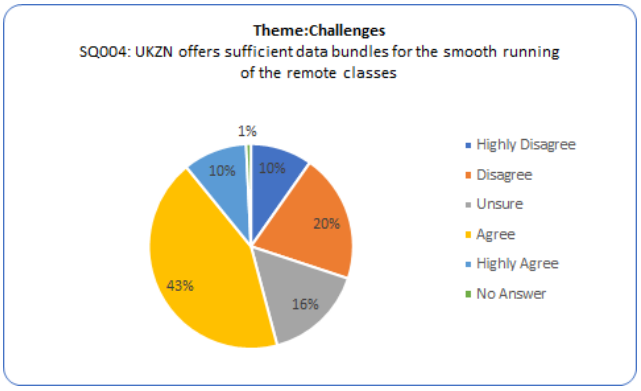


Figure 4.20: E-learning Technology challenges: Q4

Responses analysis: 43% of the respondents agreed with the statement while 20% disagreed, 16% unsure, 10% highly agree, 10% highly disagreed and about 1% did not give any response to the statement. The results indicate that most academics (53%) are satisfied with the data bundles offered by the UKZN.

The responses to the statement related to the technological challenges indicate that there are very little speculations that E-learning will present challenges on its implementation at the UKZN.

4.3.1.3 The impact of E-learning on academic staff

There were four statements probing into this statement and the following response ratios were observed:

SQ001: E-learning will improve the quality of teaching and learning at the UKZN

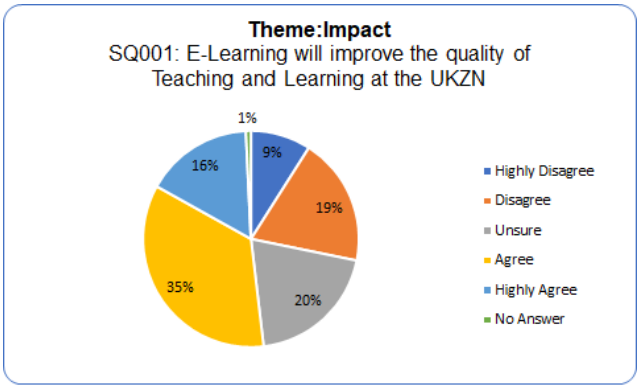


Figure 4.21: E-learning impact: Q1

Response analysis: 35% of the respondents agreed with the statement while 20% was unsure, 19% disagreed, 16% highly agreed, 9% highly disagreed and about 1% did not give any response to the statement. Combining responses that indicated agree and highly agree, the results give a 51% positive inclination that E-learning will improve the quality of teaching and learning at the UKZN. If the results are correlated with the sample size characteristic "age", most academics are young adults that are characterised by new technology trends. Therefore, the results indicate an inclination towards speeding up the implementation of E-learning.

SQ002: E-learning will allow academics more time to do preparations for teaching sessions

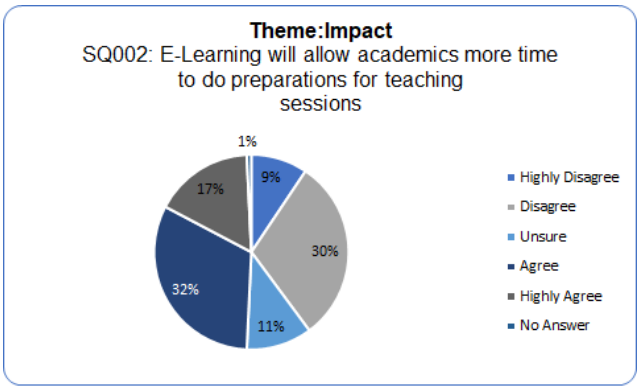


Figure 4.22: E-learning impact: Q2

Responses analysis: 32% agreed with the statement while 30% disagreed, 17% highly agreed, 11% unsure, 9% highly disagreed and about 1% did not respond to the statement. With most of the academics having a fair amount of experience in the use of E-learning as a teaching and learning mode, these results indicate the positive inclination towards E-learning saving time on subject preparations.

SQ003: With E-learning, students can easily work in groups to share subject matters

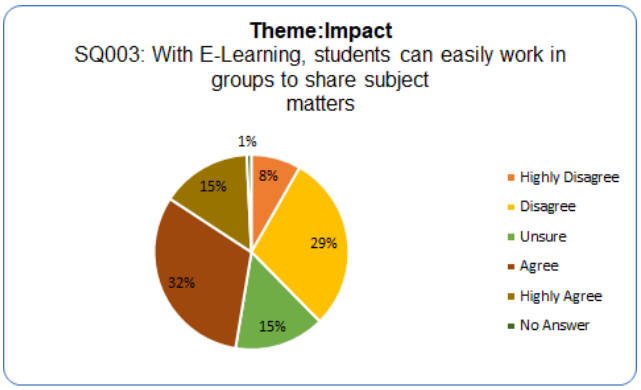


Figure 4.23: E-learning impact: Q3

Responses analysis: 32% of the respondents agreed with the statement while 29% disagreed, 15% unsure, 15% highly agree, 8% highly disagreed and about 1% did not give any response to the statement. Most of the academics agree that working in groups can be improved after the implementation of the E-learning teaching and Learning methodology.

SQ004: E-learning can deliver the same subject content as in conventional learning

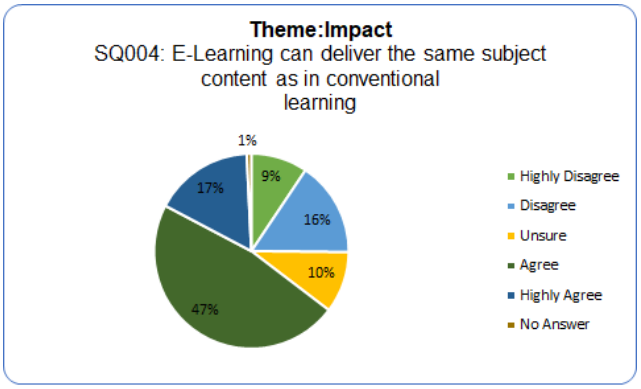


Figure 4.24: E-learning impact: Q4

Responses analysis: 47% agreed to the statement while 17% highly agreed, 16% disagreed, 10% unsure, 9% highly disagreed and about 1% did not respond to the statement. Most

academics agree that with E-learning, the subject content will either improve or remain the same as in the conventional teaching and learning mode. This is correlating to the experience of the academics.

To this theme, responses demonstrate that the implementation of E-learning will impact positively on the teaching and learning methods at the UKZN.

4.3.1.4 Motivating the academics in speeding up adoption of E-learning methods

There were four statements probing the above theme and on analysing the responses, the following was observed:

SQ001: E-learning can open the scope of advancement of my teaching career

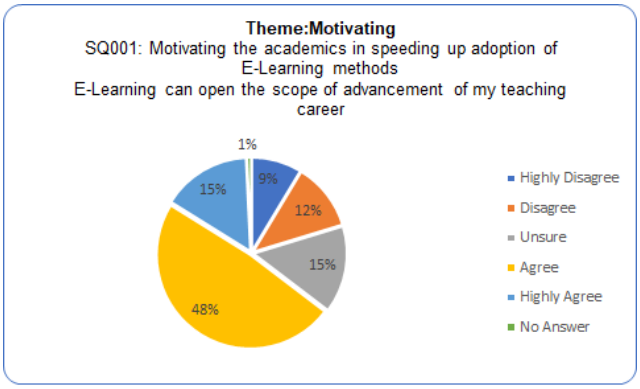


Figure 4.25: Motivating academic staff: Q1

Responses analysis: 48% agreed with the statement while 15% highly agreed, 15% unsure, 12% disagreed, 9% highly disagreed and about 1% did not respond to the statement. The results indicate that most academics (63%) agreed that their career advancement will be catalysed by the implementation of E-learning as a teaching and learning methodology at the UKZN.

SQ002: Use of computers on E-learning can contribute positively to my IT knowledge gained

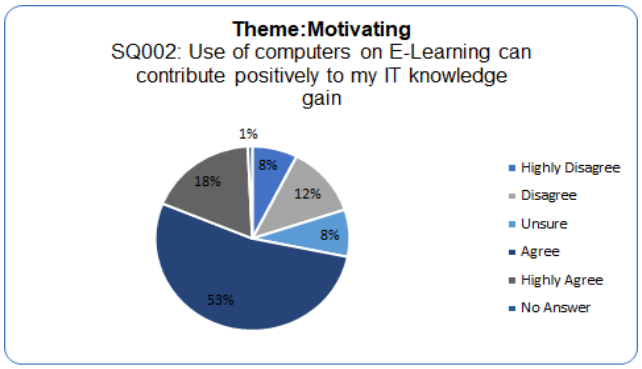


Figure 4.26: Motivating the academic staff: Q2

Responses analysis: 53% of the respondents agreed to the statement while 18% highly agreed, 12% disagreed, 8% unsure, 8% highly disagreed and about 1% did not respond to the statement. There were 71% of the responses in agreement with the statement. This can be majorly correlated with the experience of the academics in computer usage.

SQ003: E-learning makes it possible to work from home thus saving on transport costs

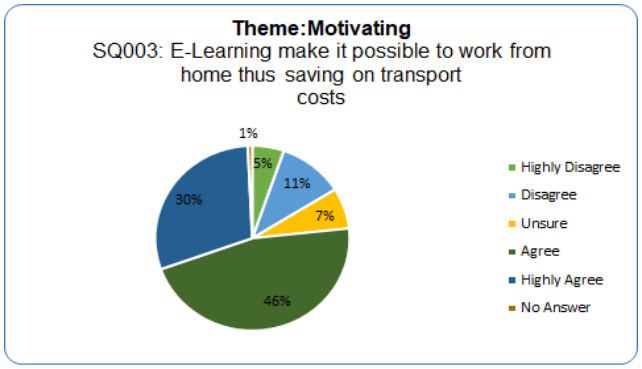


Figure 4.27: Motivating the academic staff: Q3

Responses analysis: 46% of the respondents agreed to the statement while 30% highly agreed, 11% disagreed, 7% unsure, 5% highly disagree and about 1% did not respond to the statement. The results indicate that academics will be highly motivated by the implementation of E-learning as a fully-fledged mode of teaching and learning.

SQ004: With E-learning methods, more time is available for academics to attend to their personal matters

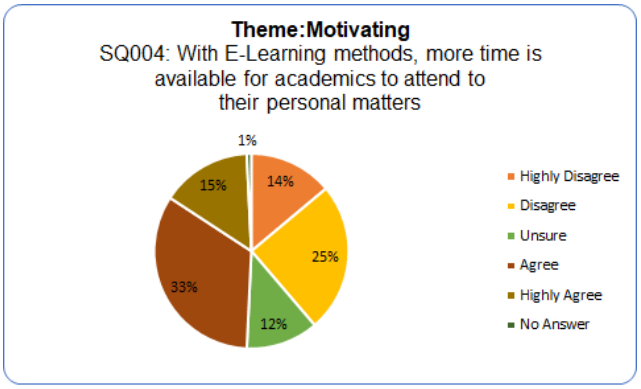


Figure 4.28: Motivating the academic staff: Q4

Responses analysis: 33% of the respondents agreed to the statement while 25% disagrees,

15% highly agreed, 14% highly disagreed, 12% unsure and about 1% did not respond to the statement. More respondents agree that working from home can give them more time to attend to their personal matters. However, a close look at the demographics of the sample shows that varieties of personal attributes can result in diverse response to this. Consequently, there was no remarkable difference between those that agreed and those that disagreed.

Relative to the theme "motivation", the results show that there is a fair amount of motivation of the academic staff at the UKZN.

4.3.2 Section D

This section consisted of eight open ended questions for qualitative data collection. These questions were arranged in the same pattern as in closed-ended questions. That is, the same four themes were applied with two questions each. The questions were coded Q1 to Q8 as following:

Table 4.4: Themes and coding of Open-ended questions

THEMES	QUESTIONS
Attitudes towards E-learning	Q1: Explain your personal experiences with E-learning? Q2: What can you do to motivate other academics in adopting E-learning?
E-learning technology challenges	Q3: what are your IT systems challenges that make you think E-learning will be hard to adopt? Q4: How can the UKZN IT systems be improved to be more efficient and user friendly?
Impact of E-learning on academic staff	Q5: Will the adoption of E-learning affect quality of both teaching and learning (Explain)? Q6: What impact will E-learning have on the student group work?
Motivating academic staff	Q7: How can E-learning be used for the academics to gain more knowledge in their field of expertise? Q8: What would be a financial gain to academics when working from home after the adoption of E-learning?

Data analysis was carried out scientifically through the application of the NVivo software which yields “Word-cloud”, highlighting words that are mostly used by the respondents in answering the questions. The boldest word is regarded as the one mostly common in the responses and sliding down in an ascending size, the words become less significant. For an example:

Theme 1: Attitudes towards E-learning – in Q1, the "Word-cloud" depicts the significance of the words as below:

Thereafter, these most significant words are referred to the respective responses to discern on the perceptions and the feelings of those respondents. In the analysis, only top four of the words were used. The actual word count as to how many times these words were used by different respondents are as follows in Table 4.3 below.

Table 4.5: Word count in each open-ended question

WORD-COUNT ANALYSIS									
Q1			Q2			Q3			Q4	
WORD	RATE		WORD	RATE		WORD	RATE		WORD	RATE
Learning	159		Learning	130		learning	124		System	94
Experience	107		Academics	96		students	70		User	85
Time	64		Encourage	56		connectivity	50		friendly	50
Teaching	56		Colleagues	52		support	42		teaching	21
Q5			Q6			Q7			Q8	
WORD	RATE		WORD	RATE		WORD	RATE		WORD	RATE
learning	139		Group	124		Learning	46		Gain	111
Quality	94		Work	124		knowledge	42		Financial	102
students	66		Students	111		Academics	33		Saving	60
Improve	56		impact	63		research	32		work	46

Q1: Explain your personal experiences with E-learning – The most used word was "learning", followed by "experience", then "time" and fourthly "teaching".

The responses which consisted of these words were extracted from the data collected and are as following:

Learning: "Learning" was the most used word in Q1. Below is the extract of responses from the relevant data collected.

Learning	
Resp. #	**Full response Quoted**
17	I've practiced versions of e-teaching and learning for almost a decade. The transition from blended approach to virtual approach was reasonably straightforward
100	Personally, I have a lot of E-learning experience, but i must say that covid19 has re-introduced E-learning and the uptake now is lot better than it was years back. I think E-learning is finally going to take over in education sector
175	E-learning is great and I like the blended learning approach but it requires me to be very organised and have the entire plan for the semester laid out. There is also a drastic increase in the amount of time spent doing administration with E-learning.
204	I have good experience with e-learning, and enjoying it

Responses indicate that applying an E-learning methodology can be fulfilling in their respective teaching and learning approaches. The methodology improves academics' focus in the planning and execution of the daily lectures, while at the same time requiring the same amount of learning from the students.

Experience: experience was the second most used word in Q1 and responses have been extracted as follows:

Experience	
Resp. #	**Full response Quoted**
4	I have good experience with e-learning, I have about 7 years' worth of experience.
117	I have vast E-learning experience, and I am very excited with the adoption of E-learning at UKZN. This would certainly improve the quality of content delivery and management
205	I have good experience with e-learning.it has taught me lot of things, and I am able to conduct my lecturer sessions with ease and a lot of confidence.
257	I have a lot of experience on e-learning. I believe it's a technology that has been ignored for far too long in South Africa until recently when covid-19 hit us. Had we fully adopted E-learning years bad, we would not have found ourselves in the situation we found ourselves in. E-learning promotes a modern way of teaching and there is no reason it cannot be adopted and dominate the education sector

Most of the responses indicate that academics already have attained some E-learning experience through blended teaching and learning approach. The blended approach has been in place for some time now at the UKZN. Responses are also indicative of the long awaited for roll-out as academics have been preparing themselves for such an opportunity.

Time: was the third most used word in Q1. Responses extracted from the data collected are as follows:

Time	
Resp. #	**Full response Quoted**
57	It took a bit of time to learn the best practice approaches to teaching certain sections but I am now confident in adopting e-learning.
77	It was challenging at first but with time and support I got more and more confident
89	I'm happy with the way it is going since the initial lockdown. I'm comfortable with this medium, and it hasn't taken me long to adapt to it. It is less stressful, than the conventional methods and it saves time, money on a daily basis. travel time is eliminated, and as well as running costs to get to work in the usual circumstances. However, I have to say that I've had many instances where technology and data hasn't been very reliable, and I've had difficulties connecting with students and staff to fulfil my teaching and learning obligations. Apart from that sometimes it's also very difficult to balance home and work life. Sometimes we have to also attend to personal matters at home while I'm working etc.
134	I enjoy teaching tremendously both in the classroom and online. E-learning offers a number of possibilities for engaging students individually which is not always easy in big classrooms of 200+ This does require a lot of time, planning, skills and engagement though,

Responses indicate that time is an important factor in the E-learning methodology. There is a need for the provision and allowance of the learning curve. Time saved on the actual application of the E-learning methodology is more beneficial when compared to that spent on the learning curve. Furthermore, respondents highlight on more time saved on travelling which is quite beneficial to them for attending to personal matters.

Teaching: was the fourth most used word in Q1. Responses extracted from the data collected are as follows:

Teaching	
Resp. #	**Full response Quoted**
3	It was challenging at first as I was familiar with traditional methods. I see it as an absolute necessity now. It has proved to make teaching and learning more accessible even during pandemics
79	i don't have much experience, but I have been exposed to E-learning and have used it in my teaching.it is a wonderful technology
126	As an IT person, I was motivated to find different ways to incorporate E-learning as part of teaching the content in the curriculum.
224	I enjoy teaching tremendously both in the classroom and online. E-learning offers a number of possibilities for engaging students individually which is not always easy in big classrooms of 200+ This does require a lot of time, planning, skills and engagement though,

Responses indicates that teaching has improved in many ways after the adoption of E-learning. With E-learning, lecturers are exposed to the variety of possibilities and alternatives for the achievement of applaudable outcomes.

As "Theme 1" consisted of two questions, the second question was treated the same as the first one.

Q2: What can you do to motivate other academics in adopting E-learning?

The most used words in the responses to this question were:

Learning	
Resp. #	**Full response Quoted**
20	I would really encourage my fellow colleagues to embrace change and use E-learning because it is definitely a modern way of teaching and learning. I would encourage more forums and workshops to improve awareness of academics over this tool
100	I would really implore my fellow colleagues to get involve and play their part in speeding up the adoption of E-learning at ukzn.it is long overdue. Yes, having other platforms like forums, etc would assist, and I don't mind assisting
195	I would really love to see other academics adopt e-learning, and I would engage with them in on-on-one discussions and arrange workshops and webinars to engage and have discussions on pros and cons of E-learning and how we as academics would benefit from adopting E-learning
239	I would strongly encourage my fellow colleagues to adopt E-learning as remote teaching and learning. I would motivate them by increasing awareness of e-learning, and have this topic discussed in knowledge session with them.
265	All academics should think about their pedagogy and sound pedagogic ways to reach their students. What we need to encourage pedagogic innovation including E-learning are clear incentives towards promotion through good teaching which are equal to those offered for primary research in our field.

The word "Learning" appears in most of the respondents' affirmation of the importance of E-learning. The responses quoted indicate that academics are ready and show cooperative behaviour towards the adoption of fully-fledged E-learning as the remote teaching and learning mode. In summary, academics demonstrated being highly motivated towards E-learning methodology.

Following are some extracts from the responses:

Academics: was the most used word and below are the full responses extracted, subsequently the explanations are in line with the theme.

Academics	
Resp. #	**Full response Quoted**
20	I would really encourage my fellow colleagues to embrace change and use E-learning because it is definitely a modern way of teaching and learning. I would encourage more forums and workshops to improve awareness of academics over this tool
87	I would really love to see other academics adopt e-learning, and I would engage with them in on-on-one discussions and arrange workshops and webinars to

	engage and have discussions on pros and cons of E-learning and how we as academics would benefit from adopting e-learning
105	One among the best way to motivate them is to have a platform as a group of academics to share our daily challenges and also share new tools that can be explored that seem viable for teaching and learning.
265	All academics should think about their pedagogy and sound pedagogic ways to reach their students. What we need to encourage pedagogic innovation including E-learning are clear incentives towards promotion through good teaching which are equal to those offered for primary research in our field.

The responses indicate that academics are prepared to let the perceptions of technology challenges not influence them, but focus on achieving what is more important in the field of pedagogics. This gives a distinct impression of the respondents' feelings that technology challenges comparatively weigh less than the E-learning methodology.

Encourage: below are the full responses extracted, and subsequently the explanations are in line with the theme.

Encourage	
Resp. #	**Full response Quoted**
4	I would strongly encourage my fellow colleagues to adopt E-learning as remote teaching and learning. I would motivate them by increasing awareness of e-learning, and have this topic discussed in knowledge session with them.
127	I would really encourage my fellow colleagues to embrace change and use E-learning because it is definitely a modern way of teaching and learning. I would encourage more forums and workshops to improve awareness of academics over this tool
144	We share our experiences and try to assist and encourage each other
226	I would really encourage my fellow colleagues to play their part and embrace this wonderful tool, meant to assist us. I would encourage various forms of platforms where this topic can be discussed and information and experience sharing

Most responses demonstrate a high level of motivation whereby academics primarily indicate a great desire for the implementation of the E-learning as a teaching and learning methodology. This level of encouragement exhibits the great hope that even academics that are still inept in technology can be easily co-opted into technology-based learning platforms and methodologies.

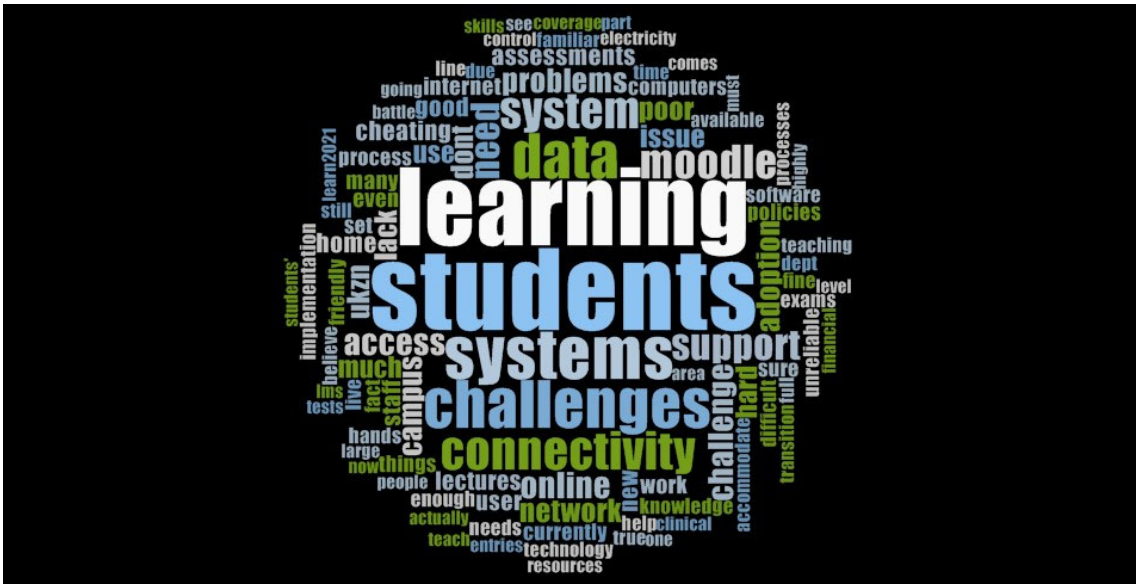
Colleagues: below are the full responses extracted, subsequently the explanations are in line with the theme. The first column on the left indicates the respondents' position in the data collection sheet and on the right-hand side column are the respective responses.

Colleagues	
Resp. #	**Full response Quoted**
11	Engage with my fellow colleagues, you know some people are scared of change and growing hence you find the negative perceptions. I would like to see more webinars and workshops addressing this particular matter
100	I would really implore my fellow colleagues to get involve and play their part in speeding up the adoption of E-learning at ukzn.it is long overdue. Yes having other platforms like forums, etc would assist, and I don't mind assisting
146	word of mouth engagements with fellow colleagues
226	I would really encourage my fellow colleagues to play their part and embrace this wonderful tool, meant to assist us. I would encourage various forms of platforms where this topic can be discussed and information and experience sharing

Most responses indicate that academics are willing to give each other support, hope and confidence that the technology-based methodologies are designed as an attempt to make lives of academics easier through the simplification and improvement of their daily programmes as well as success in their careers. This again indicates a high level of motivation of the academic personnel at the UKZN.

Theme 2: E-learning technology challenges

Question 3 (Q3) of the theme was: *what are your IT systems challenges that make you think E-learning will be hard to adopt?*



Depicting the words according to their frequency of appearance in the relevant responses to the question, it was observed that "learning" (appearing 130 times) was the most frequently

used word. In close analysis of the actual responses, it was noticeable that in these responses, "learning" was mostly picked up due to the references to the topic. However, there are some interesting points made by some of the responses, and such responses are discussed below.

The second most used word was "students" (appearing 70 times), followed by "connectivity" (appearing 56 times) and then support" (appearing 52 times).

Learning	
Resp. #	**Full response Quoted**
16	*teaching and learning system that is not highly user friendly. *Load shedding. *Network problems. *Fact that E-learning can be impersonal. *Lack of IT support after hours for evening classes.
76	Mathematics is an interactive subject currently I am struggling to be hands on when using eLearning. Secondly the kind of laptop provided by the university are not making it easy to teach mathematics via E-learning. Touch screen laptop might help
158	Working from home is highly difficult to adopt E-learning because of other people/pets in the home that make a noise and cause distractions.
214	streamlined processes automation in line with teaching and learning at UKZN

Responses to this question highlighted three technological challenges that create some hurdles in the process of E-learning adoption. Firstly, it was the infrastructural issues such as access to networks electricity power supply in the rural areas. Secondly, it was the specification of the laptop sullied by the university to students in courses that demand high processing power like Engineering. Both academics and students experience challenges when such equipment takes a long time in responding to commands.

Third was the type of equipment used by the students as supplied by the university. Highly interactive subjects such as Mathematics demand modern and updated input options like touchscreens, microphones, trackball, light-pen and so forth.

Students: was the second most used word in responses to this question. Responses containing the word were extracted as indicated below.

Students	
Resp. #	**Full response Quoted**
46	Connectivity issues in South Africa coupled with unstable Eskom electricity-provision. Unresponsiveness on the part of the students.
163	The only drawback that I experienced was the practical / clinical aspect - I find students need hands on practise with clinical skills. Watching a video is a good intro but it does not compensate for hands on training. OUR dept at UKZN does

	not have all the IT skills programmes that other universities (especially international institutions) have and thus this area is very much neglected from an e-leaning perspective
189	Sufficient and reliable data and internet connectivity for students. This has been a major challenge for us and has prevented live-streamed lectures to large classes (300 - 1000 students). We can't even do full pre-recorded lectures because the files are too large to upload if we do videos. So we have resorted to narrated lectures. I think if we had more support in this area we could be much more effective. Assessments are a major issue. There is so much cheating taking place since we moved online. We are behind other universities in addressing this. We have not received adequate support to set up the SEB. When I enquired I received a very unhelpful PDF. This did not solve my issue at all. This is a glaring gap that needs to be addressed. We need more efficient ways to prevent students cheating in tests and exams. Also, as we have moved to continuous assessment, this has meant a heavy workload for staff as they are marking twice as much as before.
246	E Learning is hugely problematic to those students who do not have data and/or connectivity and a quiet place to study via E-learning resources

The responses that were basically constructed with the word "student" as a base indicate a concern by academics that E-learning may be a drawback as far as students are concerned. Apart from the scarcity of the resources such as the data and weak network connections, courses based on practical activities may be affected as well. Most students have been complaining that videos are not sufficient and effective enough to guide them through clinical experiments. Students need to be more hands-on in this regard.

Connectivity: is the third most used word and the extracts from the data collected are presented below.

Connectivity	
Resp. #	**Full response Quoted**
41	The lack of resources for students if they are not physically on campus and the poor connectivity in rural areas.
73	Unreliable electrical supplies, unreliable internet connectivity. I even resorted to going on campus to address connectivity problems. On campus I had problems when using my office for online tutorials and there were frequent breaks in connectivity with a landline.
180	Unreliable electrical supplies, unreliable internet connectivity. I even resorted to going on campus to address connectivity problems. On campus I had problems when using my office for online tutorials and there were frequent breaks in connectivity with a landline.
266	Network connectivity is the main challenge. When you have a zoom lecture you wait for thirty minutes before you can have half of the class.

Academics here again stress the importance of reliable and consistent connectivity through reliable power supply, network service provider and so forth.

Support: is the fourth most word in the responses to this question. Below are some of the responses as extracted from the data collected.

Support	
Resp. #	**Full response Quoted**
12	Extremely slow and very unreliable on-campus Wi-Fi. No immediate IT support when there are problems during lectures. Lack of customisability of our LMS, Moodle. Moodle is also very cumbersome and has a bad user interface. Lack of detailed documentation specifically for the features available on the UKZN installation of Moodle.
136	Our IT E-learning staff are not true experts in the field. I asked one recently for help in how to set up small groups of students to conduct reading journals, where they make their own entries, and respond to their partners' entries. After 3 consultations it transpires our version of Moodle cannot do this. Another colleague later told me this feature comes with the paid version which are not signed up for. So we have financial challenges meaning we are unlikely to have the best E-learning systems available.
215	lack of real time support
256	our systems are not fully up to standard to support the full implementation of e-learning

Most of the responses highlight the competency of the IT staff at UKZN as the area of concern. Sometimes the technicians fail to provide spot-on answers to the problems experienced by the academics. Furthermore, even if they can provide the relevant answers, it is often experienced that the system runs either too slow or lacks the software to support the query.

Although most of the respondents failed to respond directly to the questions of technology challenges, the responses exhibit an instinctive recognition of the factors that are more important to boost one another in embracing technology-based methodologies rather than focussing on negativities.

Theme 3: Impact of E-learning on academic staff

Theme 3 had two questions, namely:

Q5: Will the adoption of E-learning affect quality of both teaching and learning (Explain)?

Q6: What impact will E-learning have on the student group work?

The "Word-cloud of the Q5 depicted the most used words as "Learning" with 139 count, "Quality" with 94 counts, "Students" with 66 counts and "Improve" with 56 counts.

Following are the extracts from the responses to this question:

Learning: is the top-most used word in the responses to this question. Following are the extracts from the responses.

Learning	
Resp. #	**Full response Quoted**
42	I do not believe there will be positive effects without at the same time having good pedagogy. Primarily this means all lecturers being literacy teachers for reading, writing and E-learning tools. Technology is not a magic bullet and naive adoption of technology is positively harmful.
60	E-learning has the potential to improve the quality of both, but deep engagement is required from both sides. In the absence of the latter, the teaching and students' learning experience can be very superficial, compared to a contact environment.
81	Yes and no. Initially, we may see a decrease in quality of teaching and learning as both staff and students learn to navigate the digital realm. I think the biggest challenge for teaching is finding a happy balance where all students have equitable access to online material and live or recorded lectures. More training for teaching staff is required to optimise their use of these E-learning platforms. Overtime as everyone becomes more familiar with it, it will become easier and more readily accepted. The quality will improve if there are more opportunities for live-streaming lectures. This mimics contact teaching. The need to be in classrooms is fast becoming outdated. If we have the proper technology, E-learning platforms, technical support and bandwidth many of our courses could be taught remotely without sacrificing quality. We are currently, however, going through initial teething problems. So I do feel strongly that more support is needed. There are some programmes, which we do not have access to, that allow you create your own animated slides (e.g. cartoon-like -e.g. Powtoon)

	which I feel would draw more attention from students. We are limited in our creativity to adapt - and I feel that we should look more into these options.
134	That depends on how seriously we engage with it. Students and staff need to take the challenge seriously and engage with the possibilities. There is no better of worse of the two platforms, rather, we are more used to doing things in the "old" way and hence are not (yet) optimising the E-learning and have a tendency to romanticise face-to-face learning.
208	E-learning would definitely improve quality. Students can fit online courses around their existing responsibilities and commitments, and can engage with multimedia content and learning materials at whatever time is most convenient to them. Even better: they don't have to travel anywhere to study, they can simply log in to the virtual campus from the comfort of their own home or office. Retention rates are higher with online learning

Academics' opinions are divided in these responses, with those believing in E-learning promising a positive impact on the teaching and learning areas, and those still perceiving the conventional methods as irreplaceable in other areas. Furthermore, some respondents believe that E-learning will push the necessity of improvement for some of the academics in their pedagogy approaches.

Quality	
Resp. #	**Full response Quoted**
13	Yes. While in theory it should improve the quality due to the flexibility it offers, it may, in reality, go down given the reduced interaction from students.
120	Yes, the quality will improve a lot after the adoption of e-learning
186	No, it encourages cheating during tests and exams. This severely affects quality and getting an accurate figure on the true class average etc.
257	yes, E-learning will improve the quality of teaching and learning

Most of the academics are of the opinion that E-learning will improve the quality of teaching and learning. Improvement of teaching and learning will impact positively on the academics' lives. There is a concern though that the level of cheating in tests and exams may escalate. However, with the UKZN promising to go on technology such as "Safe Examination Browser" (Varpio *et al.*), there will be no compromise in the quality of any assessment outcomes.

Students: was the third most used word in the responses to this question. Following are some of the extracts from the responses to this question.

Students	
Resp. #	**Full response Quoted**
47	E-learning requires commitment from students and to be able to take responsibility for their own learning. Many students expect the lecturer to take them by hand and keep the control. The jump from school to university in terms of self-study is too big for many students.
125	I do think that students benefit from personal contact but if done together with E-learning then quality will be improved
208	E-learning would definitely improve quality. Students can fit online courses around their existing responsibilities and commitments, and can engage with multimedia content and learning materials at whatever time is most convenient to them. Even better: they don't have to travel anywhere to study, they can simply log in to the virtual campus from the comfort of their own home or office. Retention rates are higher with online learning
243	Yes. Some students learn better with traditional lectures, whereas other students perform better with e-learning.

Academics responded to this question in a positive manner. They perceive that E-learning will impact positively in students' lives. E-learning also demands a lot of self-discipline from both the academics and the students. Besides the academic achievements, the academics' characters will also improve a lot. With an honest commitment to E-learning, the quality of teaching and learning will improve tremendously.

Teaching: was the fourth most used word in the responses to this question. Following are some of the responses as extracted from the data collected.

Teaching	
Resp. #	**Full response Quoted**
58	Yes, it will improve the quality of the teaching and learning.
137	I strongly believe that the adoption of E-learning would improve the quality of both teaching and learning. Delivery of content to our students would definitely improve
195	E-learning would not doubt improve quality in teaching and learning. I have no doubt about that
245	Yes, it will enhance both teaching and learning quality

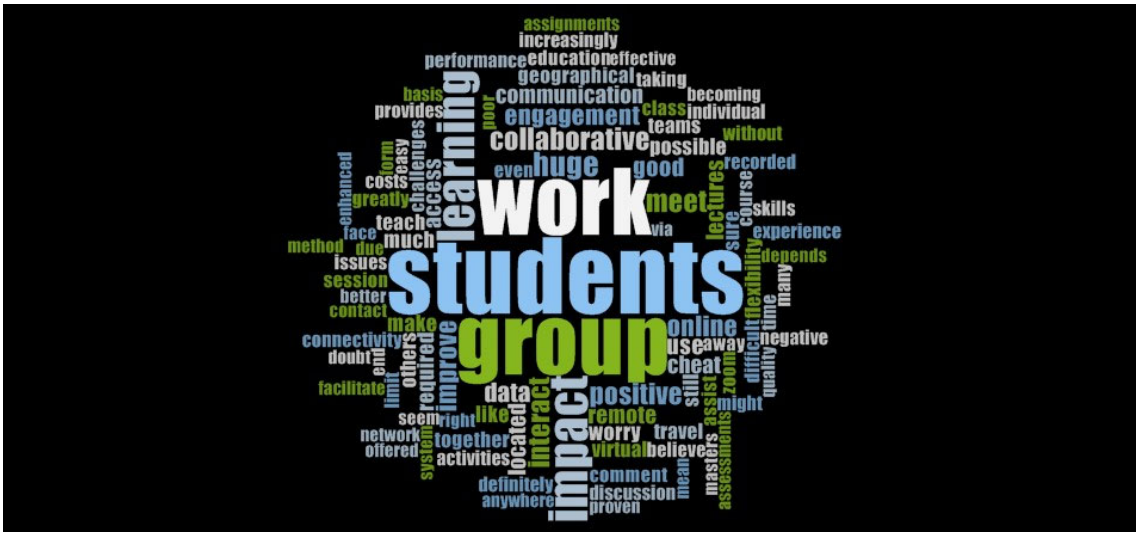
The respondents highly recommend an E-learning methodology for the improvement of the teaching and learning quality. They are specifically of the opinion that the delivery of subject content will be easier with high levels of comprehension from the students' side.

Q6: What impact will E-learning have on student group work?

On the same theme of the impact of E-learning on academics, there was a second question probing academics' feeling about students' group work. The question was based on whether E-learning will meet the demands of students' group work.

"Word-cloud" arranged the most used words as follows:

"Group" 124, "Work 124", "Students" 111 and "Impact" 63.



Work: was the most used word in the responses to this question. Following are the extracts from the responses to this question.

Work	
Resp. #	**Full response Quoted**
42	I don't believe group work will be positively impacted. This method needs sound pedagogic underpinnings and careful planning from the lecturer. All independent work by students is fraught with the possibility of poor performance and misunderstanding if the lecturer does not understand why they are using it and the educational goals of group work. I constantly have to question and revise my assignments and assessments in response to students' performance.
103	E-learning embraces collaboration, and for students to work in groups on E-learning should not be the problem. the Cooperative learning where students work together in small groups on a structured activity and they are individually accountable for their work is a good example of E-learning and student group work working together
162	I think it will allow students to create virtual communities of practice. I think it will have a positive impact because students can work together in groups at any time, and from anywhere. E-learning provides students with more flexibility.
185	Through group work students learn to work with each other. They learn tolerance and the basics of decent engagement and communication. These are important

	skills needed in the working world and which students might not fully develop if E-learning is strictly followed.
234	Online group work is becoming an increasingly popular instructional strategy, therefore I have no doubt that E-learning would definitely bring a positive impact on student group work. E-learning improved student perceptions, communication, quality of education, critical thinking, self-learning

Most responses indicate that E-learning promotes group work, especially as collaborations which are very easy when students create virtual groups. That also increases student's participation as students will be participating from their comfort zone of their private dwellings.

Group: was the second most used word in the responses to this question. Following are some of the extracts from the responses to this question.

Group	
Resp. #	**Full response Quoted**
67	My students have worked better in groups with e-learning. moreover, they have developed skills in working in groups remotely which will hold them in good stead going forward.
103	E-learning embraces collaboration, and for students to work in groups on E-learning should not be the problem. the Cooperative learning where students work together in small groups on a structured activity and they are individually accountable for their work is a good example of E-learning and student group work working together
186	It will encourage group work, but I'm not sure if that's useful except in a tutorial setting. Graduated students don't give a job interview in a group, and if a student cannot in the end think for him/herself then the education system has failed him/her.
234	Online group work is becoming an increasingly popular instructional strategy, therefore I have no doubt that E-learning would definitely bring a positive impact on student group work. E-learning improved student perceptions, communication, quality of education, critical thinking, self-learning

Responses indicate that E-learning is suitable for the students' group work. If students need a lecturer's intervention, they can send an invite through the virtual meeting software and on acceptance, the lecturer can be available for help.

Students: was the third most used word in response to this question. Following are some of the responses as extracted from the data collected.

Students	
Resp. #	**Full response Quoted**
56	I think it will allow students to create virtual communities of practice. I think it will have a positive impact because students can work together in groups at any time, and from anywhere. E-learning provides students with more flexibility.
107	It will decrease it because online learning isolates students. Where as face to face helps students immediately gel together
231	very positive impact because the geographical location of students won't matter
265	I don't believe group work will be positively impacted. This method needs sound pedagogic underpinnings and careful planning from the lecturer. All independent work by students is fraught with the possibility of poor performance and misunderstanding if the lecturer does not understand why they are using it and the educational goals of group work. I constantly have to question and revise my assignments and assessments in response to students' performance.

Respondents show that E-learning will impact positively on the students as the excitement of being independent will boost their energy levels. The methodology provides flexible time as students can switch from group to group in search of their personal preferences and satisfaction. However, the responses still put emphasis on lecturers' self-discipline in pedagogy underpinnings, planning and effective responses to the performances of the students.

Impact: was the fourth most used word in responses to this question. Following are some of the responses as extracted from the data collected.

Impact	
Resp. #	**Full response Quoted**
56	I think it will allow students to create virtual communities of practice. I think it will have a positive impact because students can work together in groups at any time, and from anywhere. E-learning provides students with more flexibility.
150	It would have a huge impact. Students can engage and communicate better and with lot of flexibility
195	Online group work is becoming an increasingly popular instructional strategy, therefore I have no doubt that E-learning would definitely bring a positive impact on student group work. E-learning improved student perceptions, communication, quality of education, critical thinking, self-learning
250	I think it will allow students to create virtual communities of practice. I think it will have a positive impact because students can work together in groups at any time, and from anywhere. E-learning provides students with more flexibility.

Respondents insist on the importance of students creating virtual teams and grouping themselves accordingly for the E-learning methodology to deliver positive results in group work.

Theme 4: Motivating academic staff – this theme was underpinned by two questions, namely

Q7: How can E-learning be used for the academics to gain more knowledge in their field of expertise?

Q8: What would be a financial gain to academics when working from home after the adoption of E-learning?

For Q7, the "Word-cloud" depicted the most used words as following:

"Word-cloud" arranged the words according to their frequency of appearance in the responses as: "Learning" was the mostly used word with 46 counts; "Knowledge" was the second mostly used word with 42 counts; "Academics" was the third mostly used word with 33; and Research the fourth mostly used with 32 counts.

Learning: was the top-most used word in the responses to this question. Following are the extracts from the respondents in the data collection.

Learning	
Resp. #	**Full response Quoted**
47	We as academics engage in E-learning all the time - read our articles online, listen to youtube talks of experts in our field, attend short conferences and even weeklong E-learning conferences. Affordable and do not need to pay for transport and accommodation to attend conferences. However some personal contact is also important to build networks and get to know other experts.
111	E-learning can enable academics to take courses from international universities, on content which will enhance the degree offering.
205	Online learning provides educators with more opportunities to teach in a variety of ways. Communicate more effectively with students. Hold students accountable. Learn new technical skills. These are all the skills an academic would learn,and in turn, grow in their career and gain more knowledge
250	E-learning provides academics with access to various websites and online conferences to assist academics in improving their knowledge in their field of expertise.

Most respondents felt strongly that E-learning will provide them with more opportunities as they need to browse different website, as well as downloading videos that will empower them in their teaching and learning careers. Furthermore, with E-learning, the academics can make use of international standards that can be easily shared with the students.

Knowledge: was the second most used word in the responses to this question. Below are the extracts from the responses.

Knowledge	
Resp. #	**Full response Quoted**
81	The one positive thing that has come out over the past year is that we can now more readily have webinars and international experts presenting on their research. The sharing of ideas and knowledge has become ironically more accessible as a result of lockdowns and restrictions on travel. We have more opportunities to gain knowledge and participate in our fields of expertise than in the past (where travelling often at your own expense was prohibitive).
114	It’s a modern way of teaching, therefore it can contribute in knowledge gaining in their field
192	It can't - academics must go out there and play their part. knowledge is sourced, not delivered
245	Online libraries have opened up a new world for academics. The ability to attend e-conferences, international meetings and lectures has helped me gain more knowledge in my field. I am then able to pass this knowledge on to my students...so the gain is universal as it positively impacts my teaching

The responses indicate that academics strongly believe that as a modern teaching and learning methodology, E-learning will open new doors for them. E-learning is such a motivation to always search for the current information.

Academics: was the third most used word in the responses to the question. Below are the extracts from the responses as obtained during data collection.

Academics	
Resp. #	**Full response Quoted**
5	E-learning can enable academics to take courses from international universities, on content which will enhance the degree offering.
99	E-learning is an enabler, and therefore any way of gaining knowledge by academics, I'm sure E-learning can be used as an enabler for that
137	It can be used as an empowerment tool for academics. I mean using this platform would yield more knowledge for lecturers in the teaching and learning space
257	exposure of academics would essentially equip them with more knowledge on the subject matter

Responses to this question indicate that academics feel that E-learning can be of great motivation in their quest for academic knowledge. By spending long hours on the computer, academics can gain a lot of knowledge in teaching, which will in turn motivate them to further their studies.

Research: was the fourth most used word in the responses to this question. Following are the extracted responses.

Research	
Resp. #	**Full response Quoted**
42	I research in a new field of sociology and pedagogy which is mainly found in databases rather than in libraries. This is true for most cutting-edge research
95	Cutting edge technology and more resources for them to expand knowledge (research funding & exposure to industries who are ahead
193	The data could be used for various research objectives.
229	Online platforms allow greater participation in the international research arena eg. attending international conferences that would previously have been too expensive.

E-learning pushes academics to engage in current research in their subjects, which gives them a cutting edge, especially in the spheres of pedagogy.

Q8: What would be a financial gain to academics when working from home after the adoption of E-learning?

For Q8, the "Word-cloud" depicted the most used words as follows:

The "Word-cloud" arranged the frequency of the words used in responses to this question as follows: The word: Gain" was the first most used word with 111 counts, followed by the word "Financial" with 103 counts, then the word "Saving" with 60 counts and the word "Work" with 46 counts.

Gain: was the top-most word used and below are the responses extracted from the data collection data.

Gain	
Resp. #	**Full response Quoted**
51	Not so much if staff members must still invest in data. otherwise definitely the financial gain will be there in terms of travel costs
81	Perhaps not so much tangible financial gain. But there are a host of other benefits. The biggest is saving on fuel and time wasted driving in traffic. Also, better for the environment! Better on overhead costs for the university (e.g. electricity and water consumption). Cleaner and safer working environment. Such things outweigh financial gain per se.
127	There is a financial gain in terms of travel costs, but proper home office space and costs of electricity probably break even with the benefits. for me conducting lecturer sessions from home and have the recording of the session is far better to gain than financial gain.
257	big financial gain in terms of cost saving

Academics feel that they will be savings on different factors if the adoption of E-learning can be successful. They highlight the possibilities of gain in the areas of travel cost, time and the fact that lecturers will be recorded and ready for a repeat as and when needed.

Financial: was the second most used word in the responses to this question. Below is the extract from the responses.

Financial	
Resp. #	**Full response Quoted**
14	working from home has its benefits, but requires a lot of discipline. Financial there is definitely a financial gain
157	not so much if staff members must still invest in data. otherwise definitely the financial gain will be there in terms of travel costs
186	I'm not sure there is a huge financial gain, but I see a psychological gain as I can do lots of other work (writing research papers/proposals) from home uninterrupted.
218	No traveling expenses, reduced child care, no need to travel to conferences - I think the benefits from a financial perspective are huge.
250	I don't think there should be any additional financial gain. Academics are being paid to lecture it should not matter if they are lecturing online or face-to-face.

Most responses feel that there is a financial gain in the adoption of E-learning as a teaching and learning methodology.

Saving: was the third most used word in the responses to this question and the extract from the information as in data collected is listed below.

Saving	
Resp. #	**Full response Quoted**
11	huge financial gain, time saving and cost saving
177	Reduced transport costs, saving time that could be used to interact more with post-graduate students and academic writing.
189	Perhaps not so much tangible financial gain. But there are a host of other benefits. The biggest is saving on fuel and time wasted driving in traffic. Also, better for the environment! Better on overhead costs for the university (e.g. electricity and water consumption). Cleaner and safer working environment. Such things outweigh financial gain per se.
260	not much really. I think there are some losses. Only petrol saving is a bonus.

Respondents felt that there will be great saving benefits from the adoption of E-learning.

Work: was the fourth most used word in the responses to this question. Below is a list of extracted responses consisting of such a word.

Work	
Resp. #	**Full response Quoted**
4	"Cost and time saving, this means that financial we will save on petrol and other costs of going to and from work"
113	"Not traveling to work"
186	"I'm not sure there is a huge financial gain, but I see a psychological gain as I can do lots of other work (writing research papers/proposals) from home uninterrupted.
239	cost and time saving, this means that financial we will save on petrol and other costs of going to and from work

Responses indicate that academics will save a lot on travel costs when working from home.

4.4 Conclusion

This chapter presented the results of both the quantitative and qualitative data analyses. Being a mixed methods research study, both quantitative and qualitative data outputs were presented, discussed and converged for synchronised findings. The findings revealed that the academics at the University of KwaZulu-Natal were prepared for the adoption and implementation of E-learning as a fully-fledged teaching and learning methodology. Therefore, the study has contributed to the reassurance of UKZN that they are ready to implement E-learning in the event that the pandemic breaks out again.

The following chapter will focus on the statement of findings, recommendations and the limitations of the study.

CHAPTER 5
FINDINGS, RECOMMENDATIONS AND LIMITATIONS

5.1 Introduction
The previous chapter presented both quantitative and qualitative data outputs as analysed through the mixed methods approach. In this chapter, both data sets will be summarised using joint displays that array the quantitative and qualitative results simultaneously (Guetterman, Fetters and Creswell 2015). By so doing, the key finding summary will conclude by presenting a single summary of results. This is a choice made by this study as there is no specific stage forcing the study to integrate the results (Rai 2018). In essence, this chapter presents findings uniformly in line with the Framework designed as a trajectory for this study.

5.2 The findings of the study
On reviewing the literature, three theoretical perspectives and models were explored, and the acknowledgement was made of their contribution to different fields of technology adoption. The study objectives helped as guidance in choosing the model, with components that were relevant to this study. Using those components has contributed positively to arriving at the findings of this study through answering the main question. To recap on such components, the study re-visits them as indicated below:

- Attitudes of Academic staff towards E-learning;
- E-learning technology challenges faced by academics during the adoption of E-learning;
- The impact of E-learning on academic staff; and
- Motivating the academics in speeding up the adoption of E-learning methods.

5.2.1 Findings on attitudes of the academic staff towards E-learning
The theme consisted of four quantitative questions and two qualitative questions exploring the attitudes of the academic staff members at UKZN towards the adoption of E-learning as a fully-fledged teaching and learning methodology. In summarising the responses to the questions, the following inferences are drawn:

For responses to the quantitative statements, the following deductions are made on the above theme:

SQ001: I have applied E-learning in my teaching methods

To this statement, the responses indicated that 82% (agreed plus highly agreed) of the respondents agreed with the statement while the rest were either unsure or disagreed. Proportionately, more academics have had a fair amount of exposure to E-learning as a learning and teaching methodology.

SQ002: I have sufficient skills as required by E-learning technology

The response analysis indicated that 71% of the respondents agreed with the statement while the rest either disagreed or were unsure. This indicated that most of the academics have had sufficient exposure to applying E-learning in their teaching and learning methods.

SQ003: I am confident that E-learning will work with minimum glitches

On analysing the responses to this statement, it was discovered that 68% of the respondents agreed with the statement while the rest were unsure. This demonstrated that most academics are highly confident that there will be minimum obstacles in the adoption of E-learning.

SQ004: *E-learning is a long overdue system of teaching and learning at UKZN*

The responses analysis indicated that 78% of the respondents agreed with the statement, while the rest either disagreed or were unsure.

With the above observations on the quantitative data analysis, it was fair to state that academics demonstrate a highly positive attitude, and they are ready to respond positively to the adoption of E-learning as a teaching and learning methodology at UKZN.

Attitudes of the academic staff towards E-learning was again checked through two open-ended questions as follows:

Q1: Explain your personal experiences with E-learning?

Using "Word-cloud", it was revealed that most of the respondents feel that the adoption of E-learning is a long overdue intervention.

Q2: What can you do to motivate other academics in adopting E-learning?

Analysing the responses to this question, an inference could be drawn that the respondents are highly motivated and can even go to the extent of helping others in speeding up the adoption of E-learning.

The results of both quantitative and qualitative data analyses indicate that most of the respondents are optimistic about the adoption of E-learning. Under difficult situations, they are hopeful that E-learning will not only minimise the chances of spreading communicable diseases like Covid-19, but will also make learning easier for both academics and students. This demonstrates a positive attitude, and the study can conclusively state that such a positive attitude is an indication that the UKZN academic staff are ready to adopt E-learning as a teaching and learning methodology.

5.2.2 Findings on E-learning technology challenges faced by academics during the adoption of E-learning

The theme consisted of four quantitative questions and two qualitative questions exploring the possibility of technology challenges that may be experienced by the academics if E-learning is adopted as a fully-fledged teaching and learning methodology at UKZN.

On quantitative data analysis, the following observations were made:

SQ001: *UKZN IT system is user friendly*

The Responses analysis to this statement indicated that 60% of the respondents agreed with the statement, while the rest either disagreed or were unsure. Responding positively to this statement indicated that academics at UKZN are currently experiencing no serious problems with the IT system used by the institution. It also signals the high hope that the current IT system will cope with all the E-learning technical demands.

SQ002: *UKZN IT help desk is always available in case of technological glitches*

Responses analysis indicated that 59% agreed with the statement, while the rest either disagreed or were unsure.

Therefore, such results were an indication that the IT support system of the institution is less of a concern for now. The team is convincingly capable to cope with the technological demands of E-learning.

SQ003: *UKZN IT software supports the E-learning technology requirements*

Responses analysis showed that 64% of the respondents agreed with the statement, while the rest either disagreed or they were unsure.

The response patterns are a positive indication that academics believe in the current IT system of UKZN.

SQ004: *UKZN offer sufficient data bundles for smooth running of the remote classes*

Responses analysis indicated that 53% of the respondents agreed with the statement, while the rest either disagreed or were unsure. The response pattern signified a fair amount of satisfaction that the institution's supply of data bundles is sufficient to carry them through while working from home. This indicates that a very minimal amount of downtime is expected regarding data bundle shortages.

On qualitative data analysis, the following observations were made:

Q3*: What are your IT systems challenges that make you think E-learning will be hard to adopt?*

Responses to this question highlighted a few technological challenges that may create some hurdles in the process of E-learning adoption. Unfortunately, such problems are major infrastructural concerns that would require high-level State policy-makers to address. These concerns include electricity supply and weak network provision. These are far beyond the institution's reach.

Q4: *How can the UKZN IT systems be improved to be more efficient and user friendly?*

The analysis applicable to this question was done through "Word-cloud" and very mature comments from the respondents were observed. Firstly, the respondents commented that UKZN's IT systems are user-friendly. The online learning platforms must be upgraded regularly, and more training must accordingly be given to staff members, and adjust the resources for the leverage of such training. Staff training would be more effective if regular surveys are conducted by the institution to identify specific inefficiencies in the system, or the user/system discrepancies.

On both quantitative and qualitative data analyses, most of the respondents indicated that technology is not a significant challenge for them in conducting lectures and students'

assessments remotely. Valid comments were received as to what could be of benefit to E-learning adoption. Conclusively, there are very limited challenges to the adoption of E-learning by the institution.

5.1.1 Findings on the impact of E-learning on academic staff

The theme consisted of four quantitative questions and two qualitative questions exploring the impact that E-learning may have on academic staff members.

Findings from the four statements as abstracted from the quantitative data indicate the following:

SQ001: E-learning will improve the quality of teaching and learning at the UKZN

A majority 51% of the responses agreed with this statement, while the rest of the respondents either disagreed or they were unsure. This is an indication that according to the academics, the adoption of E-learning will improve the quality of teaching and learning at UKZN.

SQ002: E-learning will allow academics more time to do preparations for teaching sessions:

Although there was a thin margin between those responses in agreement with the statement, an inference can be drawn that a reasonable majority agreed with the statement: 49% of those in agreement as opposed to the split between agreement at 39% and unsure at 11%.

SQ003: With E-learning, students can easily work in groups to share subject matters.

The split indicates that 47% of the respondents agreed, while 37% disagreed, and the remaining portion were unsure. Consequently, a reasonable inference can be drawn that most of the responses agreed with the statement.

SQ004: E-learning can deliver the same subject content as in conventional learning

A whopping 64% of the responses agreed with this statement.

In conclusion on this theme, the following was drawn:

Findings from the four statements as abstracted from the qualitative data indicate the following:

On both questions probing the perceptions of academics about E-learning impact, one conclusion can be made that the academics are very positive of the impact.

Therefore, it was objective and sensible to conclude that the finding to this theme was closely identified with the fact that academics perceive that E-learning will have a highly positive impact on their teaching and learning life.

5.2.3 Findings on motivating academics in speeding up the adoption of E-learning methods

The theme consisted of four quantitative questions and two qualitative questions exploring the need to motivate academics to speed up the adoption of E-learning.

SQ001: E-learning can open the scope of advancement of my teaching career

After the analysis of the responses to this question, it was revealed that the majority of 63% agreed while the rest either disagreed or were unsure. The results indicate that the academics believe that the adoption of E-learning will have an immense impact on their career advancement. Such a conviction is an indication that UKZN academics are already excited by the introduction of E-learning as a teaching and learning mode.

SQ002: Use of computers on E-learning can contribute positively to my IT knowledge gained

Responses analysis revealed that the majority of 71% respondents agreed with the statement while the rest either disagreed or were unsure. This is indicative of the academics' conviction that besides contributing to their career advancement, the adoption of E-learning would help in honing their IT skills at the same time. The results demonstrate that UKZN academics are excited about the adoption of E-learning.

SQ003: E-learning make it possible to work from home thus saving on transport costs

Responses analysis showed that the majority of 76% of the respondents agreed with the statement while the rest either disagreed or were unsure. This indicates that the UKZN academics believe that there will be financial savings realised through the introduction of the E-learning.

SQ004: With E-learning methods, more time is available for academics to attend to their personal matters

Responses analysis indicated that the majority of 48% of the respondents agreed with the statement while the rest either disagreed or were unsure. Because 12% of the respondents were unsure, together with 1% that did not respond to the question, an inference can be drawn that 48% was the majority comparative to the 39% that totally disagreed. Therefore, it can be concluded that the academics feel that the adoption of E-learning will provide more time for them to be doing other things that are personally beneficial or to their work.

On the analysis of the responses to the two open-ended questions of the qualitative data collected, the following results were obtained:

Q7: *How can E-learning be used for the academics to gain more knowledge in their field of expertise?*

Most respondents felt strongly that E-learning will provide them with more opportunities as they would be encouraged to browse different website when gleaning appropriate teaching materials. They will also get used to downloading relevant videos that will empower them in their teaching and learning careers. Furthermore, with E-learning, the academics can make use of international standards that can be easily shared with the students.

Q8: *What would be a financial gain to academics when working from home after the adoption of E-learning?*

Academics indicated that the adoption of E-learning will present much potential for saving on different aspects. Travel costs was top on the lists of items that would realise savings through the introduction of E-learning. Time was next on the list, while the recording of lectures was also perceived as the other area of savings that would be gained. Academics feel that lecturers will be recorded and ready for a repeat as and when needed, instead of going through the same thing verbally when students need further clarifications.

5.3 Summary of the key findings

Table 5.1: Summary of key findings

OBJECTIVES	KEY FINDINGS
1. To determine the levels of Academic staff satisfaction with blended and E-learning adoption during Covid-19	Academics are highly satisfied with the adoption policy, and they are ready for any challenges that it may pose to the sphere of teaching and learning modes.
2. To determine the challenges experienced by academics during the adoption of E-learning during Covid-19	The academics seem to have already gained a fair amount of training. Findings indicate that any challenges experienced through the adoption of E-learning can be easily mitigated.
3. To establish the impact of E-learning on academics during the implementation of remote teaching and learning	Findings revealed that the academics are excited about the proposal and feel that the adoption of E-learning will have a positive impact on their teaching and learning careers.
4. To recommend what could/can be done to improve the E-learning transition for academic staff.	The findings indicate that the academics are highly motivated and ready for the adoption of E-learning as a teaching and learning mode. Very little motivation will be needed, and it must be in the form of in-situ training.

5.4 Recommendations

The review of existing literature in this study created an insight into answering the question underpinning the problem statement of this study. From the pioneers of some models and frameworks already existing in the institutional theories that have helped in solving problems of a similar nature, this study was able to trail in the same track from relevant data collection and analysis to arriving at the findings.

Consequently, the recommendations for action in this study are based on the framework underpinned by the study objectives that guided it throughout the research process. Following is the key recommendation for action.

The key recommendation of the study would be for UKZN to speed up the adoption of E-learning as a fully-fledged teaching and learning mode. The rollout can be conducted across all the colleges.

5.5 Limitations of the study

There were several concerns observed on the outcomes of data analysis. However, such concerns fell outside the scope of this study. The study focus was on the level of readiness of UKZN academics in the adoption of E-learning as the mode of teaching and learning. However, it would not be fair not to highlight such limitations of the study. The following are some of those limitations:

5.5.1 Electricity supply problems

There was a strong concern that E-learning may be negatively impacted by the unreliable power supply that has engulfed South Africa as a country. Both academics and institutions cannot effect any change to this situation, neither can this study make any recommendations in that regard.

5.5.2 Communication Network Providers

It was revealed through the evidence of this study that some of the areas, especially the rural areas of the country, do not have a strong network signal. As a result, internet is very slow or even non-existent. This is a serious impediment to the success of E-learning as most of the stakeholders at UKZN are from the rural areas. However, important as it is to the successful implementation of the E-learning, such problems fell out of the study focus.

5.6 Conclusion

The adoption of fully-fledged E-learning had always been perceived as incapable of delivering the same results as conventional teaching and learning methodologies. Despite all the negative things that had been levelled against E-learning, this study was able to prove that UKZN can overcome any problem associated with the adoption and implementation. The study proved that the institution is ready to adopt and use E-learning as an alternative teaching and learning methodology. Although not being a focus of the study, the infrastructural support for this technology was identified as a concern. However, UKZN has very little influence on

infrastructural issues such as network connectivity as well as the reliability of the power supply. The chapter identified such issues as the limitations of the study.

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ANNEXURE A: QUESTIONNAIRE

Research Questionnaire

SECTION A: PERSONAL INFORMATION

Indicate with X

	GENDER	**Male:**			**Female:**	
	AGE	**21-30**	**31-40**	**41-60**	**60+**	
	QUALIFICATIONS	**Degree (Jnr):**	**Degree (Hon.)**	**Master's**	**PhD+**	
	RESIDENTIAL LOCATION	**Rural:**	**Quasi-rural**	**Quasi-urban**	**Urban**	
	Campus	**Howard College**	**Westville**	**Edgewood**	**Medical School**	**Pietermaritzburg**

6. Race

African	**Coloured**	**Indian**	**White**	**Other**

7. Home language

Afrikaans		**IsiZulu**		**Setswana**	
English		**Sepedi**		**Tshivenda**	
IsiXhosa		**Sesotho**		**Xitsonga**	
IsiNdebele		**SiSwati**		**Other**	

SECTION B: UKZN EMPLOYMENT INFORMATION

COLLEGE	**Law & Mngt.**	**Humanities**	**Health Sciences**		**Science & Agriculture**
POSITION	**Tutor**	**Lecturer**	**Snr Lecturer**	**Dean**	**DVC**

Class Taught	1st Yr. Undergrads	Post 1st Yr. Undergrads	Horn.	Masters	PhD.
E-learning Experience	1-5 Yrs.	6-10 Yrs.	11-15 Yrs.	16-20 Yrs.	20^{+}

Section C: CLOSED ENDED QUESTIONS (QUANTITATIVE)

Indicate with X your level of agreement with the statement

EXAMPLE

STATEMENT	Highly Disagree	Disagree	Unsure	Agree	Highly Agree
E-learning methods are not applicable at UKZN		**X**			

N.B. The above response indicates that the respond disagrees with the statement.

QUESTIONS

Theme: Attitudes of Academic staff towards E-learning

STATEMENT	Highly Disagree	Disagree	Unsure	Agree	Highly Agree
1. I have applied E-learning in my teaching methods					
2. I have sufficient skills as required by E-learning technology					
3. I am confident that E-learning will work with minimum glitches					
4. E-learning is a long overdue system of teaching and learning at UKZN					

Theme: E-learning technology challenges faced by academics during the adoption of E-learning

STATEMENT	Highly Disagree	Disagree	Unsure	Agree	Highly Agree

1. UKZN IT system is user friendly					
2. UKZN IT help desk is always available in case of technological glitches					
3. UKZN IT software supports the E-learning technology requirements					
4. UKZN offer sufficient data bundles for smooth running of the remote classes					

Theme: The impact of E-learning on academic staff

STATEMENT	**Highly Disagree**	**Disagree**	**Unsure**	**Agree**	**Highly Agree**
1. E-learning will improve the quality of teaching and learning at the UKZN					
2. E-learning will allow academics more time to do preparations for teaching sessions					
3. With E-learning, students can easily work in groups to share subject matters					
4. E-learning can deliver the same subject content as in conventional learning					

Theme: Motivating the academics in speeding up adoption of E-learning methods

STATEMENT	**Highly Disagree**	**Disagree**	**Unsure**	**Agree**	**Highly Agree**
1. E-learning can open the scope of advancement of my teaching career					
2. Use of computers on E-learning can contribute positively to my IT knowledge gained					
3. E-learning make it possible to work from home thus saving on transport costs					

4. With E-learning methods, more time is available for academics to attend to their personal matters					

SECTION D: OPEN ENDED QUESTIONS (QUALITATIVE)

Instruction: Please answer the following questions as you understand the situation in relation to your current job, in five or more lines.

Theme: Attitudes of Academic staff towards E-learning

Explain your personal experiences with E-learning
What can you do to motivate other academics in adopting E-learning?

Theme: E-learning technology challenges faced by academics during the adoption of E-learning

What are your IT systems challenges that make you think E-learning will be hard to adopt?
How can the UKZN systems be improved to be more efficient and user friendly?

Theme: The impact of E-learning academic staff

will the adoption of E-learning affect quality of both teaching and learning? Explain.
amenability What impact will E-learning have on the student group work?

Theme: Motivating the academics in speeding up adoption of E-learning methods

How can E-learning be used for the academics to gain more knowledge in their fields of expertise?
What would be the financial gain to academics when working from home after the adoption of E-learning?

ANNEXURE B: PERMISSION TO UNDERTAKE RESEARCH AT UKZN

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

9 September 2021

Mr Siphamandla Handsome Nyathikazi
Durban University of Technology
Email: Nyathikazi@ukzn.ac.za

Dear Mr Nyathikazi

RE: PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal (UKZN) towards your postgraduate studies, provided Ethical clearance has been obtained. We note the title of your research project is:

"The adoption of E-Learning as a remote teaching and learning methodology in the tertiary institutions during a covid-19: A case study of the University of KwaZulu-Natal."

It is noted that you will be constituting your sample as follows:

- By handing out questionnaires to academic staff members at UKZN (Taking in account the regulations imposed during the lockdown ie restrictions on gatherings, travel, social distancing etc. ZOOM, Skype or telephone surveys recommended).
- With a request for responses on the website. The questionnaire must be placed on the notice system http://notices.ukzn.ac.za. A copy of this letter (Gatekeeper's approval) must be simultaneously sent to (govenderlog@ukzn.ac.za) or (ramkissoonb@ukzn.ac.za).

Please ensure that the following appears on your notice/questionnaire:

- Ethical clearance number;
- Research title and details of the research, the researcher and the supervisor;
- Consent form is attached to the notice/questionnaire and to be signed by user before he/she fills in questionnaire;
- gatekeepers approval by the Registrar.

You are not authorized to contact staff and students using the 'Microsoft Outlook' address book. Identity numbers and email addresses of individuals are not a matter of public record and are protected according to Section 14 of the South African Constitution, as well as the PAIA and POPI Act. For the release of such information over to yourself for research purposes, the University of KwaZulu-Natal will need express consent from the relevant data subjects. Data collected must be treated with due confidentiality and anonymity.

Yours sincerely

_____
Dr KE CLELAND: REGISTRAR

Office of the Registrar
Postal Address: Private Bag X54001, Durban, 4000, South Africa
Telephone: +27 (0)31 260 7971 **Email:** registrar@ukzn.ac.za **Website:** www.ukzn.ac.za
Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

ANNEXURE C: LETTER OF INFORMATION & CONSENT LETTER

LETTER OF INFORMATION

Title of the Research Study: The adoption of E-Learning as a remote teaching and learning methodology in the tertiary institutions during covid-19: A case study of at University of KwaZulu Natal

Principal researcher: Siphamandla Handsome Nyathikazi

Co-Investigator/s/supervisor/s: Dr. S. Parbanath

Brief Introduction and Purpose of the Study: The study will be based at the University of KwaZulu-Natal, and its focus will be investigating whether the academics were ready for the adoption of E-Learning as a remote teaching and learning methodology in the tertiary institutions during covid-19 A random sample will be selected from the academic staff from the colleges of this institution.

This study probes into the challenges making it hard to implement the E-learning in its full capacity. Consequentially the research will be a case study at the University of KwaZulu Natal. A mixed method of both quantitative and qualitative research methodology approach will be adopted in this study. The academic staff of the University of KwaZulu-Natal is the population of the study, and the formula to constitute the sample of the study will be adopted.

Good morning Prof/Dr/Adv/Mr/Mrs/Ms.....

I am a student at DUT doing research for my degree in Master of Information and Communications Technology and I would like to invite you to participate in the research as explained above. Hereinunder, is the questionnaire that you will be requested to fill in. Please note that this is an at will exercise and you are free to withdraw from the study as and when you wish.
You must also understand that answering of the questionnaire bears no costs to both the researcher and the respondent. You are free to discuss the contents of this letter with your family, if need be for further explanation you can contact any of the people whose contact details are provided at the bottom of the letter.

What is Research (Research is a systematic search or enquiry for generalized new knowledge)

This is a case study based at the University of KwaZulu-Natal. It endeavors to provide insight into whether the academics of the institution were ready for the adoption of E-Learning as a remote teaching and learning methodology in the tertiary institutions during covid-19. You will be requested to answer a questionnaire of both closed and open-ended questions. The questionnaire will take about ten to fifteen minutes to complete, and confidentiality of your identity is hereby guaranteed. You have the right to remain anonymous if you choose to do so. Moreover, all information obtained for purposes of this research will be kept confidentially and none will be identifiable with any of the respondents.

In the event that you become interested in the results of the study, such information can be disseminated to the individual participants.

Persons to contact in the Event of Any Problems or Queries: Please contact the researcher Mr SH Nyathikazi (0834033291), my supervisor Dr Steven Parbanath (033 845 8843) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

30 April 2021

CONSENT

Full Title of the Study: The adoption of E-Learning as a remote teaching and learning methodology in the tertiary institutions during covid-19: The case study of the University of KwaZulu Natal

Names of Researcher/s:

Statement of Agreement to Participate in the Research Study:

I....., hereby confirm that I have been informed by the researcher, Siphamandla Handsome Nyathikazi about the nature, conduct, benefits and risks of this study

I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.

I may, at any stage, without prejudice, withdraw my consent and participation in the study.

I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

I understand that significant new findings developed during this research which may relate to my participation will be made available to me.

Full Name of Participant	Date	Time	Signature/Right Thumbprint

I, Sphamandla Handsome Nyathikazi herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Siphamandla Handsome Nyathikazi	25 August 2021	
Full Name of Researcher	Date	Signature
Full Name of Witness (If applicable)	Date	Signature
Full Name of Legal Guardian (If applicable)	Date	Signature

30 April 2021