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Improving Blended Learning Usage in South African Universities: A Case of Tshwane University of Technology

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Abstract
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The emerging technologies are changing the world's way human beings do their work in all sectors education inclusive. More so, the increasing global challenges such as the covid-19 pandemic calls for the harnessing of theory to create powerful lesson plans with technology to meaningfully transform teaching with technology in a particular context. This study focused on enhancing the use of Blended learning (BL) by higher education institutions for teaching and learning.

Blended learning is a technology based enhanced learning that combines brick-and-mortar instructor-led training and online learning activities. Blended learning (BL) may be used by combining models that include but not limited to, face-to-face, rotation, flex learning, gamification, online lab, self-blended learning and online driver. However, unlike the full-fledged e-learning BL doesn't replace the face-to-face model of training but it enhances it by extending the classroom to online virtual environment.

Developing countries higher learning institutions have tried to promote BL but its continuance usage fades soon as it is implemented. The reasons for this lack of continuance are still not clear. This study's major objective was to find better ways of improving BL usage by lecturers in South African universities. This study followed a quantitative approach where data was collected using a close-ended questionnaires from the academic staff of the faculty of ICT at Tshwane University of Technology. The collected data was analysed quantitatively by using the statistical package for social scientists (SPSS vs 25). Results indicated that of the 14 variables that were suggested to have an influence on BL usage, 11 had a significant contribution while three didn't. The findings of this study indicated that self-efficacy, individual characteristics and organizational strategies have high significant contributing while performance expectancy, effort expectancy and academic work load didn't show any significant contribution. This study makes contribution that are theoretical and practical. Theoretically, this study indicated that there is a need by Higher learning Institutions to improve on the design of policies and strategies that are intended for education. More so future research can extend the findings of this study to well inform online usage for teaching and learning. Practically, the findings of this study will be used by HEIs management when making decisions regarding BL usage. Due to an unavoidable limitations, this study recommends that future research should extend the source of data by involving many other participants from different settings, involve the use of qualitative methods or mixed methods to enrich the results so as to allow generalization. Lastly, the study recommends the analysis of the interacting and moderating effects of the participants' demographical and situational variables.

Keywords
Blended learning, online learning, teaching and learning during the covid-19 pandemic

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Abbreviations

BLAM	Blended Learning Adoption Model
BL	Blended Learning
DD	Double Diamond
HEIs	Higher Education Institutions
HEQSF	Higher Education Qualifications Sub-Framework
ICT	Information and Communication Technology
IT	Information Technology
TLWT	Teaching and Learning with Technology
TUT	Tshwane University of Technology
UTAUT	Unified Theory of Acceptance and Use of Technology

Dedications

This dissertation is dedicated to my late parents Mr and Mrs J Kgasi. You always believed in me from which I gained my encouragement and empowerment.

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First and foremost I would like to give thanks and glory to the Almighty God my creator and protector for being with me throughout this journey.

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Declaration

I Mmamolefe Rosina Kgasi, hereby declare that this dissertation titled "***Improving Blended Learning Usage in South African Universities: A Case of Tshwane University of Technology***" is my own work. This work has never been submitted for a degree or any other assessment at any University. All other work that have been consulted are acknowledged by citations and inclusion in the references.

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Mmamolefe Rosina Kgasi

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Signed: …… Date: ……

Supervisor

1 Introduction

1.1 Introduction to the Field of Study

Information and Communication Technology (ICT) is increasingly changing the way human beings carryout activities in their daily life and this is happening in all sectors, education inclusive. Lecturers and all other instructors at tertiary institutions are being encouraged to find innovative ways to improve curriculum delivery through the utilization of technology so that students may have continued learning, at anytime and anywhere. Chigona (2015) allude that, leveraging technology to enhance instructional methodologies provides a personalized approach to learning that gives students control over the time, place, path and pace of their learning regardless of their geographical locations. She further notes that, using technology for blended learning also helps lecturers to improve curriculum delivery by providing them with better ways of addressing learners' needs.

Universities worldwide endeavor to meet their students' needs, however they face numerous impediments ranging from social, technological, educational to economic barriers (Ibrahim, & Nat, 2019). Because of these many challenges universities have to leverage ICT in order to remain in contact with their learners so that learning becomes a continuous process to benefit the students as well as helping universities to achieve their goals of bridging the gaps between learners and their instructors. This implies that using ICT for education allows learners to be much closer to their instructors than in the case of face-to-face lessons (Boelens et al., 2017). Technology use comes with modern tools that provide students with unique opportunities for developing their skills. With such opportunities presented by technology such as educational videos, social networks, web-conferencing, learners are brought right into the learning process through an innovative and inclusive way of learning. However, the use of ICT for education is not intended to replace the traditional face to face interaction between the learners and their instructors but to enhance it.

The use of ICT to support teaching and learning is referred to as electronic learning (E-learning) and involves the use of computer devices to deliver part, or all of the

course. E-learning has revolutionized teaching and learning in terms of access to education, knowledge and learning resources needed for skills development to big number of recipients (Ozmen et al., 2018). However, since learners still need face to face interactions with their instructors, a blended learning approach is more appropriate. Blended learning is a form of teaching and learning that conglomerates classroom learning with e-learning whereby learners can partially control the time, place as well as intervals of their learning (Adekola et al., 2017).

With blended learning, learners can access and complete their course works through online learning platform but at the same time attend face-to-face meetings with their instructors as the need may arise. Some models of blended learning include but not limited to online lab, flex, rotation, and self-blend that varies depend on the degree of technology used and the mode of implementation (Adekola et al., 2017). It is supported by various factors that include but not limited to, students positive disposition to learning, faculty technology affinity, including pedagogy fitness, institutional readiness, changing digital landscape, stakeholders expectations, internationalization, quality assurance and enhancement, physical infrastructure, learning technology support, pedagogy, management and organisation, institutional culture, collaboration, commitment, competence, communication as well as ethics/legal factors (Adekola et al., 2017, Ibrahim, & Nat, 2019).

Norberg (2017) note that blended learning offers a number of advantages to the higher education sector by combining benefits of traditional face-to-face methods and those of online delivery. They indicate that if higher education institutions leverage blended learning, they could realize better learning outcomes.

Traditionally, blended learning has been leveraged as a hybrid learning approach whereby teaching has been conducted by integrating technology and digital media with traditional instructor-led classroom activities thus allowing learners a flexible way of customizing learning experiences (Dziuban et al., 2018). In this form, any of the blended learning models that include face-to-face, rotation, flex learning, gamification, online lab, self-blended learning and online driver could be used singlehandedly to implement successful teaching and learning (Adekola et al., 2017). However, the advent of the corona-virus (Covid-19) pandemic forced many higher learning institutions to abruptly closedown leaving learning to be managed entirely in a digital environment depending on online learning (Al-Samarrai et al.,

2020).

According to Al-Samarrai et al. (2020), much as the Covid-19 pandemic made learners to miss the classroom offered opportunities of role-playing with immediate face-to-face feedback, on the other hand online learning offered them self-paced learning with E-learning or M-learning components that are interactive and accessible to the learner's at their free time, place and own devices like smartphone or tablet. This implies that the blended learning model of online learning is scaling up though with a lot of challenges that calls for the support of its implementation. The major concern is how to implement blended learning to achieve the best learning results.

1.2 Background of the study

Countries world-wide be developed or developing are increasingly being faced with a widening educational gap between student from rural poor population and the urban rich with better financial and technological resources (Oyo et al., 2017). Technological innovations like blended learning could be seen as a medium that is when leveraged may bridge this gap of education inequality. However, without proper implementation innovations like blended learning may bridge the inequality education gap without solving the challenge of quality (Dziuban et al., 2018). Quality education is influenced by several factors ranging from learners' based factors, instructors based to institutional ones (Oyo et al., 2017). This implies that quality does not exist independently, but is entirely dependent on several other factors that need to be addressed when a learning medium is being implemented, adopted and used. On the other hand, frameworks and models that supports Learning Analytics need to be developed and extended or modified from time to time.

According to Ebner et al. (2015), Learning Analytics are intended to support learners to enhance their performance, educators to get a good understanding of their learners' progress, and scientists or learning tools developers to get a clear view of how learning in a particular domain takes place. They allude that any technological support intended to support learning should put into consideration smart Learning Analytics features that are; learning awareness, privacy

awareness, visual feedback, pedagogical interventions, big data centralism and knowledge structures acquisition.

Oyo et al. (2017) allude that besides traditional challenges of developing countries like limited budgets, poor technical infrastructure and lack of skilled personnel, technological innovations in many higher learning institutions fail due to poor usage resulting from the system's failure to satisfy users' needs. Their argument echoes that of previous researchers such as (Tham & Tham, 2013) who noted that 62% of all e-learning initiatives fail to meet expectations due to many factors including users' readiness, beliefs and involvement. The same applies to the faculty of ICT at Tshwane University of Technology (TUT) that on several occasions have tried to implement blended learning but losing it somehow and resort back to the traditional face-to-face methods of teaching and learning.

Literature highlights several plausible explanations for the failed adoption of blended learning (BL) in Higher Education Institutions (HEIs). Pannan and Legge (2016) note that BL failures are as a result of the purely technological led approach that lacks the integration of the learning and pedagogical theories consideration. Dziuban et al. (2018) allude that successful BL usage is a result of clear observation of the variables demonstrated in the technology adoption and usage models, which put forward that without a good understanding of the key elements that influence adoption, efforts at introducing new ICT technologies are bound to struggle and fail.

Benson et al. (2011) highlight various potential adoption and usage factors that when not observed may undermine the successful implementation of BL. Such factors like, the design of BL modules, the level of support, lack of time and resources for course development, availability of technology and relevant skills. Oyo et al. (2017) emphasizes that HEIs in particular has a challenge of lack of involvement of users when implementing technological innovations yet many systems implemented in these settings are complex depending on the number of units to support.

1.4 Problem Statement

Dziuban et al. (2018) note that in HEIs were blended learning has been successfully implemented and used, it has worked well more especially since it covers large amount of course material that benefit learners who are independent and engaged. They emphasize that putting best practices and blended learning strategies to work together with a well-planned curriculum yield better results of a combined at-home and in-class effort. This helps to carter for all categories of learners including those who learn better in a structured environment using the face-to-face model and the other who learn better with semi-autonomous, computer-based training (Means et al. 2013; Ibrahim, & Nat, 2019). However, Norberg (2017) notes that much as many of blended learning are well developed and carefully vetted, they lack conceptualization that hinder BL's successful usage within HEIs. More still, even though the faculty of ICT at Tshwane University of technology has tried to implement BL, its usage voluntarily by staff has been very low and there is still lack of clarity for this low usage of BL. Azizi et al. (2020), also notes that since learners have unique learning experiences and instructors have different technological back grounds there is still lack of clarity of which factors could inform effective BL usage in a given context.

1.5 Research outline

This sections gives a recap of this dissertation's chapter in a chronological order so that a reader has a clear view what is expected in each chapter.

Chapter one: this chapter introduces the concept of the study, gives the background and highlights problem this study was set to solve. The chapter also highlights the research objectives and questions, the scope as well as the justification of the study.

Chapter two: the chapter discusses the literature of the study. The chapter first discusses the literature of teaching and learning with technology, then e-learning and finally blended learning in particular. The chapter also discusses related work to the study by highlighting the limitations and recommendations in those studies and finally deduces the design of the conceptual framework.

Chapter three: this chapter discusses the research design and methodology that was followed by this study. The chapter first discusses the research design as well as the philosophical understanding of the study. It then discusses the methods that were followed to collect and analyze the data for the study. More still, the chapter discusses the validity and reliability of the study and last the chapter highlighted ethical considerations that were followed in the collection, analysis and dissemination of data.

Chapter four: this chapter presents the results that were obtained from the analysis of the collected data. The chapter first presents the frequencies of the demographic and situational variables of the participants, then the correlation analysis and finally the regression analysis. Lastly, the chapter discusses the results of the study in relation to theory and practice.

Chapter five: this chapter concludes the study. The chapter first gives an overview of the study and then highlights the contribution this study makes in terms of theory and practice. It also highlights the limitations of this study based on which the recommendations for future research are given. Finally, the chapter concludes the study.

2 Research Aim and Objectives

This chapter sought to investigate how blended learning usage may be improved. In order to achieve this, the study set the following research objectives.

2.1 Major Objective

The major objective of this study was to determine better ways of improving blended learning usage in South African universities by taking a case of Tshwane University of Technology.

2.1.1 Specific objectives

The specific objectives of this study were:

1. To determine and analyze factors that influence blended learning usage.
2. To determine the role of blended learning in facilitating flexibility, interaction and learning processes in teaching and learning.
3. To analyze the level of technology usage to facilitate teaching and learning in South Africa's Universities.
4. To use the identified factors and develop a model that will be leveraged to improve blended learning in South African universities.

2.2 Research questions

In order to find the solutions to the identified research problem, this research set to answer the following research questions.

2.2.1 Primary research questions

The primary research question of this study was: How to improve blended learning usage in South African universities?

2.2.2 Primary research questions

The secondary research questions of this study were:

1. What factors influence blended learning usage?

2. What is the role of blended learning in facilitating flexibility, interaction and learning processes in teaching and learning?

3. What is the level of technology usage to facilitate teaching and learning in South African Universities?

4. How the identified factors can be used to develop a contextualized model to be used by lecturers in improving blended learning usage in universities?

2.3 Scope

The focus of this study was on how to improve blended learning usage in South African universities. The literature reviewed was on technology usage within organizations more specifically in higher learning institutions. This study didn't examine the implementation phases of blended learning though it is anticipated that from the socio-cognitive aspects of human response to information technology the factors influencing technology acceptance, adoption, use, utilization and evaluation for decision-making cut-across.

2.4 Justification of the study

The increasing use of IT and its applications like e-services such as e-learning has constantly been adopted and helped in the establishment of virtual universities in many developed countries, however, these developments are still not much rarely observed in developing countries (Eze et al., 2020). Much as there are various factors attributing to this ranging from poor and weak technological infrastructure to organizational challenges, the cases of lack of effective use are also many and needs careful attention (Kintu et al., 2017; Azizi et al. 2020). This calls of studies to highlight these factors that could be taken care of in order to enhance effective usage of blended learning.

Researchers Norberg (2017); Dziuban et al. (2018) note that learners are motivated by various factors to concentrate so that learning can take place. Among these factors is the curiosity to understand new concepts however at the same time users of technological innovations are also triggered by different factors to

voluntarily use them. What triggers this curiosity and voluntariness need to be investigated in a particular context. This implies that studies of use of technology in education settings need to involve the investigation of individual characteristics, culture and the environment which factors have been missing in many models of BL usage (Kintu et al., 2017).

Oyo et al. (2017) highlights that one challenge that has been impeding usage of technology at HEIs as lack of users' involvement. Aziz et al. (2020) adds that many HEIs just jump on the band wagon of technology implementation yet they enforce mandatory usage. This implies that there might be cases when the technological innovation is introduced when users have not been prepared for it. In such situations, despite the good potential of users with technology, the degree of usage is more likely not to be as effective as expected. This study is therefore set to look at these issues holistically so that usage of BL at universities is enhanced.

2.5 Summary

Blended learning promotes learners independence and ownership of learning and at the same time relieves some learning responsibilities from the instructors. The use of online apps and programs to teach concepts, enables learners to continue with their learning at their own pace. This chapter discussed the expected outcome of the study as well as the objectives that were set as milestones to achieve the desired goal of the study.

3 Theoretical Framework

3.1 Introduction

This chapter discusses the theoretical perspective of the study in relation to teaching and learning. It discusses online learning in general, e-learning and blended learning in particular. The chapter highlights factors that are influential when implementing online learning and those that impede blended learning in particular. More to that the chapter also discusses the related work from which a conceptual framework is designed to guide the flow of this study.

3.2 The teaching and learning concept

According to Rajagopalan (2019), teaching is a scientific process composed of communication and feedback. In the teaching process, the instructors lay down possible strategies that may produce positive impacts to the learners. These strategies could from time to time be modified, improved and redeveloped to satisfy learners' needs. Rajagopalan (2019) further emphasize that in redeveloping teaching strategies, instructors should focus on increasing accessibility of teaching materials where learners can participate on their own and at their free time. They allude that these new flexible features should be in-built into the teaching and learning system and must ensure that the learners behaviour are tilted towards this change. This implies that effective teaching should go through four important steps namely; planning, organization and identification of suitable teaching as well as managing teaching.

Ebner et al. (2015) note that because teaching is a compound activity, the teaching and learning process include many variables that interact in order for learners to incorporate new knowledge needed for behaviour change and to gain skills appropriate for new learning experiences. This implies that for teaching to be complete, learning must have taken place since teaching aims at imparting knowledge and monitoring behaviour change whereas on the other hand learning focuses on understanding and applying the acquired knowledge (Eze et al., 2020).

Logically in the teaching process, the instructor's intention is to share knowledge whereas the learners seeks receive new information. This implies that institutions of learning as well as instructors influence the extent and quality of learning. Rajagopalan (2019) emphasizes that effective teaching must result into learning and he identified several characteristics of effective teaching including;

- Teaching is an effective interaction between an instructor and a learner.
- Teaching is an art and a science. As an art, teaching calls for the exercise of talent and creativity whereas as a science, it involves a range of procedures, techniques and skills which may be studied, described and improved.
- Teaching transform into different stages including but not limited to informal raining, conditioning and indoctrination
- Teaching leverages the skill of communication
- Teaching is based on three basic poles which are, educational objectives that leads to learning experiences and behaviour change
- Teaching requires planning where the instructor decides on the objectives, methods of teaching and evaluation techniques in advance
- Teaching is suggesting and not dictating which implies that good teaching is democratic, and an instructor respects the learners and encourages them to participate actively by asking and answering questions as well as giving others a chance of discussing the asked questions
- Teaching provides guidance, direction and encouragement to the students by so doing an instructor should ensure that the teaching process promotes cooperation among leaners. More so instructors should involve learners in peer activities like organizing, managing and discussing class activities
- Teaching is remedial, instructors should solve the learning problems of learners and should also develop emotional stability among them. This implies that the teaching process must bring harmonious development of learners
- Teaching seeks to stimulate learners' power of thinking that could lead then to self-learning. This implies that the teaching effects and process can be observed, analyzed and evaluated

However, since teaching is not only intended to encourage beliefs which are supported by the evidence but is also aiming at developing the power of learners to gather the evidence so as to assess its adequacy for themselves, instructors need from time to time to get new and advanced methods of teaching (Kintu et al., 2017). It can be observed that most of the traditional teaching characteristics were intended to be achieved from a face-to-face method of teaching. The growing trend of technology has revolutionized teaching that has given birth to hybrid teaching like blended learning (BL) which approach is considered best for linking theory and practice in the teaching-learning process (Azizi et al., 2020).

3.3 Blended learning

The concept of blended learning (BL) is intended to unify tools, methods and technologies to attain learning hence the reason of mixing of the online and face-to-face elements to increase flexibility and achieve the learning goals (Seraji, et al., 2019). As Ebner et al. (2015) noted, the goal of learning environment should be promoting learners' independence, empower them to participate, interact, and cooperate as well as being in position to self-asses themselves.

According to Azizi et al. (2020), BL could also be identified by the delivery medium, type and place of teaching as well as synchronicity. They allude that the delivery medium distinguishes the provision of education whether by the instructor or by the technology. On the other hand, the teaching place should show where the learning took place whether in classroom or online. More still, the teaching type should emphasize the content presentation in the learning process whether it was content-based education or activity-based education. Lastly, the synchronicity should identify whether learners were following a group pace or individual pace. Traditionally, any form of BL model could be used be it face-to-face, flex learning, gamification, online lab, rotation, self-blended learning and/or online. However, the advent of Covid 19 pandemic forced all learning to remain in the virtual environment which signified the importance of BL Worldwide (Al-Samarrai et al., 2020).

3.3.1 Factors influencing Blended Learning usage

Blended learning usage like any other technological innovation is subjected to users' sociological and psychological characteristics and perceptions leading to

acceptance and adoption based on their demographic and situational variables. Tarhini et al. (2015) allude that before any technology is effectively used, it has to be first adopted which process necessitates the change of the users' behaviour. The desire to explain this change of users' behaviour, prompted the development of various information systems theories and models each with different factors to inform why users accept or reject technology. Generally, factors influencing usage of technology have been compounded in these theories and models with few others being generated from the day to day operational environment of organizations. This implies that effective usage is independent of the technological and individual's characteristics, the organizational support, structure and strategies towards technology as well as users' social influence and environment.

Several researchers such as (Means et al., 2013; Gawande, 2016; Kintu et al., 2017; Norberg, 2017; Dziuban et al., 2018; Seraji, et al., 2019; Azizi et al., 2020) have identified different factors influencing BL effective usage and these include;

a) Technological aspects that are classified into two categories namely users perception of the technology characteristics such as self-efficacy, computer anxiety, performance expectancy, effort expectancy and compatibility as well as readiness for technology.

b) Institutional aspects that include the support of the HEI's towards blended learning also known as facilitating conditions such as training users, providing enough BL budgets and continuous day to day support, strategies put in place to use BL such as involving users in the implementation process, the institutional structures and the flexibility of instructors including academic work load.

c) Environment aspects including the institution's surrounding such as geographical location, political issues including government support towards the use of BL, the availability of technology service providers, technology infrastructure as well as competition.

d) Social influence including what other HEIs are doing towards the use of technology or BL in particular for teaching and learning.

e) Individual characteristics these are lecturers' perceptions or features including skills and experience that may prompt them to use BL. Such characteristics like learnability, extra added skills, in-service training, attitude towards technology, beliefs and preparedness to use BL.

f) Behaviour Intention this include lecturers willingness to use BL, recommend and support its usage as well as their preparedness to improve their pedagogical skills using technological innovations like BL.

3.3.2 Role of blended learning in facilitating flexible interaction in the learning process

The strength of BL arises from the fact that it integrates online with traditional face-to-face class activities in a planned, pedagogically valuable manner (Kintu et al., 2017). The development trends in all aspects of life due to increasing technological innovations and the Worldwide challenges to classroom education has tremendously increased the momentum of BL but at the same time keeping in mind of teaching learners effectively (Seraji, et al., 2019; Al-Samarrai et al. 2020). The effectiveness of teaching implies that it is not just a matter of uploading learning materials online but the use of technology and actual teaching should inform one another. In this case, the online loaded materials should be customized and aligned to complement with what the learner had acquired or should have acquired in the class room face-to-face environment. The flexibility arises that what is learned online is in line with that of the class but in this case a learner does it at an own pace but in a synchronized manner. Actually BL is a mix of old and new as well as that of physical and digital learning.

Ebner et al. (2015) noted that learners can't learn the same way or at the same pace based on this understanding, BL may not be regarded as novel concept, but an important way forward to advance education. However by the fact that learners can't outgrow their learning styles, supporting technological innovations like BL and applying it effectively for teaching and learning will produce better results (Eze et al., 2020). Much as it is obvious that pedagogically, no educational model is one-size-fits-all, contextualizing BL development and implementation is

paramount (Norberg, 2017; Dziuban et al., 2018). This implies that for effective usage of BL instructors need to be trained in the use of technological applications for supporting education learners must have a clear understanding of what is expected of them in the new environment.

3.4 Related work

Benson et al. (2011) conducted a study to assess the educators' perceptions, attitudes and practices towards blended learning in business and management education. Their study indicated that the adoption of blended learning in higher education institutions by academic staff is quite complicated due to the fact that blended learning concept is mostly initiated at the management level who normally don't involve instructors and such makes it to meet resistance during its delivery and implementation. Based on a qualitative analysis, their study established that the perception of developing blended learning materials as time-consuming especially in the process of preparing the online content and in the identification of relevant resources due to the fact most learning materials are now available on the internet. They also found that the factors influencing blended learning integration are more inclined to instructors' attitudes and perceptions towards teaching with technologies, expected benefits as well as the effort expectancy. Their study recommended further studies to include higher learning institutions with staff from different social-technical background and culture.

Graham et al. (2013) conducted a study to develop a framework for the adoption and implementation of blended learning in higher education. Their study followed a qualitative approach to collect and analyze data from higher learning institutions administrators. Their study identified essential themes related to institutional factors that they categorized strategy, structure and support. They also indicated that awareness and exploration is a key antecedent to minimize resistance to blended learning usage. Their study recommended the need for more researcher on the transition between the adoption stages of awareness/exploration and adoption/early implementation. They further recommended for the need to investigate how blended learning can improve students' performance with studies.

Gawande (2016) carried out an analysis of faculty perceptions toward blended learning adoption at higher education institutions in Oman. Their study adopted a quantitative approach to investigate the influence of teaching styles on blended

learning adoption. They developed the Blended Learning Acceptance Model (BLAM) that was based on UTAUT. Their study established that teaching styles as a mediating factor significantly influence acceptance and adoption of blended learning in higher institutions of learning. Their study also revealed that blended learning improve learner - instructor interaction hence it is essential for the achievement of effective learning, by enhancing flexibility. More still, results of their study indicated that students' satisfaction is achieved if the blended learning is interactive and flexible, ease to use and is capable of improving students efficiency. This is also in addition to instructors' leadership skills and their capability to facilitate training and to provide technical support during the blended learning usage process. Their study recommended further study to determine both learners and instructors characteristics especially in developing countries where learners come from poor technological backgrounds.

Oluwole et al. (2018) examined college lecturers' awareness and perceptions of using blended learning. The study used a descriptive analysis to investigate factors of awareness, readiness, perception, self-efficacy, effort expectancy, computer anxiety, and performance expectancy. Findings of their study indicated that lecturers' awareness improves their perception towards blended learning usage. They recommended that future studies should extend the suggested factors to include those involving technology characteristics and availability of infrastructure. More still, the study recommends the analysis of the demographic and situational variables that could include gender, age, qualification, years of experience and voluntariness of use of technology. However, the study was limited with the methodology that was used for data analysis as descriptive analysis could not effectively be used to inform the predicting powers of the variables being analyzed.

Ibrahim and Nat (2019) conducted a study to develop a blended learning motivation model for instructors in institutions of higher education. The study categorized motivational factors into two aspects namely, extrinsic and intrinsic. Their study followed a quantitative approach by using structural equation modelling to determine the factors needed in the designing of the motivation model based on the cause-effect relationship. Factors of interaction with technology, academic work load, institutional environment, interaction with students, instructors' attitudes and beliefs, instructors learning capabilities as well as

capability to use blended learning. With the exception of academic workload all the other tested factors were found to be significant. The study recommended for more studies to extend the scope of the study and to include many other factors especially those to do with technological factors.

3.5 Theoretical foundations

In understanding the factors that leads to BL adoption and usage challenges, a service design model (Design Council, 2015) is leveraged by various studies to have a clear picture of how BL could be implemented. The British Design Council's double diamond (DD) as a service design tool is as demonstrated in Figure . The Blended Learning Acceptance Model framework will be used as the guiding framework in the design of the instruments that will be used for data collection in the discovery phase.

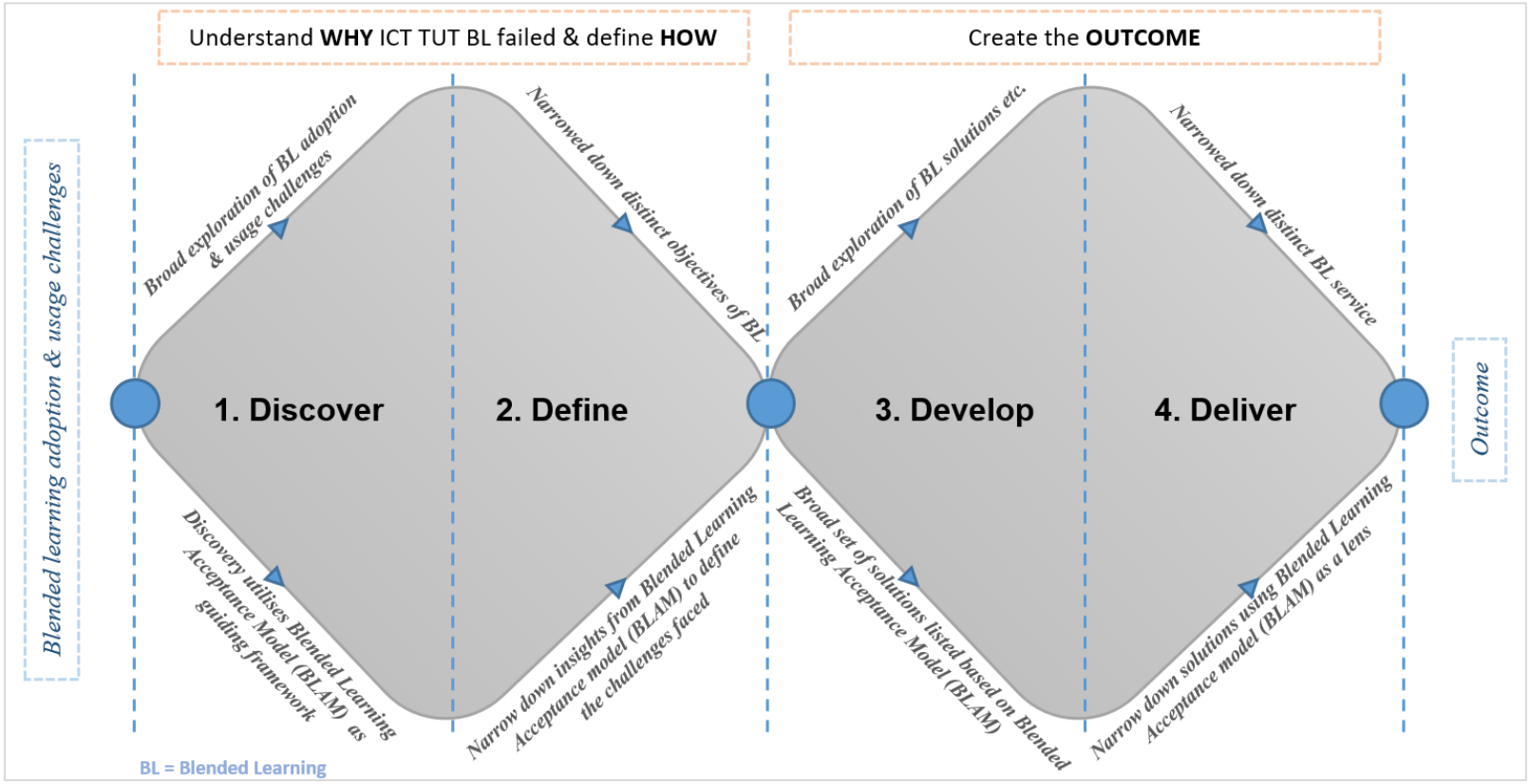

Figure 3.1: The Blended Learning Double Diamond Design Process *(Source: Adapted from Design Council, 2015)*

In the development and delivery service design phases the enhanced continuum of blended learning will be used to define the level of blending for the ICT faculty's BL service (Wong, Tatnall, & Burgess, 2014). According to Wong et al (2014) *"the idea behind the Continuum was that it was perceived as a way in which institutions could move from traditional face-to-face approaches to an 'E-intensive' approach by gradually introducing ICT as part of the delivery."* This gradual approach is consistent and synergistic with the basic intent of the second diamond service design tool. The enhanced continuum of BL is as demonstrated in Figure 3.2.

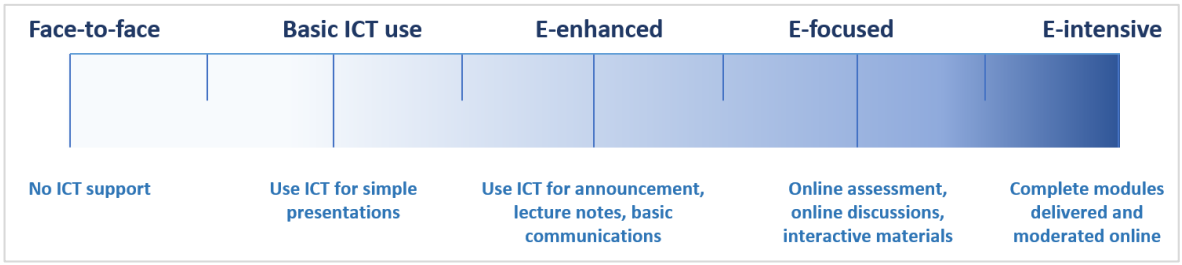

Figure 3.2: Enhanced Continuum of Blended Learning *(Source: Wong et al., 2014)*

3.6 Conceptual framework

Online learning produces better outcomes as compared to face-to-face delivery (Means et al., 2013). Whilst the success and availability of relevant information technology is necessary, they are not solely sufficient to ensure successful adoption of new ICT technologies especially in big settings like HEIs. Successful adoption of technology depends on a number of key factors that have been sketched out in technology adoption and usage models (Williams et al., 2015). There are various theories and models that have been developed to inform adoption and use of technology with the most widely used being the Unified Theory of Acceptance and Use of technology (UTAUT) model by Venkatesh et al. (2003). UTAUT suggests that successful adoption is the result of a key set of determinants that explain how and why individuals adopt new technology. This is as demonstrated in figure 3.3.

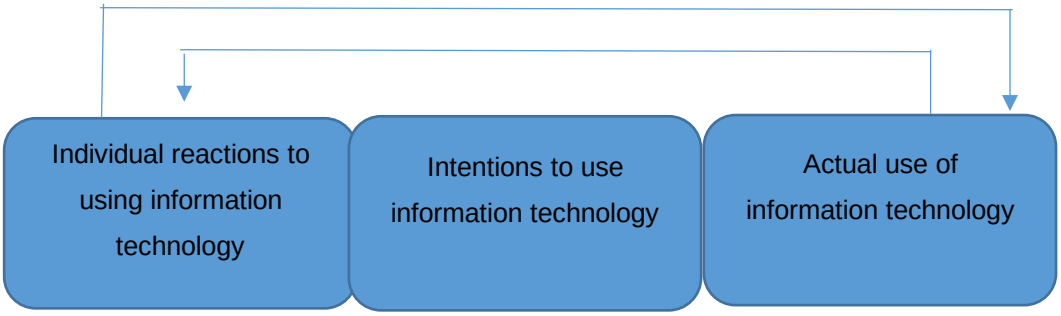

Figure 3.3: Basic Concept Underlying User Acceptance Models *(Source: Venkatesh et al., 2003)*

To achieve the aim of this study, various factors that have been mentioned in the literature were integrated. Hence this necessitated the utilization of the Blended Learning Acceptance Model (BLAM) (Gawande, 2016) demonstrated in Figure 1.2 as an underpinning theory for this study. BLAM was developed based on the UTAUT model, as a guiding framework for understanding the different dimensions of BL adoption from the perspective of the executive faculty management and lecturers, who represent key stakeholders in BL implementation.

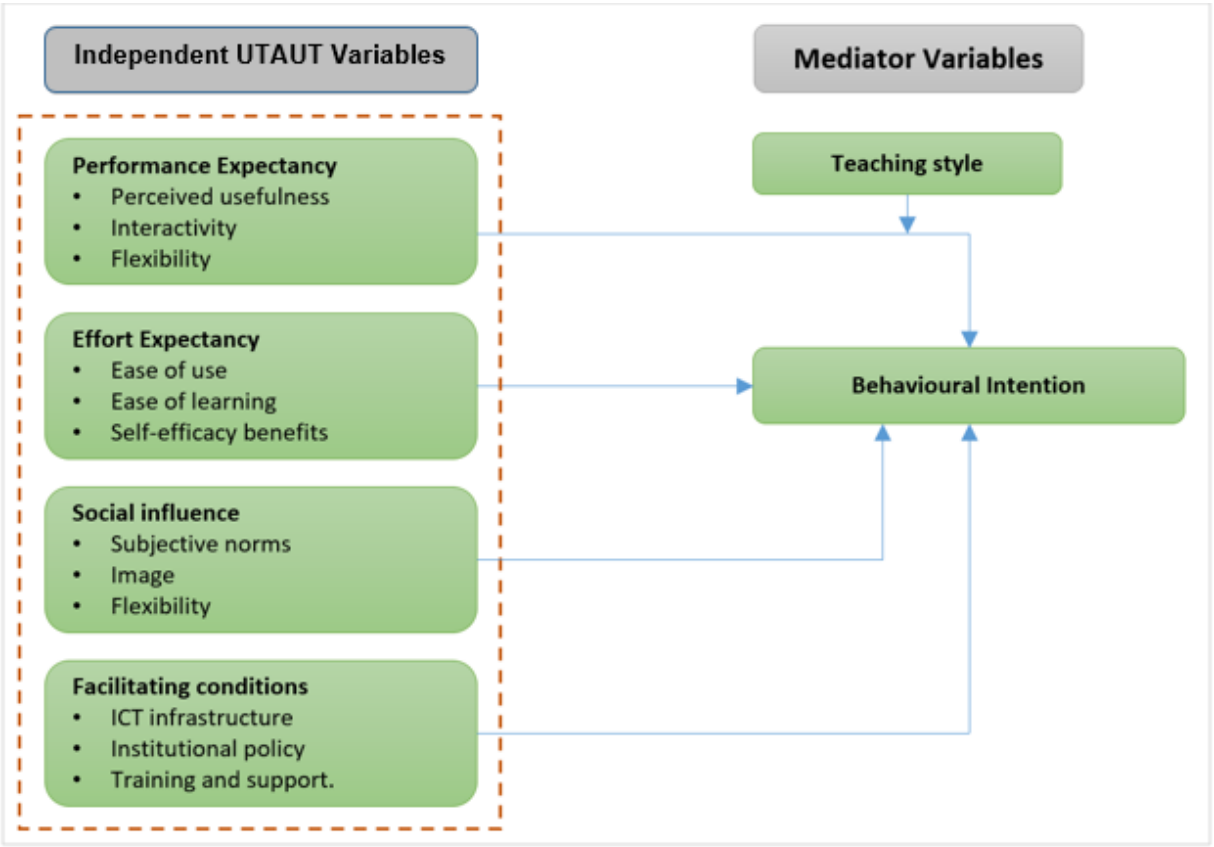

Figure 3.4: Blended Learning Acceptance Model (BLAM) (*Source: Gawande, 2016)*

From the discussed factors influencing BL effective usage a conceptual framework was deduced as illustrated in Figure 3.5. In the literature, the identified technological factors are classified into two categories namely users 'perception towards technology and organizational readiness for the technology. For instance, the performance and effort expectancy as explained in the Blended Learning Acceptance Model and UTAUT refers to how users perceive the technology whereas factors like budgeting, infrastructure, policies and standards refers to how ready the institution is ready for technology. On the other hand, some other factors like institutional aspects and social influence were considered independent but having some others constructs amalgamated in them.

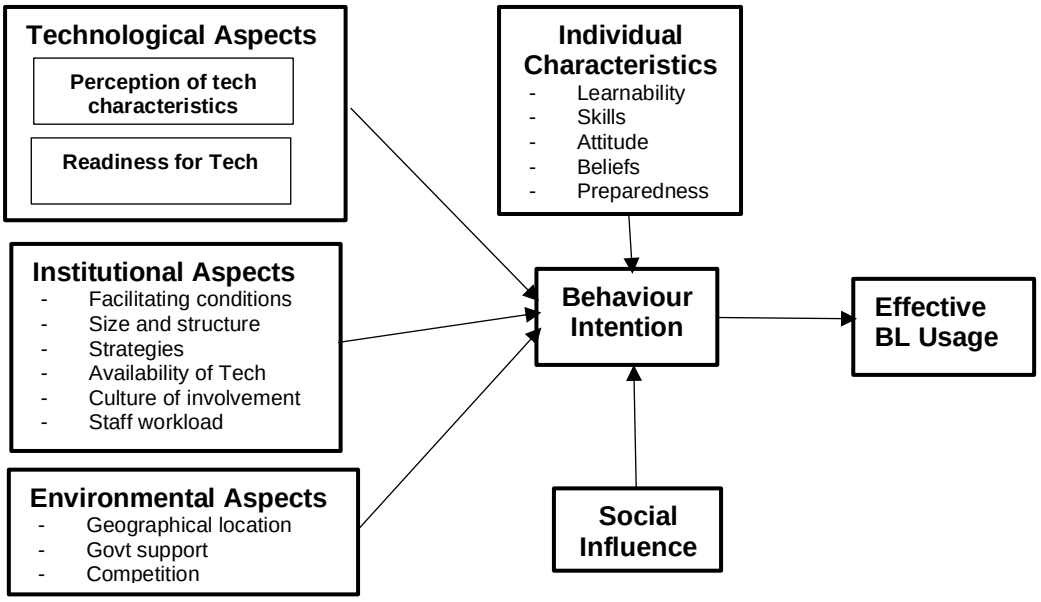

Figure 3.5: Conceptual Framework

3.7 Summary

The blended learning concept involves learning that takes place amidst consideration of place, distance as well as the use of technology. The continued improvements in both school curriculum and digital technology has led to drastic need to use BL for teaching and learning. This chapter discussed the concept of BL, factors influencing its effective usage as well as the role it plays to improve flexibility of interaction in the learning environment. Based on the reviewed literature, the chapter designed the conceptual framework that will assist to guide the flow of the dissertation. The next chapter discusses the methodology that was followed by this study.

4 Research Design and Methodology

4.1 Introduction

This chapter discusses the research design and methodology. A research methodology may be looked at as the specific procedures or techniques used to identify, select, process, and analyze data for a study. It demonstrates the path through which a study is conducted by explaining to main processes relating to the study namely the collection and analysis of data as well as the tools used for data analysis (Cohen et al. 2018). On the other hand, a research design demonstrates the overall strategy utilized by the research study and presents the logical plan followed in order to answer the research question and to achieve the objective through the collection, interpretation, analysis, and discussion of data (O'Neil & Koekemoer, 2016).

According to Creswell and Creswell (2018*),* a research design is meant to ensure that the results obtained from analyzing the collected data works as evidence to answer the research problem logically and as unambiguously as possible. In this study, after identifying the research problem for this study, a review of relevant literature on BL was carried out and based on the literature a conceptual framework was designed. A measuring instrument in form of a close-ended questionnaire was then developed and used for data collection. The collected data was then analyzed quantitatively and the validity as well as the reliability of the study were reported. Finally, the obtained results were discussed in relation to theory and practice.

4.2 Research paradigm

A research paradigm is set of beliefs and agreements that expresses common understanding of how problems should be addressed (Scotland, 2012). In other words, paradigms are worldviews, Ideologies or mindsets that are characterized by the way scientists respond to the ontological, epistemological and methodological questions relating to research. Additionally, Lincoln et al. (2018) note that a research base on these three characteristics to choose a suitable paradigm for the study. The ontology aspect answers the question relating to reality (What is reality?) whereas the epistemology aspect zeal on the how something is known (How do you know something?) while the methodology concentrates on finding the unknown (How to go about finding out the unknown?). These characteristics of paradigms explains in holistic manner how a researcher views, discovers

and use knowledge. The relationship between these three characteristics of paradigms are graphically illustrated in Figure 4.1.

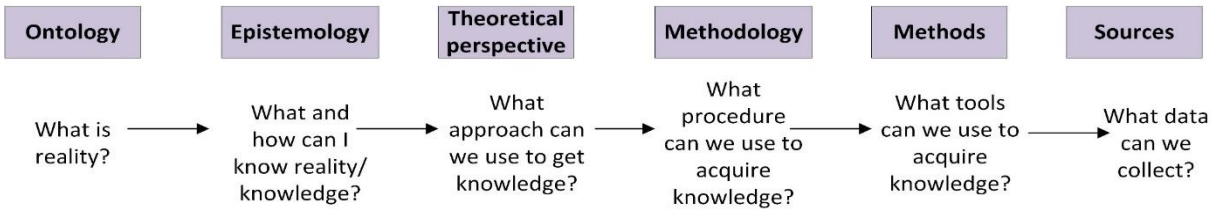

Figure 4.1: Relationship between the characteristics of paradigms. (Source: *Scotland, 2012)*

In this study, the reality is that blended learning was implemented at Tshwane university of Technology faculty of ICT but it lacks effective usage. Implying that there is a need to enhance its usage but the underlying challenge is that how best BL usage can be enhanced. On the other hand, the epistemological stance of this study is how best BL usage can be enhanced. This question could be answered if the primary users who in this case are lecturers need to be involved to know their perceptions, beliefs, thinking and understanding of the use of BL. Since the lecturer are many and the study doesn't involve intense feelings, these ideas from the lecturers can best be obtained by using survey methods like questionnaires. Based on this understanding, this study will then follow a positivism paradigm.

4.3 Research approach

Creswell and Creswell (2018) explains a research approach as a plan and procedure consisting of steps of how data related to the study is to be collected, analyzed and interpreted. Being that this study is following a positivism paradigm, it will follow a quantitative approach. The use of a quantitative approach was advantageous for study in many ways including;

- This study was conducted during the time when most staff were working from home hence using a quantitative approach helped a lot as staff were only sent an online survey-link and they responded to the questionnaire during their free time from home. This was going to be very challenging if a qualitative approach had been followed as it was not going to be easy to set interviews for the participants.
- The use of a quantitative approach by leveraging close-ended questions enabled easy uploading of online surveys using survey monkey and also easy to capture the

responses from the participants. Participants were only sent a link using the faculty mailing list and responses were captured in the survey monkey database. This also helped to have many participants and a high response rate.

- Using the online survey made the collection of data cost effective as compared to a situation if interviews were to be conducted as such would have been done telephonically and would have been very costly in terms of airtime.
- Coding and analysis of data was much easier and faster as from the online database of survey monkey, responses were just exported into the statistical package for social scientists (SPSS) for analysis.

4.4 Data collection and analysis

This section explains the questionnaire development and methods used to analyze the collected data.

The close-ended questions was developed based on the 5point Likert scale where by 1 and 5 will represented strongly disagree and agree respectively, 3 represented neutral whereas 2 and 4 represented respective intermediate values. Due to the fact that data was collected during the Covid 19 pandemic, the questionnaire was transcribed into Survey monkey for online data collection. This was necessary since most staff were working from home and there were travel restrictions. Participants were sent a survey link which they opened to access and fill the questionnaire. The filled questionnaires were then captured on the survey monkey database from where they were exported to excel and then to SPSS for analysis.

After developing the questionnaire, it was coded to enable easy transcription into SPSS after data collection. Unlike in qualitative study, a quantitative questionnaire coding is intended to give brief representation or abbreviation of the construct to avoid long statements and ambiguity during data analysis. The constructs of the questionnaire were coded as follows. Performance Expectancy (PE), Effort Expectancy (EE), Compatibility (Co), Readiness (RE), Self-efficacy (SE), Computer anxiety (CA), Social Influence (SE), Individual Characteristics (IndChar), Environmental (Envt), Facilitating Conditions (FC), Strategy (Stra), Structure (Stru), Academic work load (AWL), Behaviour Intention (BI) and Blended Learning Usage (BLUsage).

4.4.1 Population and sampling of the participants

The major aim of this study was to improve blended learning usage for teaching and learning hence the targeted population of the study was staff in the ICT faculty. These staff included lecturers, mentors and tutors. However, due to the fact that the targeted population was

small, the study used inclusive sampling whereby all members falling in this group were requested to answer the questionnaire so that the study could reach the desired number needed for quantitative approach. According to Kothari (1991) for scarce sample population a sample size of 40 is considered enough though a size of 80 is more preferred for quantitative analysis. The faculty of ICT has about 120 staff including part-timers.

Therefore, 120 links were sent out using the faculty mailing list. But because this was a time when staff where working from home, and many especially part-timers had little access to their mails due to data challenges only 82 participants participated in the study giving a response rate of 68.3%. Of the 82 filled questionnaires only 74 were complete and others had to be discarded due to the missing data.

4.4.2 Data analysis

Before capturing the questionnaire in survey monkey for data collection, its validity was ensured. Salkind (2017) indicates that both validity and reliability are two major tests that need to be checked for any quantitative study. He alludes that the questionnaire should be checked for face validity, content validity, construct validity, and criterion-related validity whereas reliability should be tested using internal consistence by measuring the Cronbach's alpha coefficient value. The collected data in the main survey was analyzed quantitatively using SPSS v 25. Descriptive analysis as well as inferential statistics of the correlation and regression analysis were used.

4.5 Validity and reliability

A research study is conducted using a measuring instrument and it is done in such a way that the obtained scores make sense based on the understanding of the construct being measured. This implies that there must be consistence in the measuring and an understanding of what is being measured. Salkind (2017) indicate that to achieve the objective of measuring, reliability and validity of the measuring instrument must be ensured. He notes that reliability is about the consistency whereas validity is about the accuracy of the measure.

To ensure validity of this study, the measuring instrument which was a close-ended questionnaire was checked for face, content, construct, and criterion-related validity.

a. **Face validity**; this check helped to ensure that the measuring instrument used for this study which was close-ended conforms to the common agreement (Cohen et al., 2018). After designing the questionnaire, the researcher asked

another experienced researcher and a language editor to assist in checking for grammatical and typographical errors, alignment of questionnaire items and the constructs of the conceptual framework as well as its clarity. This was done before piloting the questionnaire.

b. **Content validity**; this check was done to ensure that the questionnaire was designed to reflect a true assessment of blended learning. The experienced researcher assisted in ensuring that major concepts of BL usage measurements are included in the questionnaire and are a true reflection of the conceptual framework. Further still, during the pilot test which was done with a few lecturers of another faculty, participants were requested to give their comments and areas of improvement to the questionnaire.

c. **Construct validity;** Salkind (2017) notes that a measuring instrument should be designed to reflect the correct operational measures of the study's concept which was in BL in this study. This implies that there must be logical relationships between the questionnaire's sections and measuring items and the constructs and attributes of the conceptual framework. This study was underpinned by the Blended Learning Acceptance Model (Gawande, 2016) and so the questionnaire was designed based on BLAM and conceptual model illustrated in Figure 2.3. These constructs interdependencies were then tested by the correlation analysis.

d. **Criterion validity;** this is used to check how a measure predicts performance on an external criterion (Cohen et al., 2018). This validity check was done when designing the questionnaire to ensure that the question items are well compared with those others of studies on that had previously been conducted to explain the acceptance, adoption and usage of blended learning.

Reliability also known as internal consistence measures the consistency of the measuring instrument that it gives consistent results each time it is used (Creswell & Creswell, 2018). In this study, Cronbach's alpha was used to measure the reliability of the close-ended questionnaire with results that were obtained from the pilot study that was conducted with a few members from another faculty. A computer reliability analysis (Alpha Cronbach) was conducted for the overall measuring instrument, as well as for the independent constructs that were represented as various sections of the questionnaire. The reliability coefficient for

the overall questionnaire was 0,902 and the reliability coefficients in respect of the various constructs are as illustrated in Table 4.1.

Table 4.1: Construct's Reliability

Constructs with their coding	**Cronbach's Alpha (α)**	**α -Based on Standardized Items**	**Number of Items**
Performance Expectancy (PE)	.733	.777	4
Effort Expectancy (EE)	.704	.741	3
Compatibility (Co)	.703	.697	3
Readiness (RE)	.801	.814	4
Self-efficacy (SE)	.792	.796	4
Computer anxiety (CA)	.575	.566	3
Social Influence (SI)	.669	.707	4
Individual Characteristics (IndChar)	.758	.787	5
Environmental (Envt)	.696	.715	5
Facilitating Conditions (FC)	.619	.663	4
Strategy (Stra)	.824	.856	3
Structure (Stru)	.747	.760	4
Academic work load (AWL)	.643	.654	3
Behaviour Intention (BI)	.786	.811	3
Blended Learning Usage (BLUsage)	.881	.893	3

Results demonstrated in Table 4.1 indicates that 10 out of 15 constructs had their internal consistent greater than the recommended threshold of 0.7 which implied that these 10 constructs were directly progressed for further analysis (Pallant, 2016). The remaining five constructs, computer anxiety (CA) had a reliability of .575, social influence (SI) with .669, environment (Envt) with .696, facilitating condition with .619 and academic work load (AWL)

with .643. But all these constructs had five or less measuring items, according to McCrae et al. (2011), absolute reliability is the degree to which repeated measurements of the same instrument on the same individual vary around the true score. If the variation is small with repeated measurements, then the absolute reliability is high. Implies that there is no agreed value for intraclass correlation coefficient hence values less than 0.7 but greater than 0.5 with the constructs having less measuring items should be accepted. In this case all the values that were less 0.7 were all greater than 0.5 hence all the five constructs were accepted.

4.6 Ethical considerations

TUT ethics approval policy dictates that when data is to be collected from staff or students, the faculty ethics committee (FREC) notes it and is submitted for approval at the Central research committee (REC). Additionally, the faculty of ICT Executive Committee (EXCO) has also to approve data collection from the faculty staff after obtaining approval from REC. This procedure was carefully followed. On the hand the questionnaire was also accompanied by the letter (Appendix A) explaining the nature, purpose and intention of research. In this survey accompanying letter, it participants were reminded of their rights and voluntariness of participation. They were also assured how their privacy was going to be protected during the process of data collection, analysis and dissemination of findings. Participants were also reminded not to include any form of identification while answering the questionnaire. All these ethical considerations were carefully followed as also recommended by REC.

4.7 Summary

This described the recipe that was followed during the development of this research. The chapter looked at the philosophical stance of this study based on which a suitable paradigm was selected. For each method, the reason why it was selected and the advantages it provided to this research has been discussed. The next chapter presents the results that were obtained from the data analysis.

5 Analysis and Presentation of Results

5.1 Introduction

This chapter presents the analysis and results of the study whereby the descriptive analysis of the participants' demographics and situational variables is presented in form of frequencies. This is followed by the descriptive analysis of the demographics, situation variables and constructs in form of frequencies and graphically representations. Further to this, this chapter also presents the descriptive analysis results of the constructs showing how the measuring items questions were answered by the participants and the percentages for each construct's responses. Lastly, the chapter presents the correlation and regression analysis that explains the interdependencies between the constructs and how much each construct contribute to the overall prediction of the effective usage of blended learning.

5.2 Frequencies of participants' situational variables

The participant's situation variables that were investigated in this study included awareness of blended learning, practical experience with blended learning, familiarity with terms associated with blended learning and /or e-learning, effects of the introduction of blended learning on lecturers and their jobs, institution's level of training and support towards blended learning as well as availability of technological equipment and tools for teaching and learning.

5.2.1 Awareness of blended learning

Participants were asked about the awareness of blended learning 94.5% (n = 70) indicated that they were aware of the concept of BL whereas 5.5% (n = 4) were not aware of the BL concept. The results of the study indicates that the BL concept is not a new concept as most participants were of it. The small number of participants 5.5% who were not aware might have been mentors, tutors or newly recruited staff. The implications of the findings of this study is that if all other factors are taken care of, BL usage could be enhanced. The graphical representation of the findings is also demonstrated in Figure 5.1.

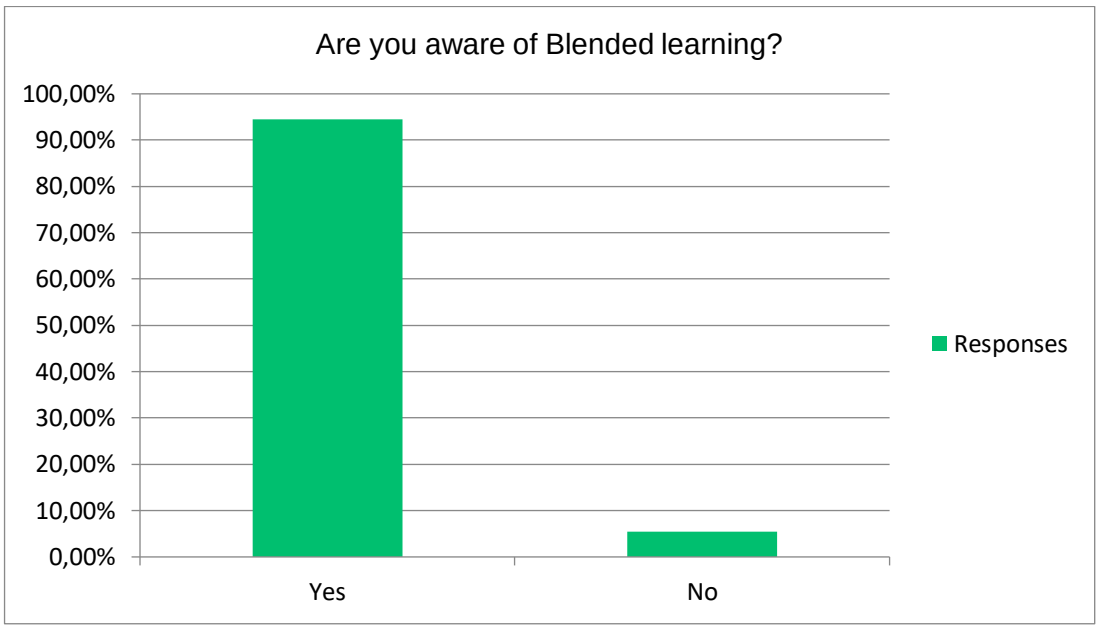

Figure 5.1: Awareness of BL

5.2.2 Practical experience with blended learning

The participants were also asked to rate their practical experience in years with BL this included the usage period of BL. Results indicated that the majority 65.9% (n = 49) had experience of 0-5yrs from the ranging interval this included the 5.5% (n = 4) who had no idea of BL, the second biggest number was those with 6-10yrs experience whose percentage was 31.7% (n = 24). Only one participant indicated that she/he had an experience of 11 – 15yrs and none had more than that. The implications of these findings are that BL like many other e-learning applications is a new innovation concept whose gospel need to be spread across HEIs especially in the developing countries (Kintu et al., 2017; Azizi et al., 2020). Another implication is that many HEIs in developing countries are still novice with the use of technology for education even though such has already taken stage in many developing countries (Oyo et al., 2017; Eze et al., 2020). The results of this finding are also graphically demonstrated in Figure 5.2.

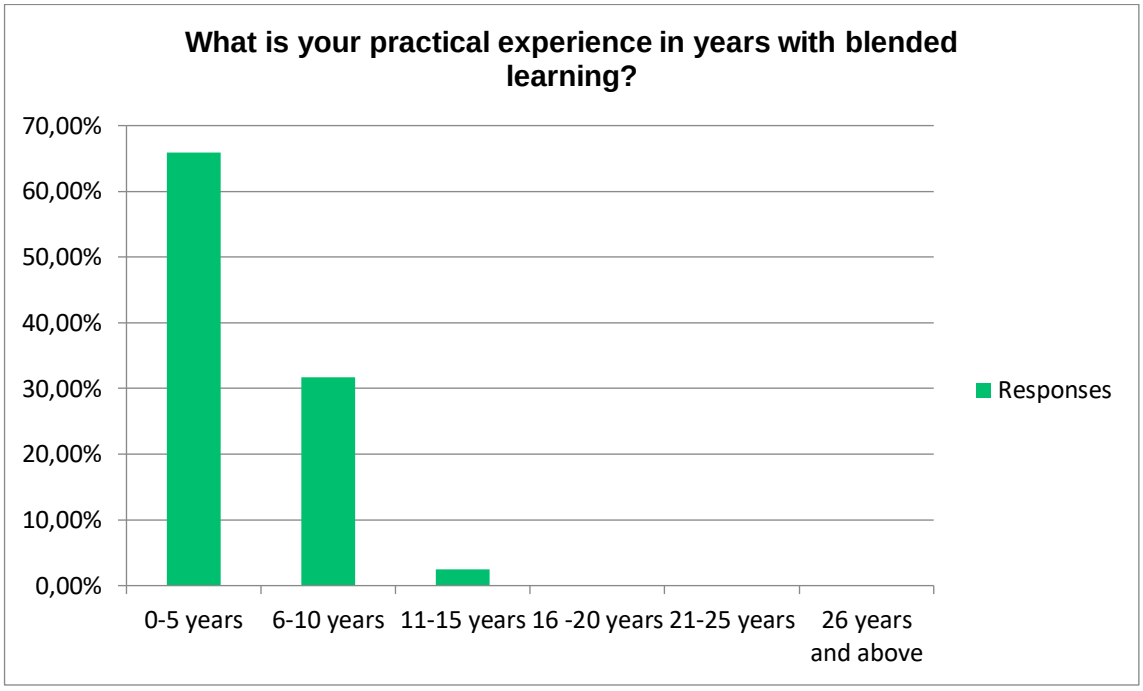

Figure 5.2: Practical experience with BL

5.2.3 Familiarity with terms associated with BL and /or e-learning

Participants were also asked whether the staff in the work environment are familiar with terms associated with BL or E-learning. These terms included; D-learning, E-assessment, Computer-aided teaching, Flipped classroom, Virtual learning environment and Synchronous & asynchronous learning. Participants' responses are presented in Table 5.1.

Table 5.1: Staff familiarity with BL and/or E-learning terms

	Total	Percentage of participation	Weighted Average	Percentage of Weight
Online Learning	69	93.2	4.39	87.8
E-Learning	68	91.9	4.51	90.2
M-Learning	68	91.9	3.91	78.2
D-Learning	68	91.9	3.23	64.6
E-Assessment	68	91.9	4.06	81.2
Computer-Aided Teaching	69	93.2	4.17	83.4
Flipped Classroom	69	93.2	3.37	67.4
Virtual Learning Environment	68	91.9	3.86	77.2
Synchronous & Asynchronous Learning	68	91.9	3.83	76.6
	Answered		**69**	
	Skipped		**5**	

Participants indicated that the majority of their staff have are familiar with most of BL and/or e-learning terms. 93.2% (n = 69) indicated that e-learning is the most common known concept with a weighted average of 4.39 (90.2%), followed by the online learning term with weighted average of 4.39 (87.8%) whereas Synchronous & asynchronous learning, Flipped classroom and D-learning are the least familiar terms with weighted averages of 3.83 (76.6%), 3.37 (67.4%) and 3.23 (64.6%) respectively. These findings implies that much as BL and e-learning concepts may be considered new, those in the education environment are familiar with their concepts and it is easy to implement them if all impeding factors are addressed (Norberg, 2017; Dziuban et al., 2018). Another implication is that, mostly the factors identified as barriers of BL and e-learning usage in developing countries are much to do with technological infrastructure and lack of finances to support the IT budgets associated with online teaching (Seraji, et al., 2019; Al-Samarrai et al. 2020). The factors of awareness and learnability have not featured much as impeding factors in BL and e-learning studies. These results are also presented graphically as illustrated in Figure 5.3.

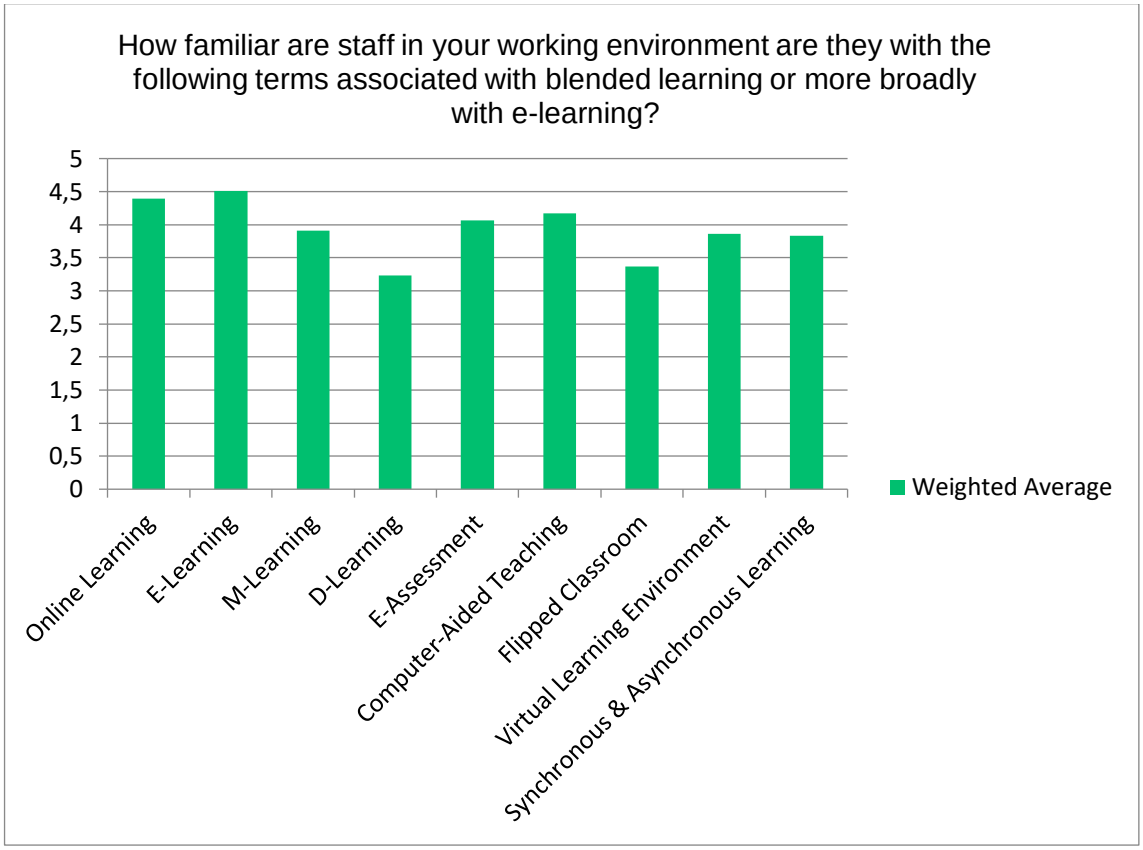

Figure 5.3: Familiarity with terms associated with BL and /or e-learning

5.2.4 Effects of the introduction of BL to the lecturers and their jobs

Participants were also asked whether the introduction of BL will have an effect on the lecturers and their job security. The majority 75.6% (n = 56) strongly agreed that lecturers will need to work harder to cope up with the technological developments in the education sector. Similarly, 60% (n = 44) of the participants strongly disagreed that ultimately lecturers will be replaced by computers. The findings of this study are in agreement with those of those of previous researchers such as (Chigona, 2015; Boelens et al., 2017; Ibrahim & Nat, 2019) who noted that the use of technology in education is to supplement the work of the teacher rather than taking it away. Blended learning on the other hand extends the classroom face-to-face environment of learning it boosts learning with the change of place and time rather than the change of the instructor. The findings are graphically illustrated by Figure 5.4.

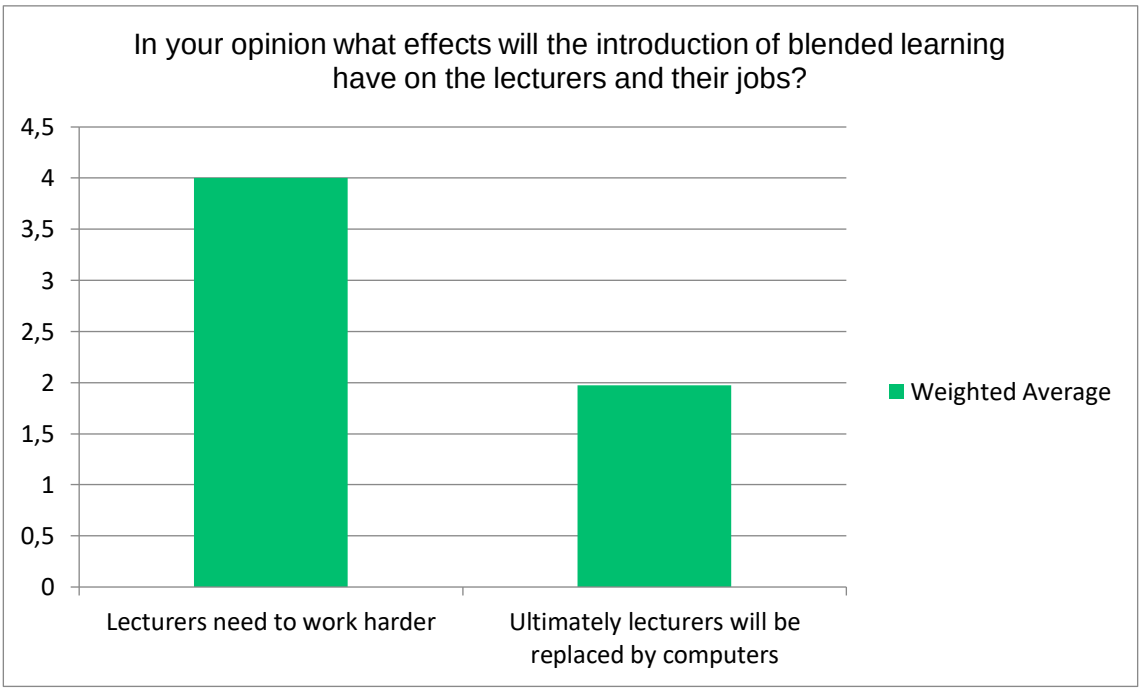

Figure 5.4: Expected effects of BL to lecturers and their jobs

5.2.5 Training and support towards BL obtained from the University

Participants were also asked to explain the extent at which the university gives them support in terms of training and other various support in the use of technology for teaching and learning. Results indicate that most participants 64.9% (n = 48) indicate that training is provided at the inception of the technological innovation whereas 67.6% (n = 50) indicated that the training provided continue after inception. These results implies that lecturers

receive initial and continuous training towards BL, but other factors that might be causing ineffective usage of BL must be investigated so that effective usage is ensured. These results are also presented graphically as demonstrated in Figure 5.5.

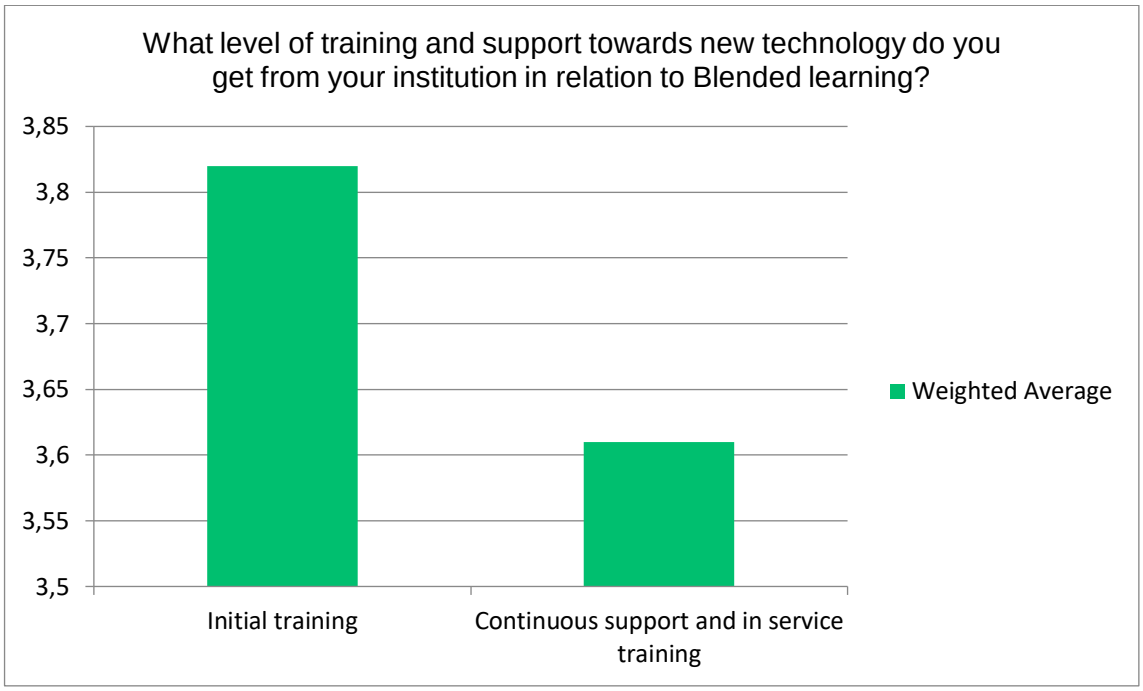

Figure 5.5: Training and support towards new technology and BL

5.2.6 Availability of technologies, equipment and tools for teaching and learning

Participants were asked to express the availability of technologies, equipment and tools that could be used to support BL. Among the tool investigated were Internet access, projectors, personal computers (PCS), laptops and printers, online chat tools, virtual learning environments and e-assessment tools. On average this question was answered in affirmative as upper weighted average of the responses was 4.33 for internet access and the lower one was 3.83 for virtual learning environment. These responses are as presented in Table 5.2 and also demonstrated graphically in Figure 5.6.

Table 5.2: Availability of technologies, equipment and tools to support BL

	Totally not	Rather not	Don't know	Quite so	Totally so	Weighted Average
Internet access	2.8%	5.6%	5.6%	27.8%	58.3%	4.33
projectors	2.9%	11.4%	8.6%	31.3%	45.7%	4.06
Personal Computers (PCS)	5.6%	5.6%	5.6%	22.2%	61.1%	4.28
Laptops and printers	2.8%	5.6%	2.8%	30.6%	58.3%	4.36
Online chat tools	8.6%	8.6%	2.9%	34.3%	45.7%	4
Virtual learning environments	2.9%	14.3%	11.4%	40.0%	31.4%	3.83
E-assessment tools	2.8%	8.3%	2.8%	30.6%	55.6%	4.28

As illustrated in Table 5.2, personal computers are the most available equipment as a good number of participants 61.1% (n = 45) indicated that PCs are totally available. Participants also indicated that there is a good availability of internet access which normally is categorized as a major barrier for online learning. In this case 58.3% (n = 43) of the participants confirmed good availability of internet access. The graphical representation of these results are as illustrated in Figure 5.6.

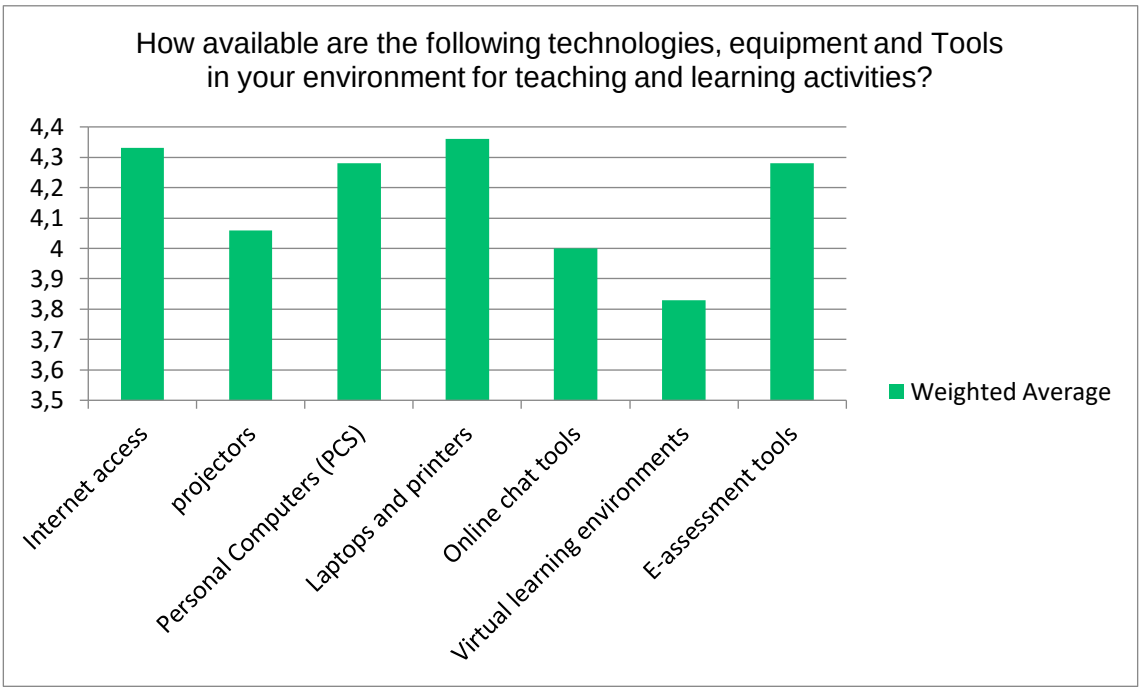

Figure 5.6: Availability of technologies, equipment and tools to support BL

5.3 Perceptions on improving blended learning usage: Descriptive analysis

The constructs that were examined for the perceptions towards improving BL usage were; performance expectancy (PE), effort expectancy (EE), compatibility (Co), readiness (RE), self-efficacy (SE), computer anxiety (CA), social Influence (SE), individual characteristics (IndChar), environmental (Envt), facilitating conditions (FC), strategy (Stra), structure (Stru), academic work load (AWL), behaviour intention (BI) and blended learning improved usage (BLUsage). The mediating variable was behaviour intention and the dependent one was improved blended learning usage. Descriptively these two variables are explained as follows;

5.3.1 Behaviour intention

For this study, behaviour Intention refers to the motivational factors to support an individual's willingness to improve blended learning usage. This shows whether the participants believe that they will be able to improve their skills on using BL given the fact that other factors have been addressed. Participants' responses are as demonstrated in Table 5.3.

Table 5.3: Descriptive analysis of the BI construct

Questionnaire Item	Strongly disagree	Neutral	Agree	Strongly agree
I intend to use blended learning more often when interacting with my learners	3.1%	9.38%	43.6%	43.8%
Intend to support the use of blended learning in working environment	6.3%	3.13%	37.5%	53.1%
I intend to recommend other lecturers to use blended learning	3.13%	9.38%	40.6%	46.9%

As demonstrated in Table 5.3, results indicate that the majority of the participants 87.5% (n = 65) indicate that they intend to use BL whereas 90.6% (n = 67) intend to support its use. On the other hand, 87.5% (n = 65) indicated that they will recommend the use of BL. This implies that when the impending factors are handled BL usage would be improved. Graphically these results are also demonstrated in Figure 5.7.

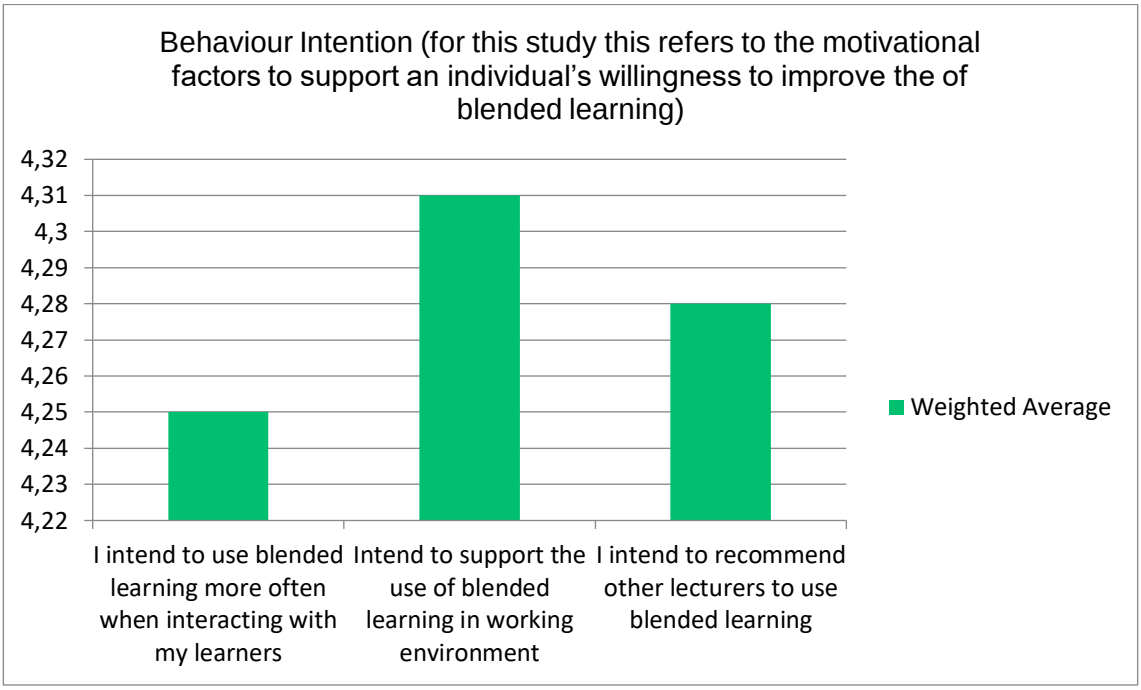

Figure 5.7: Intention to use, recommend and support BL

5.3.2 Blended learning improved usage

Participants were asked to gauge from their view, experience and perception their expectation of improving BL usage in their faculty. This aspect was measured based on three perspectives namely technological, management and individual perspectives results are as presented in Table 5.4.

Table 5.4: Blended learning improved usage

	Extremely impossible	Impossible	Fairly possible	Possible	Highly possible
From the technological perspective	3.13%	0.00%	18.75%	43.75%	34.38%
From the management perspective	6.25%	0.00%	28.13%	37.50%	28.13%
From the individual perspective	3.13%	0.00%	18.75%	37.50%	40.63%

From the technological perspective, 96.87% (n = 72) indicated that there was a possibility chance to improve BL effective usage whereby 18.75% (n = 14) indicated that it was fairly possible, 43.75% (n = 32) indicated that it is possible and 34.38% (n = 25) indicated that it was highly possible. From the management's perspective, 93.75% (n = 69) indicated that there is a possibility of improvement that is also confirmed by 96.87% (n = 72) from the individual perspective. Graphically these results are also presented in Figure 5.8.

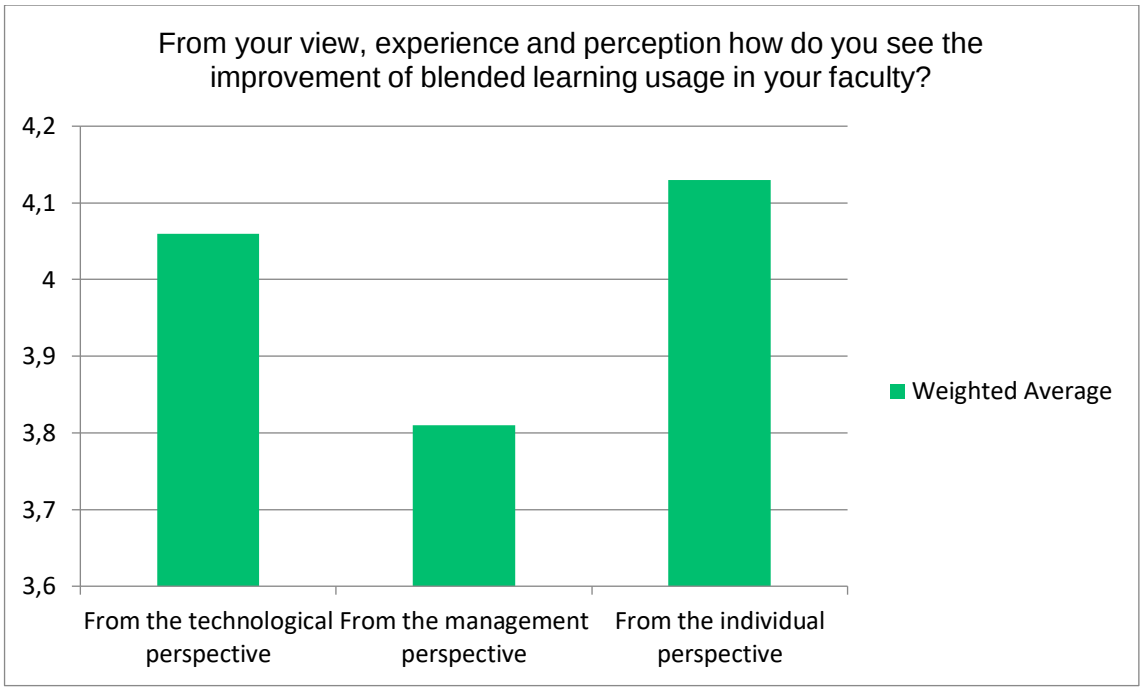

Figure 5.8: Likelihood improvement of blended learning usage in the faculty of ICT

5.4 Correlation analysis

The relationship between independent constructs influencing users' perceptions to improve BL usage was examined by correlation analysis. According to Pallant (2016) correlation quantifies the strength of the linear relationship two quantitative variables. The correlation coefficient values ranges between ± 1 whereby direct proportionality of the two variables has a positive correction and an indirect proportion has a negative correlation value. The correlation analysis between variables is as demonstrated in Table 5.5.

Table 5.5: Correlation of constructs

		PE	EE	Co	RE	SE	CA	SI	IndChar	Envt	FC	Stra	Stru	AWL	BI	BLUsage
PE	Pearson Correlation	1														
EE	Pearson Correlation	.554**	1													
Co	Pearson Correlation	.303**	.404**	1												
RE	Pearson Correlation	.308**	.310**	.612**	1											
SE	Pearson Correlation	.129	.074	.417**	.541**	1										
CA	Pearson Correlation	.097	.166*	.283**	.464**	.467**	1									
SI	Pearson Correlation	.107	.167*	.465**	.494**	.437**	.543**	1								
IndChar	Pearson Correlation	-.102	.014	.328**	.333**	.409**	.323**	.556**	1							
Envt	Pearson Correlation	.057	.113	.157*	.328**	.287**	.283**	.274**	.236**	1						
FC	Pearson Correlation	.077	.155	.221**	.263**	.204*	.352**	.373**	.429**	.402**	1					
Stra	Pearson Correlation	.053	-.047	.253**	.338**	.267**	.539**	.463**	.362**	.404**	.614**	1				
Stru	Pearson Correlation	.031	-.059	.267**	.316**	.339**	.248**	.373**	.454**	.219**	.127	.143	1			
AWL	Pearson Correlation	.094	.273**	.207*	.309**	.378**	.304**	.407**	.385**	.406**	.403**	.367**	.308**	1		
BI	Pearson Correlation	.248**	.124	.333**	.427**	.336**	.373**	.472**	.344**	.306**	.358**	.438**	.364**	.592**	1	
BLUsage	Pearson Correlation	.138	.166*	.043	.142	.139	.248**	.117	.136	.413**	.378**	.332**	.098	.404**	.369**	1

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

As illustrated in Table 5.5, most constructs showed significant correlation with one another with the exception of performance expectancy and effort expectancy that showed some none significant correlations with many other constructs. For instance, performance expectancy showed very low insignificant correlation with self- efficacy (SE), computer anxiety (CA), social influence (SI), environmental factors (Envt), facilitating condition (FC), strategy (Stra), structure (Stru) and academic work load (AWL). Similarly, effort expectancy had very low and insignificant correlations wit self-efficacy (SE), strategy and structure of an organization. On the other hand, readiness to use blended learning (RE) and behaviour

intention (BI) showed the highest and most significant correlation among constructs with the most highest being between readiness and self-efficacy with a correlation coefficient of .541 significant at 0.01 level. In terms of relationships between the variables that influence improved BL usage, the results of this study indicates that the good significant correlation is starting point these variables cause one another to happen.

5.5 Regression analysis

Regression analysis is a set of statistical measure that is used to estimate the relationships between independent variable(s) and the dependent one and is also used to assess the strength of the relationship between them (Pallant, 2016). This implies that regression analysis gives the degree of contribution of each independent variables towards the outcome of the dependent variable. The regression coefficients represent the mean change in the dependent variable for one unit of change of the independent one hence for significance, ***t-value*** should be greater or equal to ±1.96. Results of the regression analysis are as demonstrated in Tables 5.6 and 5.7 whereby the former presents the model summary while the later presents regression coefficients for each independent variable.

Table 5.6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.786[a]	.618	.006	.214	.618	.974	21	132	.006

a. Predictors: (Constant), PE, EE, Co, RE, SE, CA, SI, IndChar, Envt, FC, Stra, Stru, AWL, BI

As presented in Table 5.6, the overall predication of the model is 61.8% (R^2 = .618) this implies that the identified variables for this study has 61.8% to predict the improved use of blended learning. This means that there is a high probability of improving BL usage if the variables or factors identified in this study are taken care of by both the faculty of ICT and the lecturers who are supposed to implement BL. Regression analysis of variables is as presented in Table 5.7.

Table 5.7: Regression Coefficients[a] of the analysis of variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5.822	.831		7.006	.000		
	PE	.176	.137	.082	1.287	.174	.525	1.904
	EE	.162	.144	.066	1.125	.201	.396	2.525
	Co	.240	.121	.111	1.987	.046	.457	2.188
	RE	.251	.096	.120	2.614	.016	.413	2.421
	SE	.501	.138	.166	3.627	.000	.436	2.294
	CA	.299	.107	.149	2.791	.005	.411	2.433
	SI	.268	.136	.108	1.972	.048	.403	2.481
	IndChar	.421	.127	.159	3.316	.001	.461	2.169
	Envt	.201	.101	.106	1.996	.032	.564	1.773
	FC	.343	.173	.101	1.985	.043	.435	2.299
	Stra	.444	.160	.148	2.774	.003	.362	2.762
	Stru	.289	.117	.129	2.478	.006	.574	1.742
	AWL	.052	.180	.034	.288	.773	.413	2.421
	BI	.303	.143	.115	2.116	.028	.415	2.410

a. Dependent Variable: BLUsage

As demonstrated in Table 5.7 most of the variables showed significant contribution to the overall prediction of the model with the exception of three namely performance expectancy (PE), effort expectancy (EE) and academic work load (AWL) whose nonsignificant contributions were 8.2% with $p = .174 > .05$, 6.6% with $p = .201 > .05$ and 3.4% with $p = .773 > .05$ respectively. Among the variables that had the significant contribution, self-efficacy (SE) had the highest significant value of 16.6% with $p = .000 < .05$ followed by individual characteristics with 15.9%, and $p = .001 < .05$ whereas social influence (SI) had the least contribution of 10.8% and $p = .048 < .05$ followed by compatibility with a contribution of 11.1% and $p = .046 < .05$.

5.6 Summary

Blended learning leverages the face-to-face and online learning methods. This implies that when all factors influencing its implementation and successful usage are done right, BL can benefit institutions of HEIs' teaching and learning programs in various ways such as, expanded reach, improved engagement between learners and instructors and among themselves. This chapter investigated the many factors that had been identified from literature to be influencing BL improved usage. By using descriptive analysis, this study's

results showed that BL has a higher chance of being effectively used if all factors influence its use are paid attention to. The correlation analysis that was carried out these factors are related though they many not necessarily cause an effect with one another except for the dependent variable. Based on the finding of this study it is believed that BL will have a strong impact on the learning environment in HEIs as majority of the participants indicated a high intention to use.

6 Discussion, Recommendations and Conclusion

6.1 Introduction

The global developments and the dramatic changes in the education environment especially in the higher education institutions calls for a holistic understanding of how technology has evolved the teaching and training landscape hence allowing educators and learners to stay relevant in a fast-evolving pedagogical landscape. There are two most important things that are certain in education today. First, learner variability is the norm, not the exception and secondary, technology is here to stay. Hence there is a need to develop and facilitate learning experiences that can allow all learners to succeed regardless of their social-technical backgrounds. This chapter discusses the findings of the study in relation to theory and practice. More still, the chapter also discusses the objectives of the study and show how each set objective was achieved based on the findings of the study. Further still, the chapter highlights the contribution this study makes. Lastly the chapter discusses the limitations of the study based on which the recommendations for direction of future research are given.

6.2 Overview of the research

Learners regardless geographical location, learning landscape and variability, need to be provided with the best opportunity in order for them to develop their skills and knowledge. In many developing countries, there is inequality in the provision of quality education to learners especially those in rural geographical areas that are economically disadvantaged (Kintu et al., 2018). The learners in urban areas, become advantaged at the expense of those in rural settings as their economical advantaged improves their unique needs such as demanding for best instructors facilities and government involvement (Oyo et al., 2017). Blended learning brings the benefits of accepting learners' variability that enforces education equity and works to the best of the economically disadvantaged learner.

The growing use of technology and the advent of the Covid-19 pandemic have created a paradigm shift in the educational landscapes whereby instructors have realized the need to combine in person and online teaching and such has improved the need to use blended learning effectively. However, neither countries nor institutions had prepared for Covid-19 hence the shifting of the teaching and learning landscape caused exhausting and frustrating experience among institutions, instructors and learners as well (Al-Samarrai et al., 2020). The Covid-19 experience was an eye opener that today's education requires flexibility and agility calling HEIs to design and deliver curriculum and instruction that prepares a learners

to fit in the three learning environments namely face-to-face, hybrid instruction, and online. To achieve this, HEIs whether in developing or developed countries need to embrace blended learning.

6.3 Discussion of the findings

This study's major objective was to determine better ways of improving blended learning usage in South African universities. The study also set four objectives that needed to be answered before the research aim/ major objectives could be achieved. These four objectives guided the step by step flow of the study. This section discusses the findings in relation to these objectives.

6.3.1 Discussion of findings in relation to the first research objective

The first objective of this study sought to determine and analyze factors that influence blended learning usage. To achieve this objective this study devoted sub-section 3.3.1 to discuss the factors influencing BL usage. In this discussion six constructs were identified and these were technological, institutional, environmental, social influence, individual and behaviour intention. Further still, section 3.4 and 3.5 discussed related work and theoretical foundations respectively whereby more factors were identified and categorized in the six previously identified constructs. In this categorization new constructs and sub-constructs were created and these are considered as the factors influencing BL usage. These factors are; Performance Expectancy (PE), Effort Expectancy (EE), Compatibility (Co), Readiness (RE), Self-efficacy (SE), Computer anxiety (CA), Social Influence (SE), Individual Characteristics (IndChar), Environmental (Envt), Facilitating Conditions (FC), Strategy (Stra), Structure (Stru), Academic work load (AWL) and Behaviour Intention (BI).

6.3.2 Discussion of findings in relation to the second research objective

The second research objective was to determine the role of blended learning in facilitating flexibility, interaction and learning processes in teaching and learning. This study devoted sub-section 3.3.2 to discuss the flexibility of BL to support interaction of learners during the learning process. The discussion in sub-section 3.3.2 revealed that BL enhances flexibility by allowing learners freedom decide on when, where, what, and how they learn. This including the physical space environment of where to learn from the time they should learn and with whom to learn but at the same time collaborating with others. More still, the discussion revealed that flexibility also provides a chance to customize one's pace, place and mode of learning. This also supports the observation of Al-Samarrai et al. (2020) who indicated that the outbreak of Covid-19 spontaneously made learning to take place in an

array of settings where classroom was automatically extended to internet and in some cases a combination of the two. This use of technology by providing teaching fully online or by using technology-enhanced experiences confirms the fact that BL provides flexible interactions for learning.

6.3.3 Discussion of findings in relation to the third research objectives

The third objective sought to analyse the level of technology usage to facilitate teaching and learning in South Africa's Universities. To achieve this objective, the measuring instrument was designed with two questions that were put to the participants. These questions where; *How familiar are staff in your working environment are with the following terms associated with blended learning or more broadly with e-learning?* it was assumed that if there is technology usage to facilitate teaching learning the staff should at least be aware of the were; Online Learning, E-Learning, M-Learning, D-Learning, E-Assessment, Computer-Aided Teaching, Flipped Classroom, Virtual Learning Environment as well as Synchronous and Asynchronous Learning. The second question *how available are the following technologies, equipment and Tools in your environment for teaching and learning activities?* The technologies, equipment and tools that were investigated were; Internet access, projectors, Personal Computers (PCS), Laptops and printers, Online chat tools, Virtual learning environments and E-assessment tools.

The findings of these were discussed in subsections 5.2.3, and 5.2.6 and presented in Table 5.1, Figure 5.3 as well as Table 5.2 and Figure 5.6 respectively. These findings revealed that participants were much familiar with the BL and e-learning terms with have weighted percentages of the responses with the highest 90.2% and lowest 64.6%. Similarly, it was also revealed that the technological equipment and tools are also available in the institution as participants responded well in affirmative with a weighted average of responses highest being 4.36 and lowest 3.83. The findings of this study confirmed those of other researchers such as (Ibrahim & Nat, 2019; Zimba et al., 2021) who indicated that South African HEIs unlike many other developing countries are well facilitated and can afford online learning if all other impeding factors are addressed.

6.3.4 Discussion of findings in relation to the fourth research objectives

The fourth objective of this study was to use the identified factors and develop a model that will be leveraged to improve blended learning in South African universities. This objective linked the three objectives to aim/major objective of the study. On identification of the influencing factors and after categorizing them, the 14 constructs and sub-constructs were tested for their contribution to the overall prediction using regression analysis. According to

Pallant (2016) a regression analysis is a mathematical model presented in a linear form to indicate which independent variables have an impact to the dependent one. This kind of model is also used tell which variable matters most, which one can be ignored, how each variable interact with one another and the certainty of the identified variables in the model. In the case of this study, the dependent variable that was being predicted was BL improved usage and the predictors where the 14 independent variables. The results of the model is discussed in the proceeding subsection.

6.3.5 Discussion of findings in relation to the major research objectives

The major objective of this study was to find ways of improving BL usage in South African universities. A case of Tshwane University of Technology faculty of ICT was used. To achieve this major objective of the study a step by step procedure was followed. First it was important to review all relevant literature that led to the identification of factors influencing BL usage. The identified factors were then categorized and tested to determine their importance in the process of improving BL usage. This importance was determined by using the regression analysis demonstrated in Table 5.7 that showed that some factors had significant contribution whereas others didn't have. The regression also showed how much each of these factors contribute to the overall prediction of BL improved usage.

Findings indicated that self-efficacy which is the individual's belief of his/her own ability to succeed in a particular situation or the determinants of how one think, behave, and feel about themselves doing something (Gawande, 2016; Pan, 2020) had the highest significant contribution towards improving BL usage. Self-efficacy has been praised for having higher levels of learning outcomes. This implies that, individuals do not feel about themselves but also whether or not they can achieve their goals in life. This study is in agreement with many others such as (Oluwole et al., 2018; Eze et al., 2020; Pan, 2020) who also indicated that individuals gain confidence when they feel about themselves as being capable of doing something to achieve a particular goal. This implies that self-efficacy is a high level of motivation that enables an individual to remain focused on obtaining their set goals. In relation to this study, the findings of this study would imply that an individual lecturer would try his/her best to use BL rather than being looked at as a failure.

Another factor that was found to be highly significant was individual characteristics. In this study, individual characteristics referred to those attributes of an individual that could positively or negatively influence his/her behaviour to acceptance and use blended learning. These attributes include but not limited to learnability, skills, education background, attitude, beliefs, need change readiness and experience. For instance learnability and willingness to

learn has been found by several other studies to have a major influence on the need change readiness of an individual to voluntarily use technology (Tarhini et al., 2015). On the other hand, experience with technology develops skills even though use was mandatory and such could later transform into voluntary usage (Kalema et al., 2014). More still, as also demonstrated in Table 5.5, there was a significant relationship between individual characteristics and self-efficacy with a correlation coefficient of .409 significant at .001. In relation to this study, this could imply that lectures at TUT are facilitated with technology equipment and tools that may be used for BL. Such lecturers have self-confidence in using technology as it is not new to them and such helps them to reduce job stress and develop positive perceptions for self-efficacy that could lead to improved usage. These findings are also in agreement with Oluwole et al. (2018) who indicated that individual characteristics such as learnability improves awareness that in turn influences self-efficacy and improves BL usage.

Another outstanding factor was strategies which in this study referred to the university's plan that specifies how resources are allocated to improve teaching and learning. These strategies also work hand in hand with institutional support which in this study was referred to as facilitating conditions. As demonstrated in both Table 5.5 and 5.7, these two variables are highly and significantly correlated with a coefficient of .614 at .001 and both have significant contribution towards improved BL usage. The findings of this study are in agreement with those of previous researchers such as (Dziuban et al., 2018; Rajagopalan, 2019; Seraji, et al., 2019; Azizi et al., 2020) who noted that using technology for teaching and learning has both tangible and intangible benefits towards learning and meeting learners' demands regardless of the size and structure of the institution or learners classes hence devising better strategies is paramount. In BL for example, learners have a chance to interact and study with peers of their choice with little or no restrictions from instructors, such freedom may make learners free and improve their love and commitment to their studies.

Besides these three most outstanding, other factors that were found to have significant contribution to improved BL usage are; size and structure of the institution, compatibility of the technological system, readiness to use BL and to change from face-to-face interactions, computer anxiety, social influence, environmental, facilitating condition and behaviour intension. All these factors have been also suggested as good predictors of BL usage by many other researchers on BL and technology use in general hence the findings concurs with them (Venkatesh et al., 2003; Means et al. 2013; Williams et al., 2015; Gawande, 2016; Norberg, 2017; Ibrahim, & Nat, 2019; Azizi et al., 2020; Eze et al., 2020).

On the other hand, three factors namely performance expectancy, effort expectancy and academic work load were found not to have a significant contribution. This study's findings differ from many other researchers on technology and BL usage such as (Venkatesh et al., 2003; Gawande, 2016; Eze et al., 2020) who predicted higher significant relationships of both performance expectancy and effort expectancy with technology usage.

Performance expectancy for example that refers to the degree to which individuals perceive that using a system will help them attain a gain in job performance has a good impact on service based technology (Venkatesh et al., 2003). This implies that since the intention of using BL is to extend classroom face–to–face interaction the influence is much on the learners' side rather than the instructor's end. In this situation students perceive educational benefits extended to them to enhance classroom continuance yet on the instructor's side it is normal teaching as usual and nothing much has changed apart from the venue and medium of instruction. Whether online or not, instructors will still have to prepare the same learning materials, do schemes of work and planning and deliver the same to the learners in a similar manner. The findings of this study confirms the findings of previous researchers such as (Ebner et al., 2015; Ozmen et al., 2018; Rajagopalan, 2019) who noted that regardless of the medium of instruction, an instructor should prepare the so that teaching and learning takes place.

Effort expectancy didn't also show significant contribution to improved BL usage. Effort expectancy also known as perceived ease of use is defined by Venkatesh et al. (2003) as the level of easiness related while using technological system. When this construct is looked at in terms of the effort needed to use the system, or complexity in learning to use the system such may not apply to lecturers like those of TUT who are well facilitated. Kalema et al. (2014) indicated that with the increasing use of technology in all aspects of day to day life, some factors influencing technology usage will cease to show impact whereas others will become salient. In this case, the role that the organization play in the use of technology becomes more dominating than the users' perception of the technology. For instance lecturers who well facilitated will be using internet on a daily basis and will be having their laptops even when at home hence easiness of use ceases to be an antecedent whereas facilitation becomes salient. The findings of this study are in agreement with those of researchers such as (Ibrahim & Nat, 2019; Zimba et al., 2021) who noted that instructors in South African HEIs are well facilitated than others in many developing countries and that easiness of use may not concern them.

Lastly the academic workload construct was also found not be significantly contributing to the improvement of BL usage. This aspect may have two implications. First in many South African HEIs workload is well stipulated and where inequality exist, with some staff members being underutilized and others significantly over worked worker's unions have been involved to rectify the problem (Botha & Swanepoel, 2015). In such situations the lecturers will not see using BL as an added work load but as an extension of what they are doing. Secondary, if the teaching is only online, the instructors will perceive this as a change of medium of instruction rather than added workload for the same task and same pay. The findings of this study are in agreement with Ebner et al. (2015) who indicated that real instructors take care of smart Learning Analytics features that enable learners to understand rather than thinking of themselves.

6.4 Contribution of the study

The contribution this study makes is twofold namely theoretical and practical. Theoretically, this study investigated the use of BL and factors that influences BL usage were identified and tested. This study added on the ongoing debate of leveraging BL especially in this period of Covid-19 pandemic. These findings of improving BL usage during the virtual COVID-19 semesters in South Africa are important in both the short and the long term. This study revealed that during virtual teaching lecturers need to take into consideration the differences between students' understanding when designing learning materials for virtual environments and when conducting virtual teaching. Based on the findings of this study, lecturers will be able to develop competencies, for both the use of technical tools and for the new didactic and methodological skills. Furthermore, the findings of this study will be used by other researchers to extend research of not only BL usage but for all other forms of online learning.

Practically, the findings of this study will be used by not only TUT but by other HEIs to implement BL usage within their settings and those that have already done so to improve its usage. This study provides the much needed relevant information on blended learning. Since the findings of this study revealed that lecturers are aware of BL and have positive perception about its use for teaching and learning, the provided information by this study will help HEIs to equip their staff with the needed resources that might be missing and also to restructure their curriculum to fit the virtual environment.

6.5 Limitations and Recommendations

Much as this study was conducted in one faculty of TUT and cannot be considered as a whole representative of all HEIs in South Africa, it has provided views that are pertinent in the current pandemic of Covid -19. The study was motivated by the need to understand the underlying predictors of lecturers' use of blended learning but fitted well in the current crisis context of Covid-19 virtual teaching and learning whereby universities worldwide abruptly stopped face-to-face and switched to technology-mediated teaching. However, even this is so, this study has some limitations based on which we make some recommendations for the direction of future research.

- This study was conducted under unfamiliar situations of lockdown where there was complete social isolation in every area of life. This might have an influence on the findings of this study. First the number of lecturers who participated was small for quantitative analysis and secondly it was difficult to increase the population of the study by involving other universities as most people were working from home. This study recommends that future research should endeavour to increase the number of participants by involving other faculties and universities in order to have a good chance of generalization of the findings.

- According to Kalema et al. (2014) studies dealing with acceptance and use of technology should consider investigating the interacting effects of demographic and situation variables of the participants. In this they argued that users' perceptions towards may vary depending on the demographic variables. This study only used descriptive analysis to report on the participants' situation variables but didn't analyse their moderating and interacting effects. It is therefore recommended that future studies should consider analysing these effects as the may have influence on continuance usage.

- Mostly in universities the use of an information system is mandatory rather than voluntary use. According to Venkatesh et al. (2003), in mandatory usage some factors may be influencing the use of the system its inception but ceases to be significant with time and others become salient. This necessitates studies on the use of technology to consider using longitudinal surveys. This study on used cross-sectional survey and didn't have a chance of analysing the influence of the significant factors over time. It is therefore recommended that future research should consider the use of longitudinal survey so that they address the changes on the individual level over time.

- Acceptance, adoption and use of technology are influenced by behaviour change for the individual to decide why they should accept or reject the technology or change. This implies that there might be inner feelings that may not vividly be expressed by users in a quantitative survey that uses close-ended questions as was a case for this study. Therefore, this study recommends that future research should consider qualitative data collection and analysis in order to gain further information on lecturers' perceptions of BL.

6.6 Conclusion

Globally, the development trends in computing, the increasing application of technology and the use of the internet have brought about innovations in teaching and learning of HEIs. This paradigm shift in the educational landscape, calls for HEIs to redesign their curriculum, retrain staff and to follow appropriate frameworks in the implementation of online teaching and learning. More still, the abrupt advent of Covid-19 and the impact it created on the educational system worldwide is an eye opener for governments to revise their strategies towards education and also to equip HEIs with technologies and infrastructures needed for the integration and adoption of blended learning.

The shift to the use of technology for teaching and learning is profound since it involves a change from cohorts to competency. Using technology for teaching and learning like BL requires interactive pedagogies since it extends the face-to-face classroom environment to anytime and anywhere learning. The change in the education environment is here to stay and with effective use of BL, teaching will soon require multiple service providers including network providers, infrastructure which will eventually lead to the concept of school-as-a-service that will only be used when needed. This change in the educational landscape confirms the need for effective use of BL hence making this study pertinent.

This study explored the improvement of blended learning usage by lecturers for teaching and learning. By carrying out a review of relevant literature and using the Blended Learning Acceptance Model (BLAM) as the underpinning theory, this study identified 14 factors that influences the improvement of BL usage and the model was tested them using regression analysis. Results of the study provided convincing support for the proposed model and indicated that of the 14 factors only three were having a contribution that is not significant and the remaining 11 significantly contribute to improved BL usage. The results further indicated that self-efficacy, individual characteristics and institutional strategies have the

highest significant contribution to BL usage whereas performance expectancy, effort expectancy and academic work load have no significant contribution in improving BL usage. Based on the findings of this study, institutional management can review the possible reasons for the lecturers' lack of motivation for using BL. This may also be instrumental in adjusting strategies and to propose new ones that may help lecturers to have both theoretical and practical understanding for their own learning reflection.

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Attachments

Appendix 1: Questionnaire

FACULTY OF INFORMATION AND COMMUNICATION

DEPARTMENT OF END-USER COMPUTING

IMPROVING BLENDED LEARNING USAGE IN SOUTH AFRICAN UNIVERSITIES: A CASE OF TSHWANE UNIVERSITY OF TECHNOLOGY

Primary investigator: Ms Mmamolefe Rosina Kgasi, Master in Education Management, Candidate
Study leader: Dr Aarreniemi-Jokipelto Paivi
Dear Potential research participant,

You are invited to complete a survey questionnaire that forms part of my formal Masters in Education Management studies.

This research study seeks to investigate how to improve blended learning usage in South African universities by taking a case of Tshwane University of technology. Blended learning could be looked at as the combination of classroom or face-to-face activities in a meaningful way with online activities of all kind. The emphasis is on finding a way to combine presence and distance learning to make learning as effective and as joyful as possible. Universities worldwide endeavour to meet their students' needs, however they face numerous impediments ranging from social, technological, educational to economic barriers. Because of these many challenges universities have to leverage information and communication technology (ICT) in order to remain in contact with their learners so that learning becomes a continuous process to benefit the students as well as helping universities to achieve their goals of bridging the gaps between learners and their instructors. In order to improve the results of blended learning, several factors will have to be investigated and hence the purpose why I am seeking to collect data.

To complete the survey questionnaire, you will be asked to respond to questions regarding to your knowledge, experience, perception or attitude towards blended learning in relation to your place of work. You can complete the questionnaire at any suitable place and time of your choice. The filling of this questionnaire will not take between 15 to 20 minutes of your time.

You will not be eligible to participate in this study if you currently under the age of 18. Participation in this study is strictly confidential, no need to include any form of identification on the questionnaire and for that reason such information is not asked for.

The study and procedures involve no foreseeable physical discomfort or inconvenience to you or your employer. Kindly note the results of the questionnaire will have no direct personal benefit to you. Your participation in this study is entirely voluntary. You have the right to withdraw at any stage without any penalty or future disadvantage whatsoever. You don't even have to provide the reason/s for your decision. Your withdrawal will in no way influence your relationship with the University team. Note that you are not waiving any legal claims, rights or remedies because of your participation in this research study.

The Research and Ethics Committee (REC) of the Tshwane University of Technology have approved the formal study proposal. All parts of the study will be conducted according to internationally accepted ethical principles.

The primary investigator, Ms MR Kgasi, can be contacted during office hours at Tel +27 12 382 9752, or on her cellular phone at +27 71 563 3727. The study leader, Dr Aarreniemi-Jokipelto Paivi, can be contacted during office hours at Jari.Luomakoski@haaga-helia.fi. Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the TUT Research and Ethics Committee (REC), Dr A Mason, during office hours at Tel 012 382 6074, E-mail: MasonA@tut.ac.za. Alternatively, you can report any serious unethical behaviour at the University's Toll Free Hotline 0800 21 23 41.

This research study is of collaboration between Haga Helia and TUT and no publication prohibitions, conditions or limitations were placed on the researcher. Your co-operation and participation in the study will be greatly appreciated. Please feel free to ask any questions of your consent.

Thank you

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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

DEPARTMENT OF END-USER COMPUTING

QUESTIONNAIRE ON: IMPROVING BLENDED LEARNING USAGE IN SOUTH AFRICAN UNIVERSITIES: A CASE OF TSHWANE UNIVERSITY OF TECHNOLOGY

This questionnaire consists of three sections.

Section A: Participants general information

Section B: Participants perceptions, attitudes and understanding of Blended learning

Section C: Participants' perceptions of how Blended learning can be improved

SECTION A: GENERAL INFORMATION

In this study Blended learning is defined as the combination of classroom or face-to-face activities in a meaningful way with online activities of all kind. The emphasis of blended learning is to find a way to combine presence and distance learning to make learning as effective and as joyful as possible.

PLEASE MAKE A CROSS (X) IN THE BOX CORRESPONDING TO AN ANSWER THAT YOU FILL SUITABLE FOR THE QUESTION

1. Are you aware of Blended learning?

Yes		No	

2. What is your practical experience in years with blended learning?

0-5 years		6-10 years		11-15 years		16 -20 years		21-25 years		26 years and above	

SECTION B: PERCEPTIONS, ATTITUDES AND UNDERSTANDING OF BLENDED LEARNING

3. How familiar are staff in your working environment are they with the following terms associated with blended learning or more broadly with e-learning?

– **Term**	**Totally not**	**Rather not**	**Don't know**	**Quite so**	**Totally so**
Online Learning					
E-Learning					
M-Learning					
D-Learning					
E-Assessment					
Computer-Aided Teaching					
Flipped Classroom					
Virtual Learning Environment'					

Synchronous & Asynchronous Learning					

4. In your opinion what effects will the introduction of blended learning have on the lecturers and their jobs?

– – **Possible Expectation**	**Totally not**	- **Rather not**	– **Don't know**	**Quite so**	**Totally so**
Lecturers need to work harder					
Ultimately lecturers will be replaced by computers					

5. What level of training and support towards new technology do you get from your institution in relation to Blended learning?

– – **Level of training**	**Totally not**	- **Rather not**	– **Don't know**	**Quite so**	**Totally so**
Initial training					
Continuous support and in service training					

6. How available are the following technologies, equipment and Tools in your environment for teaching and learning activities?

– **Technology or Tools**	**Totally not**	**Rather not**	**Don't know**	**Quite so**	**Totally so**
Internet access					
projectors					
Personal Computers (PCS)					
Laptops and printers					
Online chat tools					
Virtual learning environments					
E-assessment tools					

SECTION C: PERCEPTIONS OF HOW THE USAGE OF BLENDED LEARNING CAN BE IMPROVED

By using the rating scale from 1-5 where; 1 = Strongly disagree, 2 =Disagree, 3 = Neutral, 4= Agree, 5 = Strongly agree. Indicate your level of agreement or disagreement of the following statements:

Performance Expectancy *(in this study this refers to the degree at which blended learning is perceived as providing greater benefits in improving teaching and learning)*		**1**	**2**	**3**	**4**	**5**
7.1	Blended learning allows me to conduct teaching more efficiently					
7.2	Using blended learning enables me to accomplish teaching activities more quickly					
7.3	I find blended learning a convenient way to conduct teaching and learning					
7.4	Blended learning is useful for managing my lectures					
Effort Expectancy *(is the degree to which blended learning is perceived as being consistent with the existing values, past experiences, and needs of potential adopters)*						
8.1	I find blended learning difficult to use					
8.2	Using blended learning requires a lot of time and effort					
8.3	Blended learning sometimes may be frustrating while using it					
Compatibility (*It refers to the manner in which one is thinking, feeling or behaving which shows his opinion)*						
9.1	Learning management systems we use for blended learning are compatible with my lifestyle					

9.2	Using blended learning fits well with the way I like to manage my teaching					
9.3	Using blended learning to conduct teaching activities fits into my working style					
Readiness (*this refers to how ready instructors and their institutions are technically ready for Blended learning)*						
10.1	I have enough expertise and capability to use blended learning for teaching and learning					
10.2	Our University have a risks assessment plan to benchmark while using blended learning					
10.3	Lecturers in our faculty are willing to learn and acquire knowledge and skills relating blended learning					
10.4	Management clearly explains and communicate the need for IT changes					
Self-efficacy *(In this study this refers to personal ability to succeed while using blended learning)*						
11.1	I am confident I am able to use blended learning only if I get instructions to follow					
11.2	I can confidently use blended learning even though I have never used such a system before					
11.3	I am confident of using blended learning if I have just seen someone using it before trying it myself					
11.4	I am confident I will be able to use mobile banking even if I have no one around to show me how to do it					
Computer anxiety (*this refers to the individual fear or apprehension of using a computer directly or the anticipation of having to use it blended learning)*						

12.1	I feel relaxed when using the computer to carry out my activities					
12.2	I am confident I can use the computer to use blended learning for teaching and learning					
12.3	I have the ability and confidence in using the computer in my daily routine task at the work place					
Facilitating Conditions *(this refers to the expected support or facilitation while using blended learning)*						
13.1	I am confident I would use blended learning much better if it had university support					
13.2	I would use blended learning if there was substantial support available from the IT support services within my university					
13.3	My faculty has a policy to provide in-service training to support staff when using technology					
13.4	The university offers an individual development plan to support staff to improve on their skills					
Strategy *(this refers to the focal point to which effort must be applied to achieve given goals, and success)*						
14.1	Our university has a clear vision and mission statements that we follow when conducting our activities					
14.2	detailed goals and objectives					
14.3	action plans and scorecards to help you track your progress					

Structure *(this refers to the size, structural arrangement and hierarchy within an institutions needed for decision making)*						
15.1	We have enough capabilities and infrastructure to cover the size of our staff and learners when using technology for teaching and learning					
15.2	The structure in our university and/or faculty allows ICT directorate to support the different IT and network technicians					
15.3	In general our university has supported technology innovations					
15.4	The size of the learners we serve encourage us to succeed in using blended learning					
Academic work load *(this refers to the lecturers allocate teaching work for a semester)*						
16.1	My teaching workload enables me to have enough time to prepare online learning contents					
16.2	Preparing online content is part of my teaching workload					
16.3	We are compensated for the time spent preparing learning contents					
Environment (*this refers to the institution's surrounding influences including geographical location and political issues)*						
17.1	Our Internet and network is sufficient to enable me use blended learning systems					
17.2	Our university has policies that support the use of IT for teaching and learning					
17.3	Staff in my faculty are able afford the use of blended learning system					
17.4	We have enough and reliable infrastructural resources in place to support the use of blended learning					

17.5	Our university provides support to staff who does not know how to use blended learning					
Social influence *(The belief that people important to an individual expects him/her to use the system)*						
18.1	People who are important to me think that I should use blended learning					
18.2	People who influence my behaviour think I should use blended learning					
18.3	My friends / staff are helpful in the use of blended learning					
18.4	In general, the university supports the use of blended learning					
Individual Characteristics (*this refers to the individual preparedness to use blended learning*)						
19.1	I have enough and relevant skills to use blended learning					
19.2	My education background is strong enough to adapt any new technological innovation					
19.3	I have a positive attitude towards blended learning					
19.4	I have a positive belief that using blended learning will enable me to meet my goals in teaching learning of my learners					
19.5	I have confidence and leadership skills in interacting with learners					
Behaviour Intention *(for this study this refers to the motivational factors to support an individual's willingness to improve the of blended learning**)***						
20.1	I intend to use blended learning more often when interacting with my learners					
20.2	Intend to support the use of blended learning in working environment					
20.3	I intend to recommend other lecturers to use blended learning					

21. From your view, experience and perception how do you see the improvement of *blended learning* usage in your faculty?

ITEM	Extremely impossible	Impossible	Fairly possible	Possible	Highly possible
From the technological perspective					
From the management perspective					
From the individual perspective					

Thank you

Appendix 2: Ethics Committee Approval

Tshwane University of Technology
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Research Ethics Committee

The TUT Research Ethics Committee is a registered Institutional Review Board (IRB 00005968) with the US Office for Human Research Protections (IORG# 0004997) (Expires 14 Jan 2023). Also, it has Federal Wide Assurance for the Protection of Human Subjects for International Institutions (FWA 00011501). In South Africa it is registered with the National Health Research Ethics Council (REC-160509-21).

February 16, 2021

REC Ref #: REC2020/07/011
Name: Kgasi MR
Staff #:

Ms MR Kgasi
C/o Dr J Luomakoski
Department of End-User Computing
Faculty of Information And Communication Technology

Dear Ms Kgasi,

Decision: Final Approval

Research Team: Kgasi MR
Project title: *Improving Blended Learning Usage in South African Universities: A Case of Tshwane University of Technology*
Qualification: Master in Education Management, Haaga-Helia University of Applied Sciences
Supervisor: Dr J Luomakoski

Thank you for submitting the revised project documents for review by the Research Ethics Committee (REC), Tshwane University of Technology (TUT). In reviewing the documents, the comments and notes below are tabled for your consideration, attention and/or notification:

- **Permission Letters**
  - **Dean, Faculty of ICT.** The written permission from the ICT dean to access staff members in the Faculty of ICT is in order and duly noted.

- **Proposal**

  - **Data Collection Strategy.** The revised data collection strategy is in order and duly noted.

- **Information Leaflet & Informed Consent**

  - The revised information leaflet is in order and duly noted.

- **Questionnaire**

  - **General Information, (Section A)**. The revised questionnaire is in order and duly noted.

- **Memo of Revisions**

  - A Memo that outlines the clarifications and/or revised documents in which each of the required revisions are indicated together with the action/s taken to address it is in order and duly noted.

The chairperson of the Research Ethics Committee, Tshwane University of Technology, reviewed the revised project documents on 15 January 2021. **Final Approval** is granted to the study.

The proposed research project may now continue with the proviso that:

1) The researcher/s will conduct the study according to the procedures and methods indicated in the **approved proposal**, particularly in terms of any undertakings and/or assurances made regarding the confidentiality of the collected data.
2) The proposal will be submitted to the Committee for prospective ethical clearance if there are any substantial **deviations** and/or changes from the approved proposal.
3) The researcher/s will act within the parameters of any applicable **national legislation, professional codes of conduct**, institutional guidelines and scientific standards relevant to the specific field of study. Strict adherence to the following South African legislation, where applicable, is especially important: Protection of Personal Information Act (Act 4 of 2013), Children's Act (Act 38 of 2005) and the National Health Act (Act 61 of 2003).
4) The researcher will inform the REC as soon as possible of any **adverse events** involving research participants that may have occurred during the course of the study. It includes the actions and/or processes that were implemented to mitigate and/or prevent any further injuries and/or adverse outcomes.
5) The researcher will inform the REC of any **new or unexpected ethical issues** that may have emerged during the course of the study, as well as how these ethical issues were addressed. The researcher must consult with the REC for advice and/or guidance in any such event.

6) The current ethics approval expiry date for this project is **February 15, 2023**. No research activities may continue after the ethics approval expiry date. An application for the extension of ethics approval must be submitted for projects that need to continue beyond the expiry date.

Note:

The reference number [top right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants.

Yours sincerely,

H Mason (Dr)
Chairperson: Research Ethics Committee
[TUTRef#2020=07=011=KgasiMR]

Appendix 3: Faculty Permission to Collect Data

Wed 2020/09/23 02:53 PM
Marietjie Booysen <BooysenMC@tut.ac.za>
RE: TUT Research Ethics Committee - Kgasi MR (Master in Education Management, Haaga-Helia University of Applied Sciences)
To Mmamolefe Rosina Kgasi
Cc Maredi Mphahlele; Marietjie Booysen

Good afternoon Mmamolefe

I discussed your document with the Dean and he wishing you everything of the best. Please go ahead.

Kind regards

Marietjie Booysen
Office of the Executive Dean
Faculty of ICT
B12 - 186
Soshanguve South Campus
Tshwane University of Technology
Tel: 012 382 9689 / 9280
Fax: 012 382 9146

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Wed 2020/09/23 02:53 PM
Marietjie Booysen <BooysenMC@tut.ac.za>
RE: TUT Research Ethics Committee - Kgasi MR (Master in Education Management, Haaga-Helia University of Applied Sciences)
To Mmamolefe Rosina Kgasi
Cc Maredi Mphahlele; Marietjie Booysen

From: Mmamolefe Rosina Kgasi <KgasiMR@tut.ac.za>
Sent: Friday, September 18, 2020 9:05 AM
To: Maredi Mphahlele <MphahleleMI@tut.ac.za>
Cc: Etienne van Wyk <VanWykEA@tut.ac.za>; Agnieta Pretorius <PretoriusAB1@tut.ac.za>; Marietjie Booysen <BooysenMC@tut.ac.za>
Subject: FW: TUT Research Ethics Committee - Kgasi MR (Master in Education Management, Haaga-Helia University of Applied Sciences)
Importance: High

Good morning Prof

The purpose of this email is to seek permission to conduct research within the faculty. It is a requirement for Haaga Helia's Masters programme to write a thesis towards this qualification, my topic:

Improving Blended Learning Usage in South African Universities: A Case of Tshwane University of Technology (In the Faculty of ICT)

I am attaching my proposal together with the questionnaires.

We were initially informed that we can send our documents straight to TUT ethics committee, hence I did not submit to the faculty, my sincere apologies.

Looking forward to a favourable outcome.

Kind regards

Mmamolefe